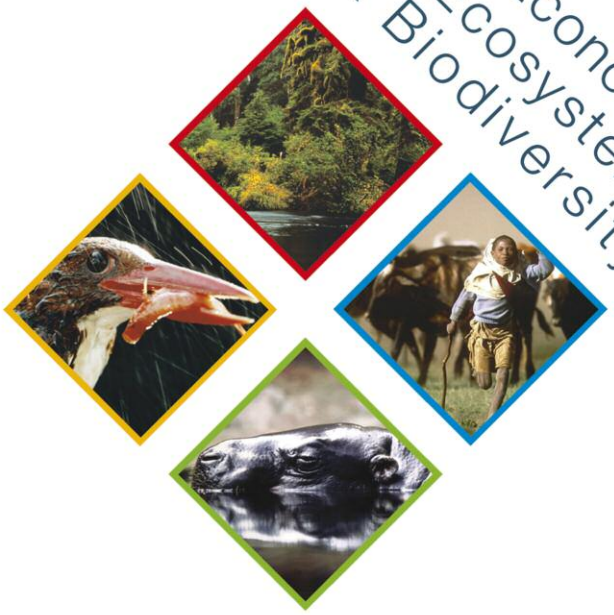
The Economics of Ecosystems & Biodiversity



Guidance Manual for TEEB Country Studies

VERSION 1.0

The Guidance Manual is an output of the "TEEB National Implemention Project: Reflecting the Value of Ecosystems and Biodiversity in Policymaking" which is financially supported by the European Commission. The project is a response to the interest and demand expressed by developing countries, including Least Developed Countries, to build national, regional and local government capacity to produce tailored economic assessments of ecosystems and biodiversity and support the mainstreaming of this information in policymaking. The heart of the project will be the implementation of TEEB projects in five developing countries (Africa, Asia and Latin America and the Caribbean) pursuant to the Guidance Manual for TEEB Country Studies. UNEP would like to thank the European Commission for its generous support for implementing the TEEB initiative.

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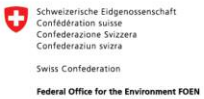

Guidance Manual for TEEB Country Studies VERSION 1.0

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WHAT IS THIS MANUAL ABOUT AND HOW TO USE IT

Since the release of TEEB's suite of final reports at the UN-CBD meeting at Nagoya, Japan, October 2010, over twenty-five countries have expressed interest in conducting national 'TEEB' studies, and several have already begun. These country-level studies will focus on evaluating national policy priorities in terms of their ecosystem service dependencies and impacts, identify and value important ecosystem services and natural areas that deliver them, and propose changes in policies and mechanisms that address national priorities and ecosystem service losses. There is considerable need for guidance for all these studies – in terms of process, organization, scope, policy contexts, valuation frameworks, methodologies, and typical solutions – the Guidance Manual for TEEB Country Studies seeks to meet these needs. Furthermore, this guidance manual can help to ensure that a national TEEB study is conducted following best-of-breed principles and reflecting best available expertise on the subject. This document is therefore designed to provide:

1. An overview of what TEEB is about and how the approach could be used by countries interested in conducting a TEEB country study (TCS).
2. Practical information on scoping to identify (a) what studies should be done and (b) how to set up the process of conducting a TEEB country study.
3. Step by step guidance on how to apply the TEEB approach for conducting a country level study with a firm foundation in the country's policy priorities.
4. Guidance on how to communicate the results, implement the policy recommendations at the practical level and support possible follow-up initiatives to the study.
5. Guidance on the process to follow in order to get the TCS peer reviewed and endorsed by the Advisory Board of the international TEEB initiative as a formal "TEEB Country Study".
6. An extensive list of references and links to other useful guidance.

In addition the TCS guidance webpage (www.teebweb.org/teeb-implementation/national-studies/) provides examples of elements from other TEEB country studies (scoping, TORs, stakeholder involvement, etc.).

For whom is this manual written?

This manual is designed for anyone who is considering or currently undertaking a TEEB country study (TCS). Its purpose is to provide guidance throughout the entire TCS cycle, from initiation, to the actual policy analysis and ecosystem service valuations, to communicating findings, to following up and applying results. Ideally, this manual lies on the desk of those in charge of conducting the study and proves useful throughout the process and whenever problems arise. The discussion of each phase is supported with examples of the experiences of countries who have already been engaged with some level of the TCS process, and provides guidance on best practises in assessing, valuing and mainstreaming biodiversity, ecosystems and their services. The manual is intended to be a 'lean' guide and accordingly, provides links and references that can be utilised by the reader where needed. The manual is not intended to be prescriptive but rather provides directions and guidelines for TEEB implementation, which must be adapted according to the specific circumstances and objectives of the country. It also outlines the quality and completeness criteria for such a study to become formally endorsed as a "TEEB Country Study" by the Advisory Board of the international TEEB initiative.

This is the first version of the manual, which we hope will be widely applied and tested in practice. We are most grateful for comments, suggestions and further examples, please contact TCS guidance webpage for more information. This is a 'living document' and will be updated as required based on the experience of countries.

LIST OF ACRONYMS

ABS:	Access and Benefit Sharing
BES:	Biodiversity and Ecosystem Services
CBA:	Cost-Benefit Analysis
CBD:	Convention on Biological Diversity
CEO:	Chief Executive Officer
COP:	Conference of the Parties
CSO:	Civil Society Organization
EIA:	Environmental Impact Assessment
ES:	Ecosystem Service
GDP:	Gross Domestic Product
GIZ:	German Agency for International Cooperation
IPBES:	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
MA:	Millennium Ecosystem Assessment
MAES:	Mapping and Assessment of Ecosystems and their Services
MET:	The Ministry of Environment and Tourism
MMA:	Brazilian Ministry of the Environment
NBSAP:	National biodiversity strategy and action plan
NEA:	National Ecosystem Assessment
NPV:	Net Present Value
NTRSA:	National Treasury of the Republic of South Africa
PES:	Payments for Ecosystem Services
SAM:	Social Accounting Matrix
SEA:	Strategic Environmental Assessment
SEEA:	System of Environmental-Economic Accounting
SGA:	Sub-Global Assessment Network
SNA:	System of National Accounts
TCS:	TEEB country study
TEEB:	The Economics of Ecosystems and Biodiversity
TEV:	Total Economic Value
ToR:	Terms of Reference
UK-NEA:	UK National Ecosystem Assessment
UNCCD:	United Nations Convention to Combat Desertification
UNCEEA:	United Nations Committee of Experts on Environmental-Economic Accounting
UNCSD:	United Nations Conference on Sustainable Development
UNFCCC:	United Nations Framework Convention on Climate Change
UNPEI:	“United Nations Poverty Environment Initiative” UNDP-UNEP partnership
WAVES:	Wealth Accounting and the Valuation of Ecosystem Services

Guidance Manual for TEEB Country Studies

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Chapter 1:
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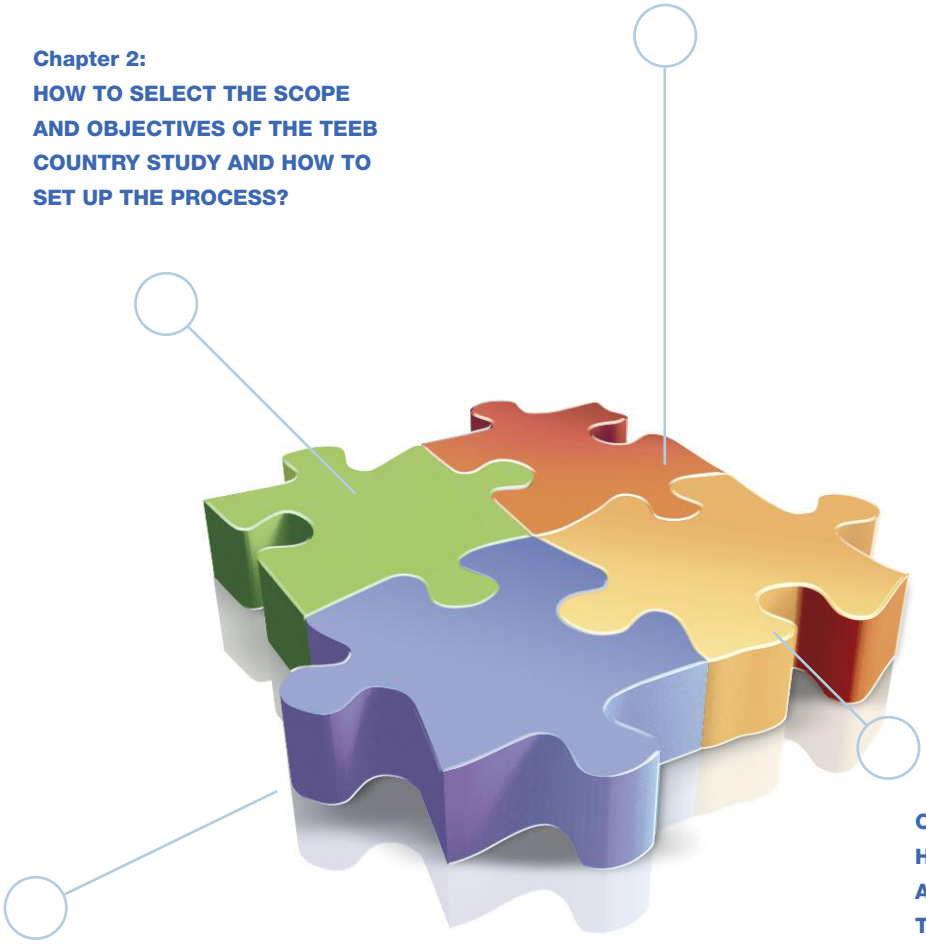
Chapter 2:
HOW TO SELECT THE SCOPE AND OBJECTIVES OF THE TEEB COUNTRY STUDY AND HOW TO SET UP THE PROCESS?



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Chapter 3:
MAIN STUDY PHASE

KEY MESSAGES

Ch. 1	• Before beginning a TEEB country study (TCS), make sure that you understand the concept of TEEB and the motivations of adding an economic perspective to the debate on biodiversity. • Discuss and identify the added value of a TEEB study in your country. • Before beginning a TCS get an overview of on-going related policy initiatives.
Ch. 2	• There are many different starting points: TEEB country study should be tailored to the national context and its needs! • Use policy makers' priorities and questions as starting point for identifying objectives of the TCS to ensure it is relevant and meets the needs of at least one group of decision makers. • Carefully balance roles and responsibilities of different groups and bodies to achieve a credible and relevant result. Try to involve all potentially relevant actors in adequate roles. It is essential that your TEEB country study engages stakeholders and addresses their needs. • The early engagement of stakeholders will encourage a demand-driven process and the uptake of results, or at least ensure support to the TCS. • It is important to achieve a balanced involvement of stakeholder groups.
Ch. 3 ***Step 1***	• Only proceed once you are absolutely clear on objectives even if this takes more time and effort than anticipated. • Be aware that while the stepwise approach should be useful to structure the activities, study processes will seldom be completely sequential or linear. Steps will overlap and may include feed-back loops. • From the outset, ensure including all relevant perspectives (e.g., of different stakeholders: national & local policy makers, local communities, civil society organisation (CSO) and business).
Step 2	• First, systematically consider all ecosystem services in order to ensure that no important services are overlooked and then focus on the most relevant ones for analysis. • Stakeholder inputs and adequate natural science expertise are indispensable in understanding aspects such as drivers of degradation, dependencies on ecosystems and vulnerability to change.
Step 3	• The issues at hand or objectives of the TEEB country study determine the information and further analyses needed and the adequate methods. • Carefully select models, parameters, assumptions, time horizons, scope and scale of studies according to the purpose of the analysis and target audience.
Step 4	• Bear in mind that biophysical information forms the basis for the generation of associated socio-economic value data or information. • Carefully consider when economic valuation is useful and what statements regarding economic value are appropriate (e.g., related to different choices or scenarios). In most cases marginal values are preferable to total values. • Trade-offs and synergies between different ES need to be made explicit. • Dealing with current and intergenerational distributional issues is an indispensable aspect of ES assessment.
Step 5	• Choose policy options with care, giving preference to those that are most likely to achieve the desired outcomes within the broad confines of existing policy, governance and institutional frameworks. • Outline the pros and cons or implications of potential policy options, their relevance for the different perspectives identified in Step 1. • Be an 'honest broker': Avoid one-sided lobbying for a particular policy option and ensure that the distributional implications and trade-offs associated with policy options are comprehensively considered.
Step 6	• Use reviewers from different stakeholder groups, including those in academia and in practical policy formulation and implementation. • Be aware of and communicate appropriately what the study has not taken into account, and where it may be partial or have its limitations. • Present and communicate study results in a way that the target audience will understand (see section 4).
Ch. 4	• Connect with on-going policy debates for translating study results into relevant arguments. • Revise the stakeholder engagement that was started in Phase 2 to ensure that all those who may be interested in the results are included, even if they have not been involved in the TCS process. • Communicate the results in ways that are relevant and engaging for different audiences. • Think beyond the end of the TCS, both for taking its recommendations forward and for continuing the research and engagement process it set in motion.

1 What is TEEB and how does it integrate into the Policy Landscape?

1.1	Understand TEEB
1.2	Identify your reasons for doing a TEEB country study
1.3	Identify TEEB-related processes and decide whether to do a TCS in this context

1.1 Understand TEEB

Key Message

- Before beginning a TEEB Country Study (TCS),ensure you understand the concept of TEEB and the motivations of adding an economic perspective to the debate on biodiversity.

The Economics of Ecosystems and Biodiversity (TEEB) is an international initiative to draw attention to the benefits provided by biodiversity (encompassing ecosystems, species and genes). It has compiled and synthesized the available evidence to highlight the values of biodiversity and ecosystem services, the growing costs of biodiversity loss and ecosystem degradation, and the benefits of action addressing these pressures.

TEEB presents an approach that can help decision makers recognize, demonstrate and, where appropriate, capture the values of ecosystems and biodiversity (TEEB Synthesis, summarized in Box 1.4 below). TEEB acknowledges the plurality of values (including monetary, non monetary, ethical, aesthetic) which people hold for nature. Illustrated through the broad compilation of numerous country examples, TEEB illustrates many different options for better incorporating nature's values in decision making: the objective of TEEB is to highlight the importance of sustainable use and conservation of nature rather than reducing it to a commodity.

TEEB aims to mainstream ecosystem services into policy making, it highlights ways to 'work with nature' to meet specific policy priorities for a country. As such, it provides more a philosophy or 'a way of thinking' than an expert-driven, one-size-fits-all approach. It should therefore be seen as an inspiration and as an invitation for others to deepen their findings and to develop more context specific recommendations. In no way does TEEB prescribe a certain valuation method or policy instrument, but its scope is kept intentionally broad to be adaptable to national circumstances and priorities.

The importance of ecosystem services, a concept that focuses on the benefits of nature to people, society and the economy (i.e. an anthropocentric view of the importance of biodiversity), needs to be seen together with the intrinsic value of biodiversity – the value of biodiversity for its own sake. Furthermore, the values of nature vary according to local biophysical and ecological conditions as well as the social, economic, and cultural context. Intangible values, such as cultural values, which may be reflected in society's willingness to conserve particular species or landscapes, or to protect common resources, must be considered alongside more tangible values such as those for food or timber to provide a complete picture. The aim of TEEB is to provide a bridge between the multi-disciplinary science of biodiversity and the arena of international and national policy as well as local government and business practices. Ideally, TEEB will act as a catalyst to help accelerate the development of a new economy: one in which the values of nature are fully reflected in public and private decision-making.

The recommendations of the international TEEB Study cover a broad range of issues, where an economic perspective can help to address biodiversity loss (for a complete version see TEEB Synthesis, Ch. 4):

1. **Make nature's values visible** – e.g. by assessing and communicating the role of biodiversity and ecosystem services in the economy and to society.
2. **Assess the value of ecosystem services and integrate these into decision making** – to improving the evidence base for decisions.
3. **Account for risks and uncertainty** – e.g. by under standing them and applying safe minimum standards or precautionary principles.
4. **Value the future** – by looking at sufficiently long timescales to account for future generations and making explicit the costs and benefits of decisions and policies using different discount rates.
5. **Measure better to manage better** – investing in improved biodiversity and ecosystem service indicators, mapping and assessments, and national accounts that take account of the roles and value of nature.

6. **Work with nature for poverty reduction** – identify synergies between nature, livelihoods and wellbeing, and target investment in public goods. Human dependence on ecosystem services and particularly their role as a lifeline for many poor households needs to be more fully integrated into policy, strategies and implementation.
7. **Encourage corporate disclosure** that goes beyond the bottom line and encourage due action and compensation for adverse impacts that cannot be avoided – ensure 'no net loss', including through in-kind compensation ('offsets'), aim for 'net positive impact' and disclose externalities and liabilities.
8. **Change the incentives** – reform of market signals (subsidies, full cost pricing, taxes and charges, fees and fines) as well as property rights, liability regimes, consumer information and other measures can green the supply chain, stimulate private investment in conservation and sustainable use.
9. **Designate, manage and invest in protected areas** – to ensure a comprehensive, representatives, effective and equitably managed network. Protected areas offer value for money.
10. **Invest in ecological infrastructure** – to support climate change mitigation and adaptation, water security and other policy goals.
11. **Mainstream the economics of nature** – into different ministries, sectors and associated policies e. g. in economy and finance, trade and development, transport, energy and mining, agriculture, fisheries, forestry, planning and water.

Implementing the eleven TEEB recommendations is about understanding the importance of nature, taking account of nature's values in decision making (policy, planning, permitting, investment, purchasing) in implementation and enforcement. On a broader level, it should be noted that the path to fully achieve the recommendations requires a wider paradigm shift. For more information, see the TEEB report - Nature and its Role in the Transition to a Green Economy (Ten Brink et al. 2012). To achieve a transition to a sustainable future will also require institutional changes as well as evolving cultural values and norms to be reflected in decision making.

The issues addressed within TEEB are proving relevant for global, regional, national and local policy platforms – including CBD, IPBES, UNFCCC, UNCCD and UNCSD. The Strategic Plan for Biodiversity 2011-2020, particular Aichi Biodiversity Target 2 includes commitments to understand and integrate the values of nature in accounting, planning, strategies and reporting processes (CBD 2010).

Box 1.1: TEEB Reports and the role of UNEP TEEB office

The launch of the Interim Report at COP 9 in May 2008 stimulated further interest in the TEEB initiative and led to calls for additional economic analysis and the production of a series of reports focussing on the needs of specific stakeholders. The TEEB initiative responded to the call for additional analysis by producing, in its 'Phase II', the following:

1. TEEB Ecological and Economic Foundations (Foundations or FND) summarizes the fundamental ecological and economic concepts and state-of-the-art methodologies for economic valuation of biodiversity and ecosystem services;
2. TEEB for National and International Policy Makers (National or NAT) provides analysis and guidance on how to incorporate biodiversity and ecosystem values in policy decisions and accounting;
3. TEEB for Local and Regional Policy Makers (Local or LCL) provides analysis and guidance for mainstreaming biodiversity and ecosystem services at regional and local levels, copiously illustrated with case study examples;
4. TEEB in Business and Enterprise (Business or BIS) provides analysis and guidance on how business and enterprise can identify and manage their biodiversity and ecosystem risks and opportunities.
5. Mainstreaming the Economics of Nature (Synthesis or SYN) provides a synthesis of the approach, conclusions and recommendations of TEEB.

For a short summary of the five main TEEB reports see the TEEB Synthesis report.

The TEEB reports were consecutively launched at specifically selected events from November 2009 until the tenth meeting of the Conference of the Parties to the Convention on Biological Diversity (CBD COP-10) in Nagoya, Japan, where the Synthesis report was presented. The four main volumes were also published as books by Earthscan/Routledge from 2010-2012.
In addition, a website www.teeb4me.com was developed to reach citizens and encourage viral spread of TEEB ideas and concepts.
TEEBcases: Examples from across the globe that illustrate how ecosystem services have already been taken into account in local/regional policy making (www.teebweb.org/resources/teeb-case-studies/).
In 2009, a TEEB Climate Issues Update was published to show how climate change and biodiversity are inextricably linked and how investments in the restoration and conservation of our planet's ecosystems, valued at several trillion dollars, can play a major role in combating climate change.
As part of the TEEB Implementation phase ('Phase III'), a number of studies have been completed or are currently underway that will build on initial findings to provide a deeper analysis of specific sectors and biomes, specifically on Cities, Water & Wetlands (WW) (completed) and Oceans & Coasts (on going).
The nature and its Role in the Green Economy report looks at how nature and natural capital contribute to a green economy, both in terms of the benefits provided to society by maintaining nature as well as the losses avoided by conserving and rehabilitating natural capital.
All reports can be downloaded at: http://www.teebweb.org/publications/ many of them have been translated into different languages

The role of UNEP TEEB Office

- developing guidance and training material
- keeping track of national TEEB initiatives
- guiding initiatives via TEEB network of experts
- connecting projects to each other (exchange of expertise and success stories) and funding options
- providing a platform to present national and sub-national TEEB projects (workshops, TEEBrief, website)
- national, regional and local capacity building
- organizing official TEEB country study review process
- providing – where possible – technical assistance (e.g. support with writing of project proposals; review of local, national and regional TEEB draft outputs)

1.2 Identify your reasons for doing a TEEB country study

Key Message

• Discuss and identify the added value of a TEEB study in your country.

Undertaking a TCS can help answer a number of the following questions. At this stage, you should identify whether these correspond to what you intend to do:

- **What is the natural capital in your country and what is driving change?** This could look at what the stock and state of natural capital is, what changes and pressures are influencing it (e.g. economic signals including subsidies and prices, information gaps, consumption and production, illegal activities), as well as identify the importance of nature and its ecosystem services, so that opportunities to better manage natural capital can be considered and policy priorities met (see Box 1.2 for discussion of natural wealth or natural capital).

- **Do we measure and understand our natural capital?** This could explore to what extent biodiversity and ecosystem indicators exist to measure natural capital, the extent to which accounts reflect biodiversity, and to identify the gaps that are worthy of attention - this would improve the evidence base for decision making. This exercise can build on efforts to establish and harmonize biodiversity indicators by the Biodiversity Indicators Partnership (BIP) and the UNEP Green Economy Initiative (UNEP 2012a).

- **To what extent are the values of nature integrated in decision making?** This could identify where there is already good integration, where there are opportunities, where there are conflicts and hence needs for mainstreaming. This can support good governance, policy coherence and decision-making at all levels, leading to better and more sustainable investment, land use decisions, procurement and consumption choices.

- **What are issues that need policy attention?** Which environmental (and also social and economic) challenges need prioritised national policy attention (such as: freshwater availability; desertification avoidance; sustainable rural livelihoods; soil fertility & agricultural productivity; eco-tourism potential; and many others).– identifying synergies (e.g. win-wins between biodiversity and supply of clean water) as well as critical trade-offs (e.g. more agricultural land vs. maintenance of primary forests, mineral extraction vs. world heritage site). This can include analysing the private and public value of biodiversity to different stakeholder groups, the need to improve incentive structures, governance, institutional engagement and participation, develop indicators and accounts to monitor changes to physical, natural, human, and social capital.

- **What are the policy tools and decision options that offer solutions?** Identify opportunities and describe policy tools to further increase nature's contribution to well-being and livelihoods. This could include not only an examination of policy tools and identification of those that are interesting to look at further, but also a first assessment investigating potentially what benefits they offer at what cost (including likely winners and losers). The probability of results being used is greatly enhanced by ensuring results are policy relevant but not policy prescriptive.

The particular selection of questions to focus on will be country dependent. Similarly, the choice of geographic scope, for example which biomes (e.g. forests, coral reefs), areas (e.g. specific coastal zones, river basins, cities or regions), sectors and environmental issue, as well as the depth of coverage will be country specific.

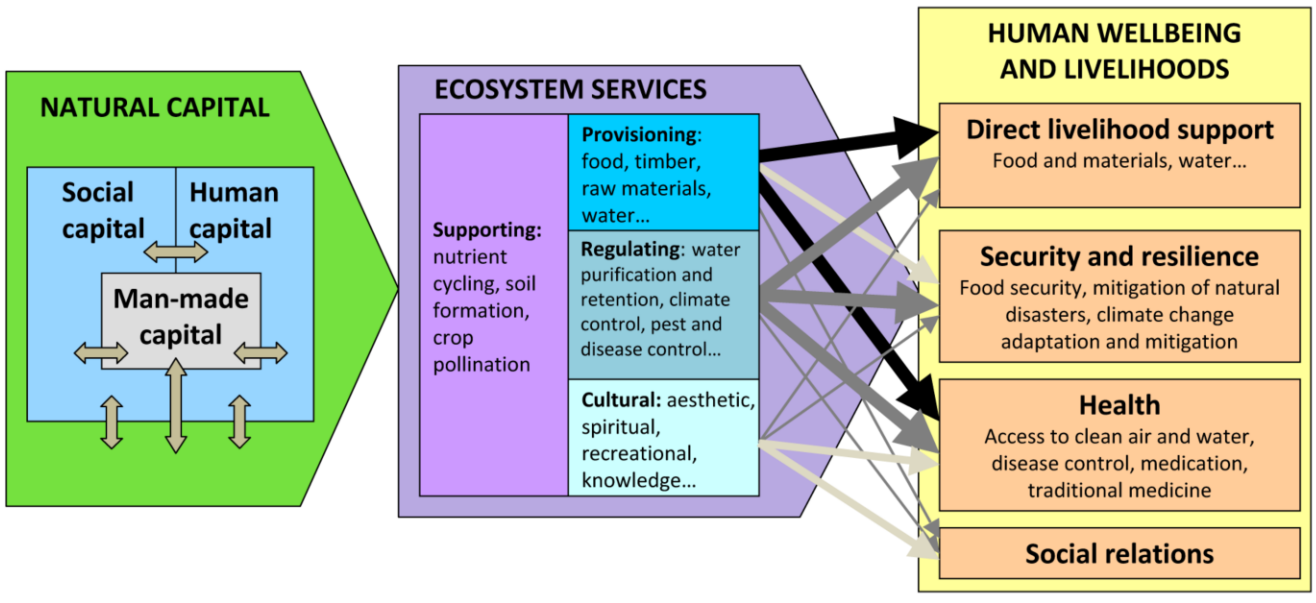
Typically, countries will not focus on all five questions raised above in a TEEB study. Some countries might choose to first conduct a scoping study to determine the appropriate focus whilst others may already have a clear objective that can define TEEB scope and focus (see Chapter 2 for scoping). Some may choose to focus on short term objectives, and others to build a basis for longer term sustainability. It may not be feasible or desirable to address all the above questions, all ecosystem services and all regions in the country.

Box 1.2: Natural Capital – Natural Wealth

Nature is more than 'natural capital' as it has not just value and importance for people, society and the economy, but also has intrinsic value, and roles and functions for other species. Natural capital can be a useful concept to communicate the value or benefits of nature to mankind. Nature, in providing a series of benefits to society and the economy, can be understood as doing so through service flows generated by stocks of natural assets, which are increasingly being referred to as 'natural capital'.

Building on the representation of the relationship between ecosystem services and human well-being developed in the context of the Millennium Ecosystem Assessment (2005), Figure 1.1 below depicts the role of natural capital in this process. The flow of ecosystem services – provisioning, regulating and cultural services – can provide direct and indirect support for livelihoods (food, materials, water, jobs), security and resilience (food, climate, and natural disasters), health (via clean water, disease control and medicines) and community well-being. Natural capital plays an essential role in the provision of these services as it underpins both the functioning of ecosystems, as well as other forms of capital (manufactured, human and social capital). In this context, it is important to note that it is societal choices which determine the investment/ disinvestment decisions on natural capital (and other forms of capital). There is also a 'critical' natural capital: if this is deteriorated radical undesired changes of ecosystems (such as crossed thresholds, tipping points and nonlinearities) may occur. Owing to the complexity and uncertainty of ecosystems it is not always possible to identify which natural capital is 'critical'.

Figure 1.1: Contribution of natural capital to human well-being and livelihoods



Source: Own representation, building on Laure Ledoux in ten Brink et al. 2012 and MA (2005) www.maweb.org/en/index.aspx and TEEB National.
Key: as in the MA 2005, the colour of the arrows presents the potential for mediation by socioeconomic factors (i.e. substitutability): the darker the arrow the more opportunities for substitution. A light colour implies less potential for substitution. The arrow's width presents the Intensity of linkages between ecosystem services and human well-being.

TEEB experience to date indicates that including a wide range of stakeholders and making the study process accessible, i.e. adopting an 'open architecture', can offer significant added value to the process and its results. Similarly, an inclusive analysis i.e. ensuring adequate focus on distributive impacts, which also keeps public goods aspects in clear focus will help provide a fuller picture and evidence base for decision makers.

What might policy makers find interesting from a TEEB country study?

As many policy makers are not primarily concerned with environmental issues in general and biodiversity policy in particular, many of them are not aware how a better consideration of nature can help to achieve other policy goals as well (further illustration and examples can be found in the TEEB chapters cited). It is therefore important from the beginning of the study to explain the added value of TEEB to these stakeholders. A TCS can help to:

- **Understand the social impacts and dependencies** on biodiversity and ecosystem services (BES), for instance, for poverty reduction strategies and job creation (TEEB National, Ch. 10; TEEB Local, Ch. 1).

- **Identify how ecosystem services** can help enhance and develop sectoral policies (e.g., energy policy, water resource management, flood prevention, etc.). It can identify win-win opportunities that help save public funds. It can also help identify trade-offs in decision-making, i.e. who benefits and who loses and hence support initiatives for reform (TEEB National, Ch. 9; TEEB Local, Ch. 4 & 5).

- **Contribute to achieve conservation policy**, and also other policies, such as water management in a more cost-effective way.

- **Create an evidence base to support Natural Capital Accounting** (see Box 1.4).

- Integrate biodiversity and ES into spatial and development planning and identify high potential areas for water, or soil protection but also for natural hazard prevention like flooding and landslides (local, subnational, national) (TEEB Local, Ch. 6).

- **Comply with agreements and policy obligations** (e.g. CBD National Biodiversity Strategies and Action Plans (NBSAPs), or improve their impact (e.g. broadening the scope of Strategic Environmental Assessment (SEA) and Environmental Impact Assessment (EIA), for instance by including the identification of potential returns on natural capital) (TEEB Local, Ch. 6).

- **Achieve added clarity on impacts and dependencies on BES** of different industry sectors to inform both regulation and cooperation with industry see Box 1.3 (TEEB National, Ch. 4; TEEB Business, Ch. 2 & 3).

- **Support commitment to identify, reduce, reform, and/or remove environmental harmful subsidies and pricing** to give positive incentives and avoid negative incentives and hence reduce pressures on the environment and liberate funds for other uses. (TEEB National, Ch. 6)

- **Create an evidence base to facilitate protected area financing**, and other important conservation objectives as well as investment in green infrastructure. (TEEB National, Ch. 8 & 9; TEEB Local, Ch.7)

- **Help raise public awareness** of the roles and importance of nature for society which can create support for future policy initiatives.

Box 1.3 TEEB for Business

A TEEB for Business study examines key sectors and businesses, studies the dependencies and impacts of the chosen sector/ business on biodiversity and ecosystem services, and recommends policies to address the risks and opportunities posed by these dependencies and impacts.

While a TEEB for Business study can be a deliverable of a TCS, the scope in terms of sectors/businesses, should be defined during the scoping phase of the TCS. A TEEB for Business study must not be separated from the overall policy priorities of the country.

In all of these cases, recognizing, demonstrating and capturing values (see Box 1.4) can help improve the incentives and signals for economic and wider societal choices regarding biodiversity and help maintain and enhance its contribution to human well-being.

Box 1.4: TEEB follows a tiered approach to analysing and structuring valuation, as set out below:

All human societies and communities have **recognized many of the values** of ecosystems, landscapes, species and other aspects of biodiversity – for example, through sacred sites, protected areas and through community stewardship of natural resources. Often, however, the values of nature are not recognised, and where they are there can be incompatibilities in the way different actors recognise and take into account these values in their actions. What is in practice recognized as being important in the current decision-making processes and institutional framework often overlooks the value of nature and as a result much of nature is being lost or degraded. When considering environmental challenges, it is useful to identify and assess the full range of ecosystem services affected and the implications for different groups in society – in some cases this recognition is sufficient to create norms, policies or legislations for conserving nature.

Estimate and demonstrate the value of ecosystem services using appropriate methods. Analyse the linkages over scale and time that affect when and where the costs and benefits of particular uses of biodiversity and ecosystems occur (e.g. local to global, current use versus future resilience 'upstream to downstream', urban to rural), to demonstrate the value and help frame the distributive impacts of decisions. Note that it is often neither possible nor desirable to carry out a cost-benefit-analysis– as discussed in Ch. 5 of TEEB Foundations, as well as in Wegner and Pascual (2011). The values of ecosystem services can be represented by a range of metrics. In some cases, qualitative indicators are the only possibility and indeed sometimes already sufficient to inform the decision (e.g. stakeholder views on cultural or spiritual importance of a site). In others cases quantitative insights are available and appropriate (e.g. number of households benefitting from the provision of clean water). While in yet other cases monetary terms can prove useful (e.g. economic savings from avoided soil erosion, or value of carbon storage; communicating with Ministries of Finance and Economics).

Capture the value of ecosystem services and seek solutions to integrate the value in decision making. There are a broad range of tools to take account of the values of nature; these may include regulation and land use planning, changes in subsidies and fiscal incentives, charging for access and use, payments for ecosystem services, targeting biodiversity in poverty reduction and climate adaptation/mitigation strategies, creation and strengthening of property rights and liability, voluntary eco-labelling and certification. The choice of tools will depend on context and take into account the costs of implementation.

In some cases the values of nature have already been recognized, demonstrated and indeed captured – for example in designated protected areas. Capturing values is about rewarding good stewardship and avoiding damage and unsustainable use. It does not have to be about 'market' solutions and should always consider social impacts (e.g. communities affected by permit and associated land-use decision or use of genetic materials, protected area zoning and property rights, investment and production decisions). A particularly important aspect of demonstrating value is to highlight the importance of public goods and public values (e.g. freshwater provision, climate regulation, landscape values) and ensure that these are fully accounted for in any analysis of land-use or wider resource use decisions – as often the wider public (e.g. citizens and communities) will have a less well organized and less effective voice than private interests. Having a fuller evidence base can inform decisions regarding appropriate governance and stewardship of resources and on permits, property, use and community access rights and privatisation.

1.3 Identify TEEB-related processes and decide whether to do a TCS in this context

Key Message

- Before beginning a TEEB country study (TCS) obtain an overview of on-going related policy initiatives.

While the main focus of a TCS should be relating to national policy priorities, as further outlined in Chapter 2, there are a number of global and national processes, initiatives and projects looking to improve the understanding of nature's role in the economy and society besides TEEB. Several are highlighted in Table 1.1 below. These are generally mutually supportive processes and initiatives, but it is important to ensure that synergies are used and duplications avoided.

Where there are existing processes other than TEEB already on-going, it will be useful to explore whether there remain issues of importance to the government not covered by these other processes to identify where and how a TEEB approach can offer added value, a TCS might also build on information generated by related processes and place them into a more encompassing or more specific framework (e.g. provide a broad overview on the importance of biodiversity and ecosystem services in a country or compile specific evidence for an improvement of a specific policy, like water management). Where there is no existing or extensive commitment to other processes yet, launching a TCS could help provide answers to these issues as well. Thus the initiation of a TCS can also be a starting point to engage in natural capital accounting or create an evidence base to contribute to NBSAP revision, for example.

The benefits of a TEEB process to the country depend on the state of the environment, pressures, state of knowledge and governance of nature in the country. Which benefits will be greatest for the country will similarly depend on context as well as the country's decision over which questions the TEEB country study will focus most on. Identifying nationally relevant policy questions is addressed in the process of scoping discussed in Chapter 2.

Key references:

Chenery A., H. Booth, C. Secades, L. Mazza, C. Brown and P. ten Brink (2013) Roadmap for incorporating Biodiversity and Ecosystem Service Values into National Biodiversity Strategies and Action Plans (NBSAPs), a report prepared by UNEP-WCMC and IEEP with financial support from Defra.

Chenery A., H. Booth, C. Secades, L. Mazza, C. Brown and P. ten Brink (2013) Guidance for incorporating Biodiversity and Ecosystem Service Values into National Biodiversity Strategies and Action Plans (NBSAPs), a report prepared by UNEP-WCMC and IEEP with financial support from Defra.

Table 1.1: Related efforts and processes and their link to TEEB

Name	Description	Link to TEEB
Wealth Accounting and the Valuation of Ecosystem Services (WAVES), facilitated by the World Bank	WAVES is a global partnership that aims to promote sustainable development and brings together a broad coalition of UN agencies, governments, international institutes and NGOs.	TEEB encourages engagement in WAVES, which was in part catalysed by TEEB. WAVES recognizes and reflects the importance of natural capital in national accounts. For further details see Annex 1.1 (Box on Waves, TEEB and SEEA)
System of Experimental Ecosystem Accounting (SEEA), (coordinated by the UN Statistics Division)	SEEA provides the statistical standard for measuring the environment and its relationship to economic and human activity. The SEEA Central Framework organizes environmental information in a systems approach of stocks and flows and integrates environmental data in physical and monetary terms with economic data.	TEEB called for the development of natural capital accounts (see CH. 4 in TEEB National, TEEB Foundations and TEEB Synthesis) and continues to do so. TCS are driven by national policy priorities, and among those is to recognize and reflect the importance of natural capital in national accounts.
Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)	IPBES provides a mechanism recognized by both the scientific and policy communities to synthesize, review, assess and critically evaluate relevant BES information and knowledge generated worldwide by experts from governments, academia, scientific organizations, NGOs and indigenous communities.	TEEB has the potential to contribute substantively to all four functions identified for IPBES in the Busan outcome as well as many of the potential activities identified in the working document on possible elements of the work programme.
National biodiversity strategy and action plan (NBSAP)	National Biodiversity Strategies and Action Plans (NBSAPs) are the principal instruments for implementing the CBD at the national level (Art. 6). The CBD requires countries to prepare an NBSAP and to ensure that this strategy is mainstreamed into the planning and activities of all those sectors whose activities can have an impact (positive and negative) on biodiversity.	TEEB is an important partner in implementing the CBD programme of work on incentive measures, and in particular its work on valuation. TEEB is particularly relevant to the revision and review or update of NBSAPs in light of the new Strategic Plan for Biodiversity 2011-2020 (decision X/2, paragraph 3 (c)), particularly Aichi targets 2 & 3. See Annex 1.2.
Ecosystem assessments, Sub-Global Assessment (SGA) Network	The SGA Network seeks to create a common platform for practitioners (individuals and organizations) involved in ecosystem assessment at regional, sub-regional, national and sub-national levels. The intention is to promote and facilitate improved capacity in undertaking and using assessments.	Practitioners involved in ecosystem assessments are increasingly expressing an interest in including an economic component to the primarily biophysical assessments. SGA work can inform a TCS. Vice versa, TEEB can add an economic dimension to existing ecosystem services assessments.

EU working Group on Mapping and Assessment of Ecosystems and their Services (MAES)	Action 5 is one of the key actions of the EU Biodiversity Strategy to 2020 (EC 2011). It states that "Member States, … , will map and assess the state of ecosystems and their service, … and incorporate the values into nationnal accounting". The results from this work will be used to inform policy decisions and policy implementation in many policy areas dependent on ecosystems and their services.	Some European countries have started TCS and might build on these when fulfilling their obligations regarding Action 5, others may choose to extend the mapping and value accounting with further TEEB related topics later.
UNEP Green Economy Initiative (UNEP-GEI)	UNEP-GEI's overall goal is to provide analysis and policy support for investing in green economy sectors.	The GE report highlights that a green economy recognizes and invests in the value of nature capital. The report highlights the economic invisibility of ecosystem services as a major cause of its mismanagement and degradation. In this sense, TEEB studies can contribute towards a green economy transition.
UNDP-UNEP Poverty-Environment Initiative (PEI)	The PEI is a joint UNDP-UNEP project to support country led efforts in mainstreaming the linkages between poverty and environment into national development policy and planning.	UNDP-UNEP PEI and TEEB are compatible initiatives with strong synergies as they both aim at mainstreaming the environment into development policy making (TEEB having a stronger focus on BES).
The Biodiversity Finance Initiative (BIOFIN)	Objectives: 1. Policy and institutional review related to biodiversity finance, with a biodiversity expenditure review 2. Assessment of the costs (needs and gaps) of achieving national biodiversity conservation/management goals NBSAP targets). 3. Assessment of potential financing mechanisms and related institutional/ governance needs.	Both, BIOFIN and TEEB will work on the mainstreaming of biodiversity and ecosystem services into decision-making and development planning; should closely liaise during national engagement processes to ensure consistency, avoid duplication and use synergies.
The Economics of Land Degradation (ELD)	ELD is an initiative for a global study inspired by TEEB on the economic benefits of land and land based ecosystems. The initiative highlights the value of sustainable land management and provides a global approach for analysis of the economics of land degradation.	Similar to TEEB ELD is trying to make economics of land degradation an integral part of policy strategies and decision making by increasing the political and public awareness of the costs and benefits of land and land-based ecosystems. For countries dealing with the issue of land degradation ELD is highly relevant.

2 How to select the scope and objectives of the TEEB country study and how to set up the process?

2.1 Outputs of the scoping phase

2.2 Identifying the thematic focus: scope and objectives

2.3 How to design the study and the process?

2.4 Getting stakeholders on board: Who should be involved? How to engage them?

After an overview of expected outputs of the scoping phase (Section 2.1), this chapter provides information on how to identify the highest priority concerns and determine focus areas and objectives (Section 2.2); how to set up the process of conducting a TEEB country study and its governance structure (Section 2.3); and how to identify and bring on board the relevant stakeholders (Section 2.4).

The three aspects addressed in sections 2.2-2.4 of this chapter are not independent of each other and are not consecutive steps, most likely they will have to be achieved in a closely interlinked way: e.g. depending on initial objectives or mandate, you identify relevant stakeholders and involve them in the further specification of objectives and priorities, then together with experts and potential users you agree on a conceptual framework that is able to address the questions identified.

The purpose of this chapter is to provide an overview of what to consider when getting started, to point to challenges that are likely to arise, and to highlight ways in which to address them.

Experience so far has shown that the situation at the outset differs widely between countries: some start out with concrete questions which a TEEB approach can inform, others decide to conduct a national TEEB study without yet having a clearly defined focus, while others commission a scoping study or a feasibility study to determine if and on what specific issues to conduct a TCS. Different people could be in charge of this phase: for example, someone in a ministry in charge of kick starting a TCS, or someone from a research institution commissioned by the ministry to conduct a TCS, or an NGO or parts of the research community trying to create momentum for a TCS, or someone commissioned to conduct a feasibility study. The following chapter has been written with the view of keeping all of these possibilities in mind.

The output of this phase can be a scoping study or an interim report for example, or less elaborate, an agreement on scope and structure of the main study and who is to conduct it. Funding may or may not be available at this point. Yet clarifying objectives and setting up a governance structure will require time and effort and at least some funds for travel and communication. If a scoping study is envisaged, funding will be critical. In the event funding is not yet available, it will have to be secured before starting the study. Identifying policy-relevant questions, outlining objectives and the added value of a TCS, are also important components of a funding proposal. So in many cases, some issues addressed in this chapter will have to be worked upon in several rounds- usually starting off roughly, in order to develop a funding proposal, and then in more detail later to prepare for the main study or to conduct a scoping study.

2.1 Outputs of the scoping phase

At the end of the scoping phase of your TEEB country study you should have identified:

Objectives and thematic focus:
- ✓ An understanding of the policy context within which your study falls
- ✓ Key thematic areas on which your study will focus
- ✓ Draft objective or set of objectives for your study
- ✓ Set of key questions which your study will aim to answer
- ✓ A list of outputs to be delivered by your study (note: outputs can be delivered throughout the project, not just at the end)

Knowledge base
- ✓ An overview of the state of knowledge on natural assets – their stock, state, changes and roles
- ✓ At least a rough overview of data availability and any potential knowledge gaps

These points will help you to reflect upon the study focus given both the importance of issues and practical considerations of data availability.

Stakeholders
- ✓ An understanding of who the relevant stakeholders are and their main interests and concerns
- ✓ A plan of how and when you are going to engage them within the timeframe of your study.

Process and Governance
- ✓ A governance structure decided upon and put in place with appropriate documentation outlining the respective roles of those involved
- ✓ Work plan and milestones developed for your study: what will be delivered by when?
- ✓ Budget and plan outlining how resources will be mobilized and agreed upon for your study
- ✓ Communication strategy for the study

2.2 Identifying the thematic focus: scope and objectives

Key Messages

- There are many different starting points: TEEB country studies should be tailored to the national context and its needs!
- Use policy makers' priorities and questions as starting point for identifying objectives of the TCS to ensure it is relevant and meets the needs of at least one group of decision makers.

A TEEB country study (TCS) has the potential to be complex, covering different topics and scales, incorporating different types of information, and considering different stakeholder perspectives, while being completed in a tight timeframe. This section outlines four starting points for scoping your TEEB country study. Having clear boundaries for the scope and scale of your TEEB country study will help you ensure the TCS meets its objectives. This means you need to be realistic regarding the scale and geographical scope achievable with available resources and timeframe for the study. The scoping of your TCS does not necessarily have to be a lengthy process, nor does it have to produce a separate scoping study, but in some cases, a fully elaborated scoping study can be an important first step in determining the need for and orientation of a full study. The time spent on scoping will thus differ between TCS.

Experience to date has shown that there are a number of different starting points for deciding how a TCS can inform the issue(s) being discussed within a country and identify entry points for the results. We have characterized them as four potential starting points:

1. **A specific request from policy** that can be addressed by a TCS.
2. **General interest to learn more about the natural assets** of the country or desire to add an economic dimension to existing ecosystem services assessments.
3. A **policy where nature could play an important role** is being formulated or revised.
4. Using the 11 TEEB recommendations for focusing the scoping exercise, or a combination of the above.

These potential starting points will be outlined with examples below.

The objectives of your TEEB country study will depend on the mandate that you have and/or the needs and interests of key stakeholders, who typically will be decision makers from government (national and local), business or civil society. A mandate or even a clear demand from a decision-making community will give the study team authority to carry out the TCS and provide an enabling environment for the implementation of study recommendations (see Box 2.3 and 2.4). See Section 1.2 for a list of reasons to do a TCS that may interest policy makers.

If you do not have a clear mandate from decision makers, it will be all the more important that you tailor the study in such a way that its results will be useful in a decision-making context. It is important to remember that your TCS should have a degree of independence, be open and transparent. Even if the focus of the study is well selected from a content point of view, there may be procedural issues hindering the success of the study, such as a mismatch between the timing of the study and of the policy process it is trying to inform. The following section will provide some recommendations on how to make the TEEB study relevant from a content point of view; the next section will highlight procedural issues for ensuring credibility and legitimacy.

Regardless of your starting point, the following tasks should be fulfilled:

1. **Define clear and relevant questions** in consultation with key audiences and users of the outputs. These questions could be applicable to a topical, political discussion or even a key national sector. A user needs assessment can contribute to defining these questions (see Box 2.1).
2. **Understand what purpose your study would best serve.** Focus could be on awareness raising, on broadening the framing of issues, on innovative responses to issues involving nature, on fundraising, or on providing direct inputs into policy design and formulation.
3. **Identify key outputs that the main study will deliver.** The outputs will be determined, in part, by the mandate you have and the audiences identified, and could include focused valuation results, or a non-prescriptive analysis of policy options or policy recommendations.

Starting point 1:
A specific request from policy

Opportunities include: creation of new tools, revision of existing policy tools, options or processes linked to biodiversity and ecosystem services, a policy 'window of opportunity' in the country. Requests might also arise while developing and implementing action plans under the Multilateral Environmental Agreements such as UNCCD, UNFCC and particularly CBD and its Aichi targets (see Annex 1.2).

Sometimes there are direct requests from policy or decision makers that can be addressed with TEEB-related or TEEB-type information, such as in the case of the Indian Supreme Court to set compensation rates for the conversion of forest (see Box 2.2). Other examples include cases in which policies directly concerned with the environment are being revised or newly implemented, e.g. EIA or SEA policies, or changes in planning law or the regular revision of agricultural policy and its agro-environmental schemes. It is important to understand the framing of these policies and how their implementation is envisaged so that study results will be useful. For example, in South Africa, planning law is based on the principle of comparing values. Thus the value of ecosystem services at the national level is relevant (see Box 2.3).

Some countries may decide to undertake a multi-report TCS echoing the international TEEB initiative which decided to focus the report on different target groups (national policy makers, local and regional policy makers, business and citizens). TEEB Netherlands is an interesting example in this regard as it combined deliverables targeted at specific groups and requested by different ministries with thematic reports (see Annex 2.1).

Box 2.1: User needs assessment

A systematic understanding of the main users and other social, economic and political target groups are vital to the success of your study. A user needs assessment at the beginning of the assessment process is a good way to begin a stakeholder engagement strategy. Ideally, the main output from such an assessment is a database of potential stakeholder groups; information about their relationship to specific ecosystem services, and their potential and capacity for engaging in the assessment. Identification of relevant initiatives is also important during this assessment. A survey is a useful tool to help you develop the stakeholder database. Ideally, the database would evolve as your study progresses and should be revisited as findings emerge (see Section 4.1).

Ash et al. (2010) suggest the following steps to be undertaken by a social scientist to develop such a stakeholder database:

1. Undertake desk research on potential users
2. Visit key potential users and carry out interviews
3. Develop a database
4. Draft a brief report summarising the results

It should be noted that there are many ways to undertake a user needs assessment and it should always be adapted to the context in which you work. A user needs assessment is not only about compiling information but can be an important step in building a relationship with your stakeholders.

Guidance on how to carry out a user needs assessment can be found in Ash et al. (2010, mainly Ch. 2) and on the website of the International Association for Impact Assessment (IAIA) www.iaia.org/publications-resources/.

For further information see www.unep-wcmc.org/ecosystems-and-humanwellbeing_553.html

Box 2.2: Case Example: India – Demand created by Supreme Court

In order to be able to set compensation rates for conversion of different types of forested land to non-forest use, the Indian Supreme Court commissioned an economic valuation study of Indian forests. By doing so the Indian Supreme Court created a demand for a valuation study.

As a basis for compensation rates, the Centrally Empowered Committee (CEC) of the Supreme Court based on published results of the Green Indian States Trust (GIST 2006) estimated the value for six different classes of forests. For this study the values of timber, fuelwood, non-timber forest products and ecotourism, bio-prospecting, ecological services of forests, and non-use values for the conservation of some charismatic species, such as the Royal Bengal tiger or the Asian lion, were taken into account. Based on the value of the different classes of forest, the Indian Supreme Court decided to establish a compensation system. In this system any party that plays part in actively converting forest into other land-uses would have to pay into an afforestation fund to improve national forest cover.

Source: TEEB National, Ch. 10, Box 10.7, Ch.4 Box 4.9 (in book)

Box 2.3: Case Example: South Africa planning law need for biodiversity and ecosystem services indicators for accounting and monitoring

South Africa is the third most mega-diverse country in the world, but biological resources are being eroded by unsustainable practices such as illegal trade, unsustainable extractive practices, habitat fragmentation and spiralling development; all are further exacerbated by climate change. Post 1994, South Africa embarked on an exhaustive planning regime and developed planning instruments and tools.

Various ministries signed a 'service delivery agreement' for ten services such as housing, energy, water, and 'biodiversity' was included as a service as well. Until 2014, status and trends of the deliverables from these services need to be reported. This generated the need to understand costs and benefits from biodiversity, to establish indicators for ecosystem services provision, and to quantify ecosystem service values for monitoring purposes, and as decision support for resource allocation.

The South African Government pursues a SA TEEB initiative at least partially with the objective to contribute to this 2014 policy goal.

Source: Interview with Kiruben Naicker (Deputy Director, Biodiversity Planning, Department of Environmental Affairs, South Africa)

Starting point 2:
General interest to learn more about the natural assets of the country or wish to add an economic dimension to existing ecosystem services assessments

One possible starting point is to undertake an assessment of natural assets, including assessments of their values, the pressures and threats they face, and the needs and opportunities for responses to initiate changes or reforms. This is likely to be the most appropriate approach in situations where the policy or decision makers voice the need for more information on the state of natural assets, and how this relates to the provision of ecosystem services as inputs to further policies, management and (environmental or financial) accounting within specific sectors.

The starting point here is to produce an assessment of natural assets (such as an ecosystem assessment) or to take a prior such assessment as a starting point. In most cases, such a study would focus on specific regions, on certain ecosystems or on a selected range of ecosystem services. Selection criteria to determine the appropriate focus include:

- if specific threats are expected to increase rapidly;
- if demand or supply of ecosystem services is expected to shift;
- if recent or upcoming policy decisions are expected to have notable impacts;
- if livelihoods of specific groups of the population are at risk because of (policy or land-use) changes that have caused the ecosystem services they depend on to deteriorate.

In order to ensure that the results can be used in concrete policy processes, derive specific questions to guide the assessment jointly with the policy makers concerned. Examples of such questions are: identifying subsidies as pressures to certain systems or services, or identifying which services are systematically undervalued or overused.

In countries, where an ecosystem assessment, e.g. a MA sub global assessment or similar process has already been completed, this assessment could be a good starting point to identify economically relevant questions to be answered by a TEEB country study. For example, the UK National Ecosystem Assessment synthesised all available information on ecosystems and their services in order to address a list of policy questions, including three economic questions:

- Are we going to consider economic values of ecosystem services?
- Why should we incorporate the economic value of ecosystem services into decision-making?
- What are the economic implications of different plausible futures?

TEEB Nordic was commissioned to conduct an initial assessment of the socio-economic importance of ecosystem services in the Nordic countries as Box 2.4 outlines.

Box 2.4: Case Example: Lessons from TEEB Nordic for scoping and planning stages of a TCS

Objectives and scope:
Synthesis of the socio-economic importance of ecosystem services in the Nordic countries (2011 – 2012).

Based on existing data, the project identified a range of relevant ecosystem services and synthesised available information on their present status, trends and socio-economic importance. The project also explored needs and opportunities for future policy action, including possible areas for Nordic cooperation. The overarching aim of TEEB Nordic was to raise awareness on the value of Nordic nature and thereby facilitate policy action in the region.

Initiation and governance: TEEB Nordic was an independent synthesis, separate from the national ecosystem service assessment taking place in, or being initiated by, the individual Nordic countries. However, the synthesis provided a useful source of information and/or starting point for these on-going and planned in-depth assessments. TEEB Nordic was funded by the Nordic Council of Ministers (NCM), an inter-governmental body for political cooperation between the Nordic countries. The synthesis was developed by the Institute for European Environmental Policy (IEEP) and the Finnish Environment Institute (SYKE). The study was supported by a range of contributors and reviewers, including Nordic researchers and experts, and members of the international TEEB community.

Engagement, communication and outreach was carried out by: (1) engaging a range of Nordic experts in the process, both as reviewers and also as authors of stand-alone TEEB case studies (see below); (2) opening a dialogue with interested relevant stakeholders, e.g. Nordic Ministries of Environment, Nordic research institutions and initiatives, and NGOs etc.; and (3) seeking visibility for the initiative and its insights in close cooperation with UNEP TEEB office (see below).

Outputs:
- A List of Nordic ecosystem services: was developed on the basis of the classification by TEEB and the MA, reflecting the specific benefits provided by the Nordic ecosystems, such as berries, mushrooms, game, reindeer herding, recreational values and cultural values, inspiration for art and design etc.

- Identification of indicators for Nordic ecosystem services based on the existing key literature and focusing specifically on indicators useful to assess and compare ecosystem services at the national level. Biophysical and socio-economic indicators were distinguished: i.e. ecosystems' ability to provide services and the socio-economic value of these services. For each ecosystem service 2–4 biophysical and 2–4 socio-economic indicators or proxies have been identified.

- A Synthesis of the existing information: on status, trends and value of ecosystem services, was elaborated and a number of novel estimates for the biophysical status of some regulating services for Nordic countries were developed, building on work carried out by the European Commission's Joint Research Centre (JRC) and the PEER research network.

- Important knowledge gaps were identified: e.g. data on regulating and cultural services and the supporting processes and functions of ecosystems, status of and trends in eco-systems' biophysical ability to provide and maintain ecosystem services, and data on trade-offs between ecosystem services.

- Development of recommendations for policy action on ecosystem services in the Nordic countries, with close links to the green economy, supported by examples of existing initiatives for ecosystem services in the Nordic countries.

- Development of six stand-alone TEEB case studies authored by a range of Nordic experts. These focus on: recreational values of the Baltic Sea; economic benefits of visitors' spending in protected areas in Finland; ecosystem services provided by the Baltic salmon; ecosystem services in the Barents Sea and Lofoten Islands; socio-economic importance of wetland restoration in the city of Nummela, Finland; and recreational values of Danish forests to guide national afforestation.

- Outreach and communication: results were presented at several events in the region as well as internationally (e.g. side event at the Rio+20 conference).

Lessons and insights for other TEEB country studies:

- Creating a comprehensive (conceptual) framework for ecosystem services and their indicators, including systematic identification of biophysical and socio-economic indicators and understanding the linkages between the two, forms a good starting point for TEEB assessments focused on (scoping) natural assets or adding an economic dimension to existing ecosystem service assessments. Such a systematic framework helps to identify gaps and information needs, further allowing judgement of the reliability of an assessment's outcomes. It also forms a 'road map' for future research and knowledge requirements, and forms a good basis for more detailed (socio-economic) exploration of a number of selected services.

- In addition to peer-review, active engagement of relevant interested stakeholders (experts, researchers, NGOs etc.) can provide multiple benefits to the process, such as raise awareness, increase buy-in, and bring additional resources to complement the study. Cooperation with TEEB UNEP office and/or other TEEB initiatives plays an important role in increasing visibility and helping to share key messages to the wider audience.

Source: Kettunen et al. (2013): Socio-economic-importance-of-ecosystem-services-in-the-nordic-countries-synthesis

Starting point 3:
A policy is being formulated or revised where the consideration of nature could play an important role or make a significant contribution, but policy makers in charge are often not yet aware of this.

This includes the necessity to mainstream ecosystem services/ecosystem-based solutions across relevant policy areas; e.g. in policy formulation or revision, wherever a policy is being formulated or revised where more explicit consideration of nature could lead to better outcomes with regards to ecosystem service provision (e.g. development planning, agricultural policy, trade and finance decisions, etc., see Box 2.5). In these cases, the scoping process is all the more important and it can be helpful to have a strong study leader and support from within the government and other strong stakeholders (e.g. a leading NGO) to help get the relevant parties on board (see also Section 2.4).

Further opportunities where TCS can be linked and fed into the formulation of other policies include: policy design for climate change mitigation and adaptation (see Annex 2.2); disaster prevention strategies that highlight the economic potential of diverse and resilient ecosystems; and poverty alleviation and sustainable livelihoods policies, whereby gains can be made from taking better note of the specific role of ecosystem services and the potential to enhance this.

Box 2.5: Case Example: TEEB Brazil – Mainstreaming the value of nature

Inspired by the CBD COP-10 in Nagoya, Japan and the attention created by the international TEEB process, the Brazilian Ministry of the Environment (MMA) has started a national TEEB initiative. TEEB Brazil aims to develop the following four main reports: (1) TEEB Brazil for National Policy Makers; (2) TEEB Brazil for Local and Regional Governments; (3) TEEB Bra-zil for the Business Sector; and (4) TEEB Brazil for Citizens.

One of the main topics of the initiative is mainstreaming the work of MMA to other ministries and different sectors; even to ministries and sectors without direct visible link to biodiversity. Identified as key actors to be involved are the ministries of:

- Finance,
- Health,
- Agriculture, Livestock and Supply,
- Mines and Energy,
- Tourism,
- Planning, Budget and Management,
- Social development and hunger alleviation,
- Science and Technology,
- Fisheries and Aquaculture,
- Development, Industry and Trade,

In addition, the Institute for Applied Economic Research (IPEA), the Secretariat of Strategic Affairs of the Presidency and the National Confederation of Industry (CNI) are expected to play a key role.

An Executive Commission and a Coordinating Commission, comprising these ministries and institutions, were proposed as governance bodies of TEEB Brazil. The engagement of all identified key actors is a challenging process and not all are involved yet, but several are already taking part in the initiative.

The Brazilian TEEB for Local Policy Makers (joint initiative of the Ministry of Environment, GIZ and CNI), for instance, is an example of coordination between different stakeholders. Its overall goal is to mainstream the values of ecosystem services and biodiversity into public and private decision-making processes. The initiative aims to raise awareness on environmental impacts and opportunities at the sub-national level. Implementation and findings of the TEEB for Local Policy Makers, however, will at a later stage serve as useful case examples for the national TEEB Brazil initiative.

For further information see: www.teebweb.org/brazil/

The regular revision of agricultural and forestry policies in Europe, for example, is now giving increased consideration to ecosystem services, albeit sometimes only implicitly. For example, the forestry sector in many countries is increasingly looking for sources of revenue beyond that from timber production (e.g. recreational access, watershed protection – both of which are ecosystem services). In the face of declining timber revenues, for example, where value is not converted to a revenue stream from users (capturing), value evidence can be powerful in making business cases and persuading policy makers about the values (recognising and demonstrating). This could help to increase public investment to the sector or rewarding changes in management practices, such as establishing PES schemes that recompense forest owners for sustainable management of forests.

The scoping of different sectors, as discussed above, can help to identify currently important issues and upcoming policy needs. Some TEEB initiatives, such as TEEB Brazil, have from the outset, involved a broad number of ministries in the scoping and selection phases to mainstream the scoping process and to incorporate valuable inputs from each ministry (see Box 2.5). The German TEEB study was commissioned by the Ministry of the Environment's Nature Conservation Policy Directorate with a request to illustrate the economic importance and values generated by ecosystems and biodiversity. During the scoping phase, a consultation process among a broad range of stakeholders identified policy-relevant issues where economic information on the role of biodiversity could provide added value. This will be used to select relevant examples and to structure the reports (see Box 2.6 on topics and Box 2.11 on process). Table 2.1 may serve as starting point for approaching relevant stakeholders to identify policy relevant questions. If you have access to high level policy makers directly, you may start out by listening to their concerns and then deriving links to ecosystems and biodiversity so that you can identify relevant questions for your TCS to address (see TCS guidance webpage for an example from Tanzania).

Table 2.1 might serve as starting point for approaching relevant stakeholders to identify policy relevant questions.

Box 2.6: Case example: Thematic focus of TEEB Germany

For the German TEEB country study ('Natural Capital Germany'), four main thematic reports are being developed:

1. The role of ecosystem services for climate change: mitigation and adaptation

2. The role of ecosystem services in urban areas: health and quality of life

3. The role of ecosystem services in rural areas: forestry, agriculture, and nature conservation conflicts; and

4. Instruments to better address the economic importance of Natural Capital and Synthesis.

These foci were chosen to mainstream TEEB beyond the most commonly monitored environmental concerns, and beyond nature conservation. In particular, within the first report on climate change, the focus lies on illustrating the advantages of explicitly considering ecosystem services relating to climate change. All reports aim at informing important current policy discussions, such as for example, agricultural policy or the ongoing German 'energy transition' – Energiewende: the nuclear phase out and transition towards renewable sources of energy. Biodiversity and ecosystem services are being affected e.g. via increased bioenergy production and new transmission lines and should be considered more explicitly in policy design.

As there is already quite an active Business and Biodiversity initiative in Germany, it was decided to provide only a brief report aiming to further raise awareness in the business sector. This report is called "Natural Capital Germany – The business perspective: prepared for new challenges". For more information, see www.naturkapitalteeb.de

Table 2.1: Selected examples of needs and opportunities for the integration of ecosystem services across a wider range of policy areas (beyond the environmental sector).

Sector	Example questions	Example opportunities	Further reading in TEEB-Reports
Basic service provisioning	• How could ecosystems and ecosystem based approaches contribute to raw materials, food, genetic resources, water etc. (see also separate sector discussions below)	• Protection and/or restoration of important ecosystems (e.g. coral reefs, mangroves, forests) that provide basic provisioning services for local communities and other beneficiaries.	**NAT** Ch. 5, 6, 7, 8 & 9
Transport, infrastructure development	• How can transport infrastructure be designed so as to minimise impacts on ecosystems and their services?	• Integrating green infrastructure elements into transport planning, and impacts duly integrated into EIAs and SEAs.	**LCL** Ch. 6.1
	• Where infrastructure is built to help people enjoy recreational benefits from nature, how can trade-offs be avoided?	• Facilitating access of citizens to ecosystems, thus increasing the benefits gained, and value derived from, ecosystems.	**NAT** Ch. 4
Health and protection against natural disasters	• Are there ecosystems which are essential for protection against natural disasters, e.g. flooding, land slides, or avalanches? • Could restoring ecosystems help to protect against natural disasters in the future?	• Potential of biodiversity to contribute to public health. • Recognising and using the potential of vital ecosystems for safe-guarding human beings against tidal surges and storms, floods, landslides, fire, droughts & desertification etc. by preventing ecosystem degradation.	**LCL** Ch. 4.3 (table 4.1 report; 4.2 book version) Ch. 5.5 & 5.6, Ch. 6, Ch. 7 **NAT** Ch. 7, Ch. 9
	• Can ecosystems contribute to waste water treatment? If so can they do this in a cost-effective way? • When major investments in water treatment infrastructure are necessary, is there scope for making use of natural systems?	• Natural vs. technical options in waste water treatment. • Manage local and regional ecosystems to enhance water supply and treatment. Evaluate potential co-benefits such as recreation and habitat conservation.	**LCL** Ch. 4.3 Water and Wetlands
	• Can ecosystems and biodiversity provide natural resources for medicine (e. g. herbs, plants, mushrooms)?	• Preservation of traditional knowledge will ensure that local communities will continue to use traditional medicines derived from plants, for example. By protecting relevant habitats, this potential will be enhanced.	**LCL** Ch. 1.6

Sector	Example questions	Example opportunities	Further reading in TEEB-Reports
	• To what extent can ecosystems and biodiversity help avoid the spread of diseases beyond their role in providing medicines?	• The management and restoration of ecosystems can provide benefits via pest control (e.g. insect predation by bats) and can avoid becoming sources of pests (e.g. mosquito breeding grounds).	**LCL** Ch. 1.6
	• Are opportunities to harness the capacity of ecosystems to improve the environment in urban areas exploited in optimal ways? • Can the incidence of allergies in urban children be reduced and the recovery of patients after illness be accelerated?	• Adequate provision of green infrastructure in urban areas (parks, gardens, urban trees and green roofs) can offer opportunities for recreation and contribute to microclimate control, air quality improvements, and water management. They also enhance recovery after illness and new results point to their importance in avoiding allergic diseases.	**LCL** Ch. 4.3 **NAT** Ch. 8 & 9
Tourism and recreation	• Is there unused potential of ecosystems and landscapes (e. g. beautiful landscapes or natural features that are so far undeveloped as tourist destinations)?	• Ecotourism	**LCL** Ch. 5.4, see also **LCL** Ch. 7.1 p. 137 in report, p. 210 in book
	• How can opportunities for tourism and recreation be aligned with biodiversity conservation objectives?	• Zoning of sites – to have core areas for conservation and other areas for recreation and tourism.	
Energy provisioning	• How can ecosystems be used as sustainable sources of energy and how can biomass be harvested in a way that does not jeopardise the provision of other ecosystem services?	• Sustainable harvesting of wood/other biomass for the production of second generation biofuels. • Improved use of biofuels in cooking stoves reducing fuel consumption and health risks.	**LCL** Ch. 1 & 10 (Ch.1.5 in book)
Agriculture, forestry and water management	• Are agricultural practices causing problems (e.g. soil erosion, nitrification, high water consumption, degradation of ability to regulate natural fluxes or disasters etc.)? • Are there market opportunities for high nature value /organic farming or forestry?	• Re introducing traditional environmentally friendly agricultural practices. • Introducing organic agriculture or agroforestry systems. • Invest in certification and labelling schemes to help consumers make informed choices and producers access higher margin markets.	**LCL** Ch. 5.1

Sector	Example questions	Example opportunities	Further reading in TEEB-Reports
Climate change mitigation and adaptation	• How can a forest, grassland or wetland ecosystem be managed in a way that enhances their capacity to store carbon? • How can green nature based solutions (e.g. natural water retention measures) be implemented to reduce the risk of floods/drought and other natural disasters /extreme weather events?	• Carbon storage capacity of natural ecosystems – which can be enhanced via protection, management or restoration - .e.g. peatlands, agricultural land etc. • Water retention/regulation capacity from natural ecosystems – e.g. via flood plain restoration, PES, etc. • REDD+ (Reducing Emissions from Deforestation and Forest Degradation).	**NAT** Ch. 2, Box 2.9, Ch. 3, Box 3.1., Ch. 5.2. Ch. 8 & Ch. 9
Poverty alleviation	• How much do poor people's livelihoods depend on ecosystem services? • How can poor people be incentivised to use ecosystems in sustainable ways so as to maintain reliable sources of revenues in the long term? • What are the implications for poverty eradication/development if sustainable land-use is not achieved?	• Integrate appreciation of wider ecosystem services to support rural well-being and livelihoods into development cooperation and poverty alleviation strategies.	**NAT** Ch. 2., Table 2.3.; Ch. 3 **LCL** Ch. 1, more extensively in book version.
Cultural and natural heritage and education	Which parts of the natural environment are unique/rare and would merit being promoted/studied/better understood and more widely appreciated? • Do citizens have easy access to a natural environment with a good quality for outdoor activities? • Does the educational system help develop appreciation for natural assets, such that citizens value and take pride in them? • Are natural assets (e.g. charismatic species and cultural landscapes) being protected and promoted in view of encouraging ecotourism?	• Education/Science: Research funding to understand ecosystem function and services, including benefits from genetic material (linked to ABS regimes) and biomimicry benefits from widely (e.g. products, process). • Citizens quality of life and health might be enhanced by ensuring/increasing access to a natural environment of a good quality. • Conservation and promotion of natural assets can create opportunities for ecotourism (i.e. loss of natural assets and cultural landscapes reduces a country's appeal for tourists).	**NAT** Ch. 5., Section 5.1. Ch. 8 **LCL** Ch. 7
	The TEEBcases contain plenty of local and regional examples for all of these areas. Many of them also include relevant policies implemented or suggested to realise the ecosystem service opportunities identified (see: www.teebweb.org/resources/teeb-case-studies/).		

Starting point 4:
Use the TEEB recommendations for scoping

The global TEEB study has summarized its main conclusions and general recommendations for the improved incorporation of nature's economic potential in eleven points (see Chapter 1.2 above). These can be found in Chapter 4 of the TEEB Synthesis report. This list can serve as a checklist to identify areas of concern for a given country, and also to structure what kind of information is already available and what kind of policies are already in place, addressing some of the issues. This approach has been used by the TEEB Flanders feasibility study to structure available knowledge and tools and compare them with user needs. Box 2.7 summarises the experience of TEEB Norway which has also used the TEEB recommendations for identifying what to address.

Box 2.7: TEEB Norway: Using the TEEB recommendations as a starting point for a TCS.

Norway has taken a key interest in TEEB since 2008. It supports and participates in various international TEEB related projects, and has encouraged the use and development of TEEB in multilateral environmental agreements (MEAs). Norway also draws on TEEB findings and recommendations at the national level, seeing the potential in better recognising, demonstrating and capturing values of biodiversity and ecosystem services in public policy and management.

In October 2011 the Norwegian Government established a National Expert Commission on Values of Ecosystem Services. The interdisciplinary commission consists of twelve experts with wide professional and scientific backgrounds, including from economics and ecological sciences. The main objective is to provide advice to national policy makers, but also seeks to influence local and regional policy makers, business, research communities and the public at large. The commission has therefore been requested to engage key stakeholders in its work, including affected economic sectors and relevant organisations, and will build on input from key research institutions. The Secretariat for the commission is provided by the Ministry of the Environment.

The commission has been given a broad and fairly open mandate from the Government, which can be broadly summarised as follows:

- To base its work on the conclusions and recommendations of the TEEB study, and assess which elements and recommendations are particularly relevant to Norway
- Consider if and how ecosystem services terms and approaches may be relevant for human well-being in Norway.
- Describe the status and trends for ecosystems and ecosystem services in Norway.
- Review methods for valuation and recognition of values of ecosystem services, and to consider advantages and disadvantages of monetary valuation.
- Investigate values of Norwegian ecosystem services based on existing studies.
- Review and consider methods for demonstrating values of ecosystem services in public decision-making.
- Consider possible means for capturing values of ecosystem services in economic and regulatory instruments.
- Review and consider ways of estimating or calculating values of ecosystem services as part of Norway's national wealth.

The mandate covers all ecosystems in Norway, including marine and Arctic ecosystems, agricultural land and urban ecosystems. The commission will also consider and reflect on Norway's relationships with ecosystems and ecosystem services in other countries, including through investments, trade and development cooperation.

The commission will present its findings and recommendations in a National Official Report (NOU), which will be delivered to the Government by 31 August 2013. The report will be subject to a broad public hearing and will be used as a basis for development of possible new policies and efforts related to values of ecosystem services. Selected recommendations may be included in Norway's revised NBSAP to be presented in 2014 as a follow-up of the Convention on Biological Diversity's strategic plan and its Aichi targets.

TEEB recommendations and the ecosystem services approach are also being used in various parts of national policy independently of the expert commission. Examples of this include reflecting biodiversity in national indicators on sustainable development in the national budget, using the ecosystem services approach in integrated plans for large marine areas and drawing on ecosystem services in climate change mitigation and adaptation, and in efforts to improve public health.

By Finn Katerås, Senior adviser, Secretariat for the Government's expert commission on values of ecosystem services, Norwegian Ministry of the Environment. See also: www.regjeringen.no/okosystemtjenester.

A check list for what you will have at the end of a successful scoping process to help shape the TCS

Independent of your starting point, the scoping process should allow you to prioritize:

- ✓ **Key issues in terms of policy** – you would aim to have a list of policy themes (such as forests) or of particular policies (e.g. PES schemes, or EIA regulation).
- ✓ **Objectives of the study** – you would aim to have these written down and agreed by the key stakeholders which you have identified in the scoping process (for further details see Section 2.4 below).
- ✓ **Key questions** to address in main study, (see Chapter 3) and **an adequate conceptual framework** that facilitates addressing these questions (see Box 2.8).
- ✓ The role of economic and monetary valuation and other economic arguments in answering the identified questions (see Chapter 3 for details).
- ✓ **Outputs of the study** – this may be an initial list of outputs that might be refined as the study progresses.
- ✓ Some idea on **desirable formats** of these outputs (e.g. policy briefs, technical reports, databases, or software tools).

The process of identifying priorities and objectives and setting up a team and a governance structure are parallel and interdependent. Different options are outlined in the next sections.

Box 2.8: Developing Conceptual Frameworks in Assessment Processes

A conceptual framework is a concise summary in words or pictures of the relationships between people and nature – in other words, the key components and interactions between humans and ecological systems. Conceptual frameworks can further clarify and focus thinking about complex relationships, including how those relationships may be changing over time and how they may be influenced by decision-making and policy.

Conceptual frameworks are common tools used within assessment processes and can help immensely to facilitate communication between different actors involved in a TCS. They can be useful when identifying which issues will be covered and to what extent. They are also instrumental in establishing the relationships of nature and other relevant issues and concerns in different policy fields. It might, therefore, even make sense to apply more than one framework for different aspects of a TEEB country study (e.g. nature's potential for poverty reduction strategies, or for climate change mitigation).

Deciding which conceptual frameworks are adequate depends on the questions you would like to answer and on the particular perspectives you would like to include. In this sense the process of agreeing on an adequate conceptual framework can help to clarify these points and reach agreement or at least a mutual understanding among the different parties involved. One lesson learnt from on-going TCS is that a conceptual framework can help avoid For further information on different conceptual frameworks that are apt for addressing biodiversity and ecosystem services in different contexts see the TEEB website and:

- Ash et al. (2010), Ch. 3 - Conceptual Frameworks for Ecosystem Assessment: Their Development, Ownership, and Use.
- TEEB Local: Ch. 2 Conceptual Frameworks for considering the benefits of nature.
- IPBES/1/INF/9 - Outcome of an informal expert workshop on main issues relating to the development of a conceptual framework for the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (www.ipbes.net/plenary/ipbes-1).

2.3 How to design the study and the process?

Key Messages

- Carefully balance roles and responsibilities of different groups and bodies to achieve a credible and relevant result.
- Try to involve all potentially relevant actors in adequate roles.

How you design your TEEB country study will reflect the mandate you have, the focus of the study, the scale (e.g. National) or nested scales (e.g. national with local case studies) of the TCS and of course, your ambitions. The design needs to be fit for purpose and reflect the objectives and other elements that you need to achieve. A TCS is a collective effort of a number of different actors in different roles. Coordination among relevant actors and potentially different study groups (e.g. local, national and business, or different thematic foci) is, therefore, key. It needs to be ensured that all activities under a national TEEB project inform and complement each other and take place within the agreed policy context.

Architecture and governance: ability to deliver while ensuring credibility and relevance

While there is no one right way to design an assessment, many assessment processes have found that governance and leadership are critical to ensuring the most is obtained from the collective capacity of an assessment team and the communication of findings. There are many different elements that could make up the architecture for a TEEB country study, which are outlined below. One rule of thumb however, is to not over complicate the design but ensure that it is balanced and allows for engagement of the research community and other stakeholders. In fact, it is all about balance.

Credibility, legitimacy and relevance. Keep in mind that policy makers can obtain a broad range of scientific knowledge via consultancies or service contracts and are often approached by the scientific community with new results. What distinguishes an assessment process from such consultancy contracts is the level of credibility and legitimacy it can achieve. To ensure both of these qualities are achieved, independence of the assessment process is crucial. Balancing these requirements while producing policy-relevant results is a challenge and trade-offs frequently arise as illustrated in Box 2.9.

Be transparent in the process. In whichever way you develop the governance structure for your TEEB country study, both credibility and legitimacy can be improved by making the process as transparent as possible: Ensure the process of selection of members of different groups is clear, documented and communicated. You may also consider drawing up 'Terms of References' for the different bodies and their roles. To ensure responsibilities are understood and it is clear who has decision-making powers for what (for examples of different ToR please see TCS guidance web-page).

Open architecture. The global TEEB study was structured so that people who wanted to contribute could do so via a number of different means, such as: via calls for evidence (also translated into several languages), in stakeholder workshops, as authors or reviewers. An open architecture can also help increase legitimacy and relevance, but needs to avoid imbalances, such as listening only to those who have the capacity to become involved on their own accounts. One way to balance this is active stakeholder engagement.

Active stakeholder engagement. The roles and rights of the stakeholders need to be decided at this stage together with a plan for engagement. As outlined in Section 2.4 and Chapter 4, there are a number of good reasons to involve stakeholders - one important reason is to achieve a balanced and comprehensive understanding of the different perspectives on the issues involved. The balance to strike here is to ensure you can consider and include stakeholder inputs, and avoid giving the impression that their inputs are not being considered and merely being used to legitimize the results. Managing expectations on what can be done and how it will be done is crucial here.

Box 2.9: Credibility, legitimacy and relevance and how to balance them

Policy makers can obtain a broad range of scientific knowledge via direct consultancies or service contracts. What distinguishes an assessment process from such consultancy contracts is the level of credibility and legitimacy it can achieve. For this, independence is crucial.

Credibility is the "perceived quality, validity and scientific adequacy of the people, processes and knowledge" involved in producing the TCS. To ensure credibility of a TCS, scientific ro-bustness is essential and can be achieved by involving key experts and state-of-the-art knowl-edge. But this is not enough – how others see the process is vital. Independence from external control and vested interest is crucial. It is therefore important to be cautious when making links and partnerships with other organizations. Transparency is key so that interested parties can understand: what assumptions were made, who was involved, in what role, how experts and approaches were chosen, and where the funding for the TCS comes from? In short: the foundation of the assessment should be documented and comprehensible to outsiders.

Relevance is the responsiveness of the TCS to policy and societal needs, the adequacy of the results in terms of scope, scale, timing, quality, level of detail etc. It is crucial for achieving impact and key to motivating participation for all participants, no one wants to lose time. "A policy mandate can enhance relevance as it builds a direct line to policy but, it may also limit flexibility to explore the wider issues and can diminish independence and legitimacy".

Legitimacy is the "perceived fairness and balance" of the TCS process. "It is particularly im-portant when knowledge is contested, when policy decisions involve winners and losers and in all other situations where conflict may arise". A sufficiently comprehensive approach and including different perspectives will provide a broad knowledge base and increase legitimacy as well as credibility. But for legitimacy the balance of involved experts and stakeholder is key. Successful conflict management also enhances legitimacy. When decisions have to be taken - reaching a compromise is in practice often more realistic and fairer than trying to achieve a consensus. Continuity in collaboration is important to have a stable basis of knowledge and skills and to strengthen relationships and build trust. Extended peer review of TCS reports through external experts, from a broad range of backgrounds as well as other stakeholders can build trust and increase both legitimacy and relevance.

Source: spiral-project.eu/sites/default/files/07_Keep-it-CRELE.pdf

Trade-offs:
Between these criteria, different trade-offs arise and have to be balanced. Finding sufficient funding for your TCS and ensuring an appropriate level of independence will not always go hand in hand. Another important trade-off is the Speed-Quality trade-off: Timely and rapid responses to policy needs enhance relevance, but time-consuming quality assessment and consensus building increase credibility and legitimacy. The clarity complexity trade-off: While formulating strong and clear messages within a TEEB-report can increase relevance whereas communicating assumptions and limitations of methods or findings as well as uncertainties will increase credibility. The Push Pull trade-off is also likely to arise: where immediate policy demand exists and can be followed, a short-term policy relevance of the TCS can be reached. But policy needs can change very quickly and emerging problems and innovative long-term solutions are unlikely to be found.

Managing trade offs:
When developing the process of a TCS, it is difficult to anticipate where trade-offs will arise and they cannot be entirely avoided. It is therefore essential to be alert and understand how trade-offs can be managed in order to ensure an appropriate level of credibility, legitimacy and independence. The SPIRAL Briefs and further information on the SPIRAL webpage provide valuable assistance and inspiration (spiral-project.eu/content/documents#jump2briefs).

Source: http://www.spiral-project.eu/sites/default/files/13_Brief_CRELE-choices.pdf

Building a governance structure

Different elements that may be considered when establishing the governance structure for a TCS and achieving the balance mentioned above are discussed here. Some examples from different TCS can be found on the TCS guidance webpage.

A study leader/chair: A Study Leader or Chair can contribute legitimacy and momentum for the entire study. Typically, someone in this role would oversee the technical analysis but maintain a broad overview. They would also provide a 'face' for the study and take the lead in communicating findings to stakeholders. This role does not necessarily have to be taken by one person alone.

Such a person should be:

- Credible (not perceived as representing only a certain sector or position, not 'usual suspect', not too 'green', yet close enough to technical expertise),
- A good speaker (able to appear in public regularly, give engaging speeches, talk to different audiences), and
- Strategic and visionary (strong enough to maintain independence, able to balance different interests, listen and understand concerns of different groups, not micro manage).

The study leader / chair will be supported in these tasks by other groups (e.g. core team, steering or coordination group, advisory board, secretariat), he or she should really be able to focus on what they are best at.

Steering (coordination or implementation) group: This group will make decisions to guide the study, ensuring that the project is delivered to meet its agreed objectives. It needs to involve the management of the study as well as, quite often, project funders. Funders often know what is needed, how issues need to be framed, and if they come from a policy or administration background, are aware of changes that the study might have to react to. The steering group should guide the study to focus on the right areas, but should not seek to influence the actual results, as this would impact independence, which should always be maintained.

If your funding does not directly come from policy, it helps to include the policy perspective and knowledge on current purposes via other groups.

Advisory Board/Expert Panel: You would typically bring together a group of experts from relevant disciplines who would lead in the design and review of the technical aspects of the study. This type of group can provide specific input (scientific, policy, stakeholder, etc.), quality assurance, help develop key messages and facilitate outreach and communication to the scientific community. This group would also advise the chairs and secretariat on technical aspects of the study.

An advisory board can be important beyond technical aspects. In the international TEEB initiative, the advisory board was composed of experts from different sectors, not only science. This opens the possibility for the board to contribute to: outreach activities, coordination with other relevant ongoing processes, strategic decisions, and help reach different contexts (beyond academics and beyond policy making, e.g. involving key opinion formers). This enhances the chance to engage in the wider societal debate. By including as many constituencies as possible, a cross sectoral debate can be achieved, which is one of the most important potentials for producing broadly relevant results (Examples of the composition of TEEB global and TEEB Germany advisory boards can be found on the TCS guidance webpage).

Author Teams: Author teams are often partnerships of organizations or individuals who undertake the technical work outlined in the design of the study. Their efforts can be complemented by: a call for evidence, workshops, and special sessions at events that gather relevant additional expertise. Authors can come from a range of organisations including universities and other academic organizations, government departments/ministries, independent consultancies, and further stakeholder groups. Author teams who bring together individuals from different types of organizations usually deliver not only the required outputs, but can also: foster deeper understanding of different positions, build important capacity, and establish new contacts and networks, which may assist in the dissemination of findings. The choice of organisations can also help with the legitimacy of the study and facilitate linkage to other processes, whether analysis, decision making or policy processes. This is particularly true when civil servants from different ministries or departments are involved: using in-house people can build important capacity and make people work across sectors but also uses limited manpower. It has proven helpful to have lead authors or coordinating lead authors in charge of different chapters.

Authors play a crucial role and often end up with most of the work. It is important to ensure focus and relevance while leaving content and results to their expertise. Yet there are some typical challenges that can be encountered. One such challenge is that academic authors have strong preference for consistency in terms of structure (usually according to academic categories) these are often not helpful for ensuring policy-relevant results, where structuring according to decision domains, order in which decisions are taken, or other practical terms can be more conducive. Also academic authors often tend to write in very abstract terms, which can make results difficult to use in practice. Illustrating with concrete examples as well as involving decision makers and targeted users of the results can help bridge this gap.

TEEB international had so called **core teams** and individual coordinators for each of its reports. The core teams involved users and experts close to the potential users of the reports. It played a paramount role in developing the overall content, writing most of the chapters (usually constituted the coordinating/lead authors) and in identifying and engaging adequate additional experts for each of the aspects included. Core teams met several times throughout the process of writing. Even if you do not set up core teams, authors' workshops are very helpful in achieving consistency and useful results.

Peer Reviewers and Review Editors: Reviewers should be independent, and it is worth spending time to ensure that appropriate reviewers are included. You may decide to also include Review Editors (Chapter Review Editors). The role of Review Editors is to work with the author teams to ensure all peer review comments (that can be conflicting) are addressed appropriately and the revision process is adequately recorded. This is an important part of quality assurance, and contributes to credibility. Written reviews can be complemented by open calls for comments e.g. via internet, or targeted events to discuss specific issues with one or more groups. Endorsement by the international TEEB Advisory board, which follows a clear protocol for review, can also contribute to credibility. The UNEP TEEB Office can assist you in identifying appropriate reviewers or, if you choose to have your TCS endorsed, it can validate reviewers for this purpose (for details see TCS guidance webpage).

Stakeholder/user groups: Such a group can provide insights necessary to ensure project outputs meet specific needs of key users, thereby maximizing value, influence and impact, as well as ensuring ownership. Stakeholders can be part of the authors or reviewers but it makes sense to also involve them separately to comment on overall strategy and design. Within your country there may also be an existing landscape of alliances, projects and initiatives that will either inform or complement your TCS. You may consider having representatives join your stakeholder group (for further details on stakeholder involvement see next section).

Overall coordination/Secretariat: The size and composition of the Secretariat depends on the scope and scale of the TCS and the magnitude of the coordination role expected of the Secretariat. Whatever the size of the Secretariat, it is essential that someone is responsible for overseeing the entire process including administration, project management, and financing. The Secretariat also has an important role in facilitating opportunities for communication and outreach. The Secretariat also needs to maintain communication and facilitate links between all the different groups involved in the TCS. In addition to the Secretariat, TEEB international had a scientific coordination team to ensure consistency between the different reports that were all written in parallel.

Communication/outreach: can be part of the Secretariat's role, but professional communication has proven useful. The communication strategy needs to be closely coordinated with all bodies involved and particularly with stakeholders. When engaging professional communicators, make sure they fully understand your approach and are also able to establish 'two way communication channels' - many agencies are used to marketing a product or idea, whereas a TCS has a lot to gain from triggering or enhancing dialogue and debate. Aggressive campaigning of easy messages can be quite counterproductive. For further details on communication strategy, see below.

Budget and workplan

One important step in the design process is estimating the budget for the TCS. Aspects which help define the budget include: spatial scale of the study, size and nature of technical efforts (e.g. the specific ecosystem services included and the scope and preciseness of analysis required), size and nature of stakeholder and communication efforts envisaged and availability of information/data; and local capacities. Budgets will also vary greatly between countries so it is difficult to provide concrete figures on the cost of conducting a TEEB country study. For many studies and assessments of this sort, inkind contributions (from individuals and organisations) are a significant way to add to nee-

ded resources. These can be in terms of expert time, data, analysis, but also use of offices, meeting rooms and equipment, compiling data or even media coverage. It is highly unlikely that you will find enough funding to pay professional rates for every step of work, but experience so far has indicated that there is substantial willingness to contribute, even without remuneration.

Providing a good platform for the results creates an important incentive for contributions. Experience so far has been that there is a lot of willingness to contribute and to provide inputs. The bottleneck is often the capacity to deal with the input, incorporate it and manage the process. It is therefore crucial to provide good management and dedicate sufficient personnel to this process, workshop organisation, receiving and understanding the inputs and incorporating them are time-consuming tasks. But be aware to balance professional process design with sufficient technical understanding of the subject matter. An assessment is neither an academic process nor a consultancy nor a policy negotiation. Enough technical understanding to ensure credibility (see Box 2.9 above), a timely and transparent process to ensure legitimacy, and good communication (two way!) are key.

The proportion of the budget that you allocate to the different activities should reflect the objective that you set for the study. Mobilising resources is always difficult. However, you are likely to have greater success if your TEEB country study is demand-driven and is responding to the needs of decision makers. Early engagement of potential funders will increase their buy in to the process and commitment to mobilise funds. Further information on mobilising funds can be found at IUCN (2012).

An overview of important budget lines, with descriptions of what you might likely need, can be found on the TCS guidance webpage.

Study planning

The outputs of your TCS can be manifold and should complement each other. While creating a large research report or book has value and creates incentives for researchers to contribute, it may not fulfil the needs of most potential users. Different reports targeted to specific audiences, executive summaries for policy makers, databases [1], illustrated case examples, models and scenarios, value calculators [2], and well-designed websites (e.g. www.naturkapital-teeb.de/ or http://teebnegociosbrasil.com.br) can all constitute complements or alternatives.

There are many advantages to organising a TCS in different phases, including: greater ease in managing the study process; capacity to learn and improve along the way and the consecutive results of the different phases provide a series of communication opportunities and can thus help to sustain interest from key audiences. It can also help address immediate opportunities in a timely manner while still addressing a broader picture by complementing this later in the process. Careful planning on whom to involve and at what stage and in what role (author, reviewer, coordinator, etc.) can also help avoid overburdening a limited amount of people. For this, it helps to go beyond the usual suspects and academic expertise to reduce risk of overburdening and to ensure results are broadly understandable to different audiences (see authors above).

While it can be a successful strategy to address different national stakeholders, coordination among the different parts of the study is key to ensuring harmonised messages are provided. The scoping process should outline all deliverables, and ensure national priorities are duly taken into account. For example, it should be avoided that prioritization of issues to be studied should not be based upon the fact that certain stakeholder groups are better organized than others or that important links in the analysis are overlooked. The different TEEB components need to inform and reinforce each other and should not be developed independently.

[1] E.g. database of valuation studies available at the ACB E-Library: http://chm.aseanbiodiversity.org/index.php?option=com_wrapper&view=wrapper&Itemid=214&current=214

[2] See for example: A Tool for the Economic Valuation of Ecosystem Services in Flanders [URL]: www.lne.be/themas/beleid/milieueconomie/engelse-brochure-economische-waardering-van-esd/at_download/file

Communication strategy

As part of undertaking a TCS, a communication strategy should be made right at the start and updated regularly. This strategy should:

- identify potential stakeholders and target audiences;
- identify communication objectives and key messages;
- determine which communication channels to use. Channels can be - electronic, offline, face to face, or through opinion leaders etc. The selection of an appropriate communication channel depends on its degree of accessibility for the target audience and on its suitability for presenting the message. For example, publications are excellent formats to present the findings of the TCS as they can accommodate detailed information, however because they are by nature bulky for audiences, such as policy actors or a general public, extracting the key messages and presenting them in much lighter formats such as policy briefs, executive summaries or brochures is advised;
- use culturally acceptable but also innovative dissemination and public relations channels: e.g. newspapers, TV and radio programmes (news, nonfiction and even fiction – in some countries a lot of social messaging is done through soap operas for example), and social media;
- plan events and publications throughout the study: to gather information at the beginning (e.g. to identify priority environmental concerns and policy options TEEB should focus on), throughout (e.g. for data input, to test the draft assessments and presentation formats) and at the end (e.g. to present the results and the process to different groups of stakeholders); and
- identify events (e.g. World Earth Day that's celebrated globally, but also more national days like independence days etc.) where both the past and the future of a country are thought and talked about. But also alert to options to link TEEB questions or results to any ongoing discussion on related issues.

TEEB country studies should operate a two-way communication process. For this involve stakeholders, understand their issues, and incorporate as broad an expertise base as possible, including practical, local and indigenous knowledge. Listening to policy makers and other stakeholders and understanding their concerns and incorporating this into the design of your TCS contributes immensely to the relevance of your results. TEEB Germany uses several means for two-way communication including an online survey to enable stakeholder input on wireframes see Box 2.11).

Box 2.10: Case Example: Communication and Mainstreaming of TEEB Germany

Starting with a workshop of the steering group identifying the different target groups, aims, messages and communication channels, a strategic concept for communication of "Natural Capital Germany – TEEB DE" has been developed. Communication activities shall reach a broad range of actors, with a focus on decision makers in politics and public administration (e.g. organizations for nature conservation, water, forestry, agriculture, tourism, cites). In addition, companies and research as well as NGOs are addressed. The challenge is to identify targeted messages and adequate communication channels for each and prioritize between these groups.

Different communication channels are used to disseminate the messages of TEEB Germany to the different target groups – inter alia the website www.naturkapital-teeb.de, project flyers (German and English), banners for events, four major and two brief reports, short versions of the major reports for policy makers. Besides these products, the process is designed to enhance two-way communication by: a stakeholder committee (PAG) meets twice a year and provides inputs, comprehensive reviews and options to comment via a webtool, a series of workshops for discussing and structuring the content of each of the four main reports, as well as separate launch events for all reports.

Mainstreaming is seen as an important element of the strategic communication. The discussion on the economic significance of ecosystem services and biodiversity and on the possibilities and limits of economic valuation is carried into different stakeholder groups. The study leader and members of the steering group are active 'messengers' for TEEB Germany and widely use opportunities for speeches, panel discussions and actively pursue input at external events. The members of the advisory board and the stakeholder committee, which includes a broad set of stakeholders, play an important role in mainstreaming the messages of TEEB Germany; in addition, they help to identify relevant thematic foci and opportunities for mainstreaming.

By Bernd Hansjürgens, study leader, and Miriam Brenck, team member TEEB Germany

Further useful tips:

- Using concrete real world examples is important to generate interest and facilitate communication ideally using examples from your own country but also inspiring, off-the-beaten-track examples from elsewhere. Make sure at least some of your examples illustrate solutions and not just values at risk.
- Involving writes from environmental and business fields in addition to science writers will provide diversity in language and approach.
- Soft knowledge (e.g. on process) is relevant – whom to involve in what order and by whom? In this context peer to peer communication can be very effective.
- An advisory board with members from different sectors and societal fields can be extremely helpful in addressing different constituencies via some of their own members.
- In order to disseminate your results to as many potentially interested audiences as possible, make the information available online and enable translation into relevant languages. Make sure you plan for adequate resources and capacities for this early on in the process.
- Do not underestimate the work needed to make a data base understandable and useable via the internet as it can easily take several months and is not always the most helpful output for the general public.

Managing expectations about results should ensure that those results that do not provide either perfect coverage of all concerns or high levels of certainty are not seen as worthless. Full coverage and perfect certainty about results do not exist (and are not even needed for the TEEB process to facilitate change). The secret lies in carefully communicating the uncertainties involved and illustrating different options to deal with them.

Key References

TEEB National Ch. 2: Framework and guiding principles for the policy response.
Booth et al. (2010): Lessons Learned from carrying out ecosystem assessments: Experiences from members of the Sub-Global Assessment Network.
Ash et al. (2010) Ch. 1: Assessing Ecosystems, Ecosystems Services, and Human Wellbeing.

2.4 Getting stakeholders on board: Who should be involved? How to engage them?

Key Message

- It is essential that your TEEB country study engages stakeholders and addresses their needs.
- The early engagement of stakeholders will encourage a demand-driven process and the uptake of results or at least ensure support to the TCS.
- It is important to achieve a balanced involvement of stakeholder groups.

A stakeholder is a person, group or organisation with direct or indirect interests in your TEEB country study and its findings. It is important to remember that assessments such as TCS do not only produce results, they are also social processes.

The process of conducting a study is often at least as important as the resulting reports or tools. When carefully designed, the process offers the opportunity to raise interest in the topic, to get people enthusiastic, to get to know their concerns and address them; being involved in the process can transport much more meaning that just looking at some results. The international TEEB study was carried out using an open architecture to ensure maximum sustained and genuine participation of interested individuals. In fact, a key lesson learned from many sub global ecosystem assessment is to be inclusive.

Potential stakeholder groups for a TEEB country study may include, but are not limited to: scientists/experts from different disciplines (not just economists and ecologists), different government departments (e.g. environment, treasury, health, water, agriculture) and levels (communal, sub national and national), government implementing agencies

such as environmental protection, public health, cultural and natural heritage, land managers such as foresters, non-government organisations, business and local communities, and the media. Box 2.11 provides examples of how to engage with stakeholders for TCS.

Identifying stakeholders and deciding on their roles is an essential element to consider during the scoping phase of your TEEB country study. To engage stakeholders will provide benefits, and importantly strengthen the credibility, legitimacy and relevance of your TEEB country study (compare Box 2.9 above).

Benefits for having stakeholders participate in a TEEB country study include that broad participation, when carefully managed:

- fosters shared understanding of objectives and processes of the assessment;
- builds trust between governments and stakeholders;
- incorporates different disciplines and expertise;
- draws on a wide range of expertise and perspectives;
- promotes information sharing and networking;
- strengthens knowledge and capacity;
- potentially narrows areas of disagreement;
- fosters agreement on criteria and methods to be employed in the analysis;
- generates full and open discussion, sharpens conclusions and avoids unsupported opinions;
- broadens interest in assessment findings, their implications and necessary responses;
- promotes a culture of responsibility among all participants;
- leads to wider awareness and distribution of findings through stakeholder networks; and
- increases the chance that results will be supported and used by stakeholders.

Stakeholders will fall roughly into two groups: a)experts (from all stakeholder groups, as well as independent) who provide technical inputs to the study and b)users of the information, such as Government Ministries, NGOs, Private Sector and even researchers (some stakeholders may actually belong to both groups). How you engage with these groups of stakeholders will differ.

Box 2.11: Different examples on how to engage stakeholders in TEEB studies

TEEB Nordic public participation

Engagement of stakeholders formed an important part of TEEB Nordic, (see Box 2.4). The purpose of the engagement process was to increase awareness and common understanding of the value of nature among different stakeholders, develop a synthesis of existing information, and allow relevant experts and institutions to showcase their work. The engagement was carried out via establishing a quality review process, inviting relevant Nordic experts to contribute their experiences as case studies, and opening a dialogue with a range of relevant stakeholders. Amongst others representatives of Nordic Ministries of Environment, NGOs, and a range of Nordic research institutions and initiatives were included in these processes.

Besides the obvious benefits of increasing the quality of study via peer-review, the engagement process helped to create a common understanding on the issues among experts, researchers and other stakeholders, creating concrete buy-in to the study and successfully paving the way for the uptake of its results. It helped to identify synergies, enabled the development of stand-alone TEEB case studies with no additional resources, without risking the integrity and/or question the evidence-based nature of the study.

Jointly with TEEB Nordic, a related project by the Nordic Council of Ministers was carried out to increase awareness at the local level and to explore, via the use of participatory stakeholder workshops, the possible applicability and usefulness of the ecosystem service framework for integrating the value of nature into municipal decision-making. This project conducted stakeholder workshops in three pilot municipalities (Holbaek/Denmark, Raseborg/ Finland, Botkyrka /Sweden). Based on the results, the ecosystem service concept was considered to have a considerable potential to support decision-making at local level by: supporting communication by providing a common language, helping to identify key issues related to the importance and management of ecosystem services, and serving as a tool for awareness raising and education.

In particular, the concept was considered to help "bridging" different municipal departments and actors, making the monetary valuation of ecosystem services not always necessary to demonstrate their value. It is thus hoped that these encouraging insights will lead to the application of ecosystem services framework in concrete decision-making in the case study municipalities.

Source for TEEB for Nordic municipalities: Project leader Louise Hård af Segerstad (Al-baeco), see also project blog at www.teeblocal.wordpress.com

TEEB Germany: online consultations

In order to allow a broad range of inputs from different stakeholder groups and ensure that topics covered in the reports are comprehensive and relevant TEEB Germany places its report wireframes (structure with brief explanation of the envisaged content) on the web. Any interested party can then comment via a prepared questionnaire allowing for open comments as well. The open access tool www.surveymonkey.com/ was used for capturing and analysing the results. The consultation for the first report generated comments from 276 different individuals from over 60 groups (declaration optional) as different as NGOs, administration, research institutes and private individuals. A scientific peer review and a wider review – mainly by different relevant organization – are intended through a web-survey as well. More detail can be found on the TCS guidance webpage

TEEB in Brazil

In Brazil, the involvement of stakeholders is essential for mainstreaming the TEEB approach into the various bodies and spheres as a collaborative process is essential. The challenges encountered so far include:

- In Brazil, many relevant parties are not convinced of the utility of a TEEB approach due to the lack of practical methodology for implementing it and, furthermore, TEEB is commonly associated with economic valuation only, leading in particular to payments for ecosystem services.
- The Governance of the TEEB Initiative in the country is not yet established – a proposal for a ministerial decree to officially establish the governance of the TEEB initiative, including the establishment of the Coordinating Committee and the Executive Committee, as well as other guidelines, is still under discussion and its approval is not expected in the short-term.

To address this it was therefore crucial to include the Ministry of Finance in the stakeholder process, and to build strategic alliances with national and international bodies holding the relevant expertise. It was also decided to follow a stepwise approach avoiding overly ambitious objectives in the first phase of the study to build trust in the process and build on this in the further steps.

The TCS team can also explore collaboration with similar initiatives (as mentioned in Section 1.3) to use their contacts and findings. Many international donor organizations have poverty and environment related programmes in a number of countries, which have studied policy options, collected data and engaged stakeholders already. This also works the other way around and the team could consider becoming part of other initiatives, advisory boards etc.

Achieving a balanced involvement of stakeholder groups will contribute to the success of your study. Stakeholder identification and engagement can be made more effective by paying attention to the following:

- Identify potential providers (stakeholders) of information on relevant ecosystem services at different scales;
- Identify a comprehensive and representative, but not exhaustive, list of groups of stakeholders who are potentially affected by the findings of the study and/or by subsequent policy changes affecting biodiversity or the stock, flow, and/or distribution of ecosystem services;
- Create a conceptual map of the groups of stakeholders, identifying their likely areas of (dis-) agreement on the management of natural wealth, identifying likely gaps and/or over-representation of likely positions;
- Practice transparency in identifying and recruiting stakeholder groups such that all interested parties have the opportunity to be heard and to participate; and
- Use an iterative, 'snowball,' stakeholder identification process to ensure comprehensive involvement.

Stakeholder participation can include the following forms:

- Face-to-face, or virtual meetings with 'experts' and stakeholders to identify priorities, concerns, and existing information;
- Focus groups to drill down to more specific priorities and concerns of a particular group or groups;
- Assistance in collecting relevant information;
- Refinement, dissemination and implementation of the report's findings and recommendations;
- Monitoring the implementation of the TCS recommendations.

Try to avoid the following:

- Over- or under- representation of any group or groups of stakeholders;
- Attempts to inappropriately influence the objectivity of the process, particularly by more powerful or wealthy stakeholders, potentially including businesses, NGOs, and/or politically connected individuals;
- Granting exclusive rights to contributors or publishers, particularly if the TCS is supported in part by public funds;
- Dilution of the findings of the report due to a consensus-based process, rather than providing for minority opinion, dissention and caveats or concerns within the reporting framework,
- Providing equal weight to all opinions, regardless of their objectively evaluated merit, strengths and weaknesses.

Ideally stakeholders will achieve a mutual understanding of positions and interests in participating. This will enhance stakeholders' understanding of the requirements and usefulness of the TEEB process and willingness to accept its limitations. It will make the results of the study much more useful to them and constitutes a result in itself: enhancing societal dialogue about the value of nature is a very important precondition for any change in decision-making. The specific role each group of stakeholders plays in the process depends on the architecture of the TCS discussed in the previous point.

Throughout the engagement with stakeholders, the role of the TEEB team should be one of the enabler. While they are part of an assessment process that follows scientific principles to ensure robustness of results, stakeholders should not feel as if they are contributing to an academic study that may or may not produce useful results. They should feel that the TEEB team is there to help them answer questions they have been asking for a long time and also reach answers that they realise they had in themselves all along (Wegner and Pascual 2011). In other words, the TEEB team should engage with the stakeholders in a way that a business or life coach engages with their client. Such coaches do not take the questions, go away, work at them and come back with answers. They work with their clients to identify what the questions, opportunities and challenges are and help their clients to concentrate on the opportunities (and through that, identify new avenues and partners they may not have thought of on their own). This is an empowering process that results in actions being owned by the stakeholders, which in turn increases the chances of them being implemented. This means that you should also be prepared to refine or even readjust TCS scope and/or objective as the process proceeds according to key stakeholder needs, preferences and resolution of conflicting interests!

Key references

Ash et al. (2010) Ch. 2: Stakeholder Participation, Governance, Communication and Outreach, p. 39-45.
Communication, Education and Public Awareness - CEPA toolkit http://www.cepatoolkit.org/
GIZ (2012): Guidance documents on stakeholder participation.
International Association for Impact Assessment www.iaia.org/training/ and http://www.iaia.org/publications-resources/downloadable-publications.aspx.
WWF (2000): Stakeholder Collaboration – Building Bridges for Conservation. Ecoregional Conservation Strategies Unit Research and Development.

3 Main Study phase

3.1 STEP 1: Refine the objectives of a TEEB country study by specifying and agreeing on the key policy issues with stakeholders

3.2 STEP 2: Identify the most relevant ecosystem services

3.3 STEP 3: Define information needs and select appropriate methods

3.4 STEP 4: Assess and value ecosystem services

3.5 STEP 5: Identify and outline the pros and cons of policy options, including distributional impacts

3.6 STEP 6: Review, refine and report

The findings of Scoping results are the departure point for the main study phase. Based on these, terms of reference can be designed which can help to orient the formation of study teams on the different aspects identified as relevant (for examples see TCS guidance webpage).

Guidance presented here on the main study phase is provided largely along the six steps outlined in TEEB Local Ch. 2. These steps are important to apply, but need not all necessarily be applied in the order presented or to the same level of detail. This reflects the uniqueness of each decision-making context along with differences between approaches favoured by individual countries and institutions.

Table 3.1 sets the scene for this Section by providing a brief synopsis of the key elements in the main study phase. These are then discussed in more detail in the subsections that follow. The table lists the six steps recommended for the- main study phase and outlines the key outputs of each step. It also presents case studies that illustrate how these steps could be practically applied and are linked to form the building blocks of a complete study process. The case studies include the following work already conducted and broadly in line with the TEEB principles, and a hypothetical example of a study that could be considered:

Example 1: Namibian protected areas valuation and sustainable financing strategy case study.
In 2010, an assessment entitled, 'The Economic Value of Namibia's Protected Area System: A Case for Increased Investment' was commissioned by the Namibia Ministry of Environment and Tourism (MET). This was an update of a similar assessment done in 2004 that contributed to substantial increases in government funding for protected areas. The updated 2010 assessment of economic values (Turpie et al. 2010) was also accompanied by a closely related study outlining a Sustainable Financing Plan for Namibia's Protected Areas (Turpie et al. 2010a). Considered together, the assessments started by demonstrating the value of protected areas and then provided policy guidance on how to better capture and sustain value through financing policy options.

Example 2: Hypothetical water resource management case study
Sustainable water resource management is a key concern in many parts of the world and, as such, is likely to form part of TCS. With this in mind, a hypothetical case study of a country wanting to focus on this policy objective is used to illustrate the application of the assessment steps.

In the Sections that follow, each step in this phase of the study is discussed in greater detail focusing on:

- Outlining the key questions that need to be considered;
- Highlighting particularly important aspects, for instance lessons from TEEB, other studies or assessment processes;
- Providing case study examples to show how key elements have been carried out and how key questions have been answered;
- Listing the key messages and outputs of each step to act as checklists; and
- Referring to key parts of TEEB documents and other sources that can provide more detail and aid further understanding of specific concepts.

Table 3.1: An overview of the main study phase

Steps	STEP 1. Refine the objectives of the TCS by consultations on the key policy issues with stakeholders	STEP 2. Identify the most relevant ecosystems and ecosystem services	Step 3. Define information needs and select appropriate methods	STEP 4. Assess and value ecosystem services	STEP 5. Identify and outline pros and cons of policy options, including distributional impacts	STEP 6: Review, revise, and report study results
Key outputs	• Clearly defined objectives and scope for the study, with the appropriate level of stakeholder involvement, especially from national and local policy-makers • Basic grasp of the differences in perspectives and potentially conflicting interests across different policy dependencies as well as impacts. • Understanding of which institutions currently govern ecosystems and biodiversity and how decisions are made. • Brief problem statement that can be referred to in order to guide the study.	• Basic understanding that can guide assessment of how different stakeholders value and prioritize ecosystem services. • Key concerns identified with regard to ecosystem degradation or loss, the main drivers and trends, and related stakeholder groups. • List of prioritized ecosystem services which are linked to the objectives of the study.	• Clarity on what information needs to be generated and how this information will be used to further the overall objectives of the study. • Decision made regarding methods to be used, with justifications for the choice provided. • Clarity on key data sources and matching of intended methods with data, time, capacity and resources available for conducting the analyses.	• Assessment and valuation of relevant ecosystem services, including the trends in usage, degradation, ecosystem health, and resilience. • Detailed understanding and assessment of the key drivers of changes (what and by whom) in ecosystem service provision, and how stakeholders are affected by the changes. • Understanding of how the benefits associated with ecosystem services and the costs associated with their degradation are distributed.	• Broad outline of currently existing policies and alternative policy options or measures, tested against consistent criteria including distributional implications. • List and brief description of policy options or measures which show promise, giving a broad rationale. • If relevant, assessment of ecosystem service provision under different policy scenarios or use options, including the trade-offs involved. • Recommendations on how to best deal with un-avoidable negative distributional impacts that may arise.	• Review of study with recommendations either integrated into the study or clear reasons given for non-integration. • Final reporting appropriate to the needs of targeted decision-makers and other audiences. • Statement of recommended criteria and indicators to be considered for impact analysis and regular reporting of outcomes, after recommended policy changes are implemented

Steps Case study examples	STEP 1. Refine the objectives of the TCS by consultations on the key policy issues with stakeholders	STEP 2. Identify the most relevant ecosystems and ecosystem services	Step 3. Define information needs and select appropriate methods	STEP 4. Assess and value ecosystem services	STEP 5. Identify and outline pros and cons of policy options, including distributional impacts	STEP 6: Review, revise, and report study results
Example 1: Namibian protected area valuation and sustainable financing strategy	The identified key issues were that the economic value of protected areas (PAs) was not properly recognized, resulting in under-funding. In addition, a sustainable financing strategy was required in order for PAs to become more financially self-sustaining.	A wide range of ecosystem service benefits from protected areas were identified, including contribution to overall ecosystem functioning, carbon sequestration, water regulation, and cultural values. A focus on quantifying tourism value was agreed on due to its importance and growth potential for Namibian economy.	Given the tourism focus, information needs were identified around tourist numbers, their expenditures (e.g., for accommodation), and turnover and value-added of 'protected area tourism' to the Namibian economy.	The overall expenditure of wildlife-viewing tourists was estimated at N$ 2.35 billion/yr, plus N$ 96 million/yr for hunting concessions. This represents 2.1% of GDP (3.8% considering indirect impacts). A Social Accounting Matrix (SAM) model showed the contributions of wildlife tourism expenditures to different social groups, including lower income.	Assessed benefits significantly overshadowed PA management costs of N$ 452 million/yr providing compelling arguments for increased funding. Options for additional revenue generation were assessed (via concessions, entry fees, etc.). Policy recommendations included social equity and poverty alleviation aspects for local communities.	The report was subject to review and published in full report as well as executive summary versions. The report funders (UNDP, GEF) and authors could then engage with decision-makers.
Example 2: A hypothetical study focusing on water resource management	Increased frequency and severity of droughts, conflicts over water availability, and pollution are constraining sustainable development. Improved water resource management (quality and quantity) was agreed on as overall objectives based on thorough stakeholder analysis and participatory appraisal focusing on lower income communities.	Water ecosystem services were identified and prioritised. It was found that water regulating services were being severely impacted on due to pollution loads and increasing water extraction. Small-scale farmers were identified as most at risk. Policy drivers were subsidies for water consumption, fertilizers, a 'growth at all costs' policy focus, and environmental law exemptions for key industries.	An assessment of impacts associated with ecosystem services deterioration was decided on. An ecological-economic model was used to show impacts of deterioration on users, employing qualitative indices of ecosystem health and monetary valuation of socio-economic consequences. Good data availability allowed thorough consideration of impacts.	The 'change in production' approach was used to quantify monetarily how decreased water quality leads to decreased crop production and quantified vulnerability among farmers. Qualitative descriptions illustrated how ecosystem deterioration manifested impacts. The assessment also revealed whose behaviour would need to change for decreased impacts and more equitable outcomes.	Behavioural responses and incentives provided the basis for identifying potential policy and management actions. The key implications of these options were considered further. This included a broad consideration of likely effectiveness and distributional implications of options using scenarios allowing for identification of measures with highest potential of achieving pro-poor sustainability goals.	The report was subject to external expert review primarily by those in the water resource planning field and finalized thereafter. Specialist input was sought in drawing up messages and recommendations for high-level policy makers. Emphasis was on communicating the complexity and potentially confusing nature of the report's results in an understandable way.

3.1 STEP 1: Refine the objectives of a TEEB country study by specifying and agreeing on the key policy issues with stakeholders

Key Messages

- Only proceed once you are absolutely clear on objectives even if this takes more time and effort than anticipated.
- Be aware that while the stepwise approach should be useful to structure the activities, study processes will seldom be completely sequential or linear. Steps will overlap and may include feedback loops.
- From the outset, ensure including all relevant perspectives (e.g., of different stakeholders: national & local policy makers, local communities, civil society organisation (CSO), business).

The scoping stage should have produced an initial set of objectives and thematic focus areas. It should also have resulted in agreement on the appropriate spatial scale and time horizon of studies. The first part of the main study phase should aim to refine objectives for each of the focus areas. The refinement process should involve stakeholders as much as possible. It is preferable to spend a little more time on refining the objectives and planning of the study process rather than commencing with an unfocused and potentially misguided study process. In setting objectives, the SMART framework has been successfully used to guide thinking (see Box 3.1).

Key guiding questions:
for refining objectives include:

- Have you properly defined the societal or environmental problems or challenges which you wish to address and the spatial scales at which they operate?
- Have you captured the main perspectives on the issues from the point of view of different stakeholders and understood how their perspectives differ? This will assist in the initial identification of potential trade-offs between ecosystem services and the stakeholders that make use of them.
- Have you ensured that you adequately understand the overall policy context, institutional structures and management practices that contribute to problems that you have identified?
- Can your identified policy objectives be turned into questions which stakeholders and clients agree to and can be answered within the study?
- Have you cross-checked whether and how the expected new insights from the TCS can be expected to contribute to addressing the issues?
- Have you ensured that you will be considering the main drivers of problems and how these may best be addressed?
- Have you considered objectives at different levels and to different degrees of detail? In this regard, Box 3.2 outlines types and examples of objectives as used by the European Commission for impact assessment.
- Have you assessed which institutions currently govern biodiversity and ecosystem services? Who are the key stakeholders and how are decisions made (formally and informally)?
- Have you decided how far the study should go into detailed analysis of policy options or concrete response to challenges (in coordination with the client and mandate)? Do you want to present broad policy options or do you feel it is appropriate to analyse these options in detail as part of your study process? Clear boundaries need to be set in this regard before commencement (see also Step 5 for more details).

Box 3.1: Setting SMART policy objectives

Objectives should ideally be (UNEP 2009):

Specific: Objectives should be precise and concrete enough not to be open to varying interpretations.

Measurable: Objectives should define a desired future state in measurable terms, so that it is possible to verify whether the objective has been achieved or not. Such objectives are either quantified or based on a combination of description and scoring scales.

Accepted: If objectives and target levels are to influence behaviour, they must be accepted, understood and interpreted similarly by all of those who are expected to take responsibility for achieving them.

Realistic: Objectives and target levels should be ambitious – setting an objective that only reflects the current level of achievement is not useful – but they should also be realistic so that those responsible see them as meaningful.

Time-dependent: Objectives and target levels remain vague if they are not related to a fixed date or time period.

Key outputs

- ❖ Clearly defined objectives and scope for the study, with the appropriate level of associated stakeholder understanding and buy-in;
- ❖ Understanding of the differences in perspectives and potentially conflicting interests; and
- ❖ A brief problem statement that can be referred to in order to guide the study.

Readings and other resources

Useful sources:

For defining objectives:

- Section 4.3, p. 32 of Integrated Policy Making for Sustainable Development: A Reference Manual (UNEP 2009).
- Section 6.2, p. 27 of the European Commission Impact Assessment Guidelines (EC 2009).

Box 3.2: Types and examples of objectives for impact assessment.

It is often helpful to distinguish between different levels of objectives. For example, in their impact assessment guidelines for policy, the European Commission divides objectives into general, specific and operational objectives (EC 2009, p. 27). They note that it will not always be necessary to consider objectives on all three levels. The general and specific objectives will typically be the core of TCSs, while operational objectives may be part of subsequent implementation processes for specific policies or measures. The table below provides examples of general, specific and operational objectives. General objectives will typically be the output of the scoping phase (see Chapter 2) whereas specific objectives would be outlined in Step 1.

General objectives	Specific objectives	Operational objectives
Improved water resources management	• Decreased water use through water conservation and demand management. • Improved water quality. • Improved allocation of scarce water resources. • Greater protection of the natural environment in watersheds that are considered critical for water provision.	• Gradually remove subsidised water tariffs over a three year period. • Provide information and training on water saving methods and technologies. • Determine the ecological reserve needed to avoid aquatic ecosystem failures and adjust water allocations accordingly. • Pilot payments for ecosystem services schemes in three important watersheds within two years.
Improved formal protection and management of particularly conservation-worthy ecosystems	• Recognition of the value of protected areas and increasing funding for protected area establishment and management. • Expansion of the protected areas network. • Improved policy with regard to protected areas management including policies focused on better relations and benefit sharing with neighbouring communities and, enhancement of income raising options for protected areas.	• Establish two new national parks within a five year period. • Increase funding to protected areas management by 50% above current levels over a five year period. • Review and amend entrance fee and commercial concessions policy within two years. • Introduce a benefit sharing policy with neighbouring communities within two years.

3.2 STEP 2: Identify the most relevant ecosystem services

Key Messages

- First, systematically consider all ecosystem services in order to ensure that no important services are overlooked and then focus on the most relevant ones for analysis.
- Stakeholder inputs and adequate natural science expertise are indispensable in understanding aspects such as drivers of degradation, dependencies on ecosystems and vulnerability to change.

The scoping process will have identified policy issues on which to focus. The ecosystem services relevant to these policy issues need to be properly identified. In addition, it is often necessary to prioritize and focus on particular ecosystem services that are especially relevant. Aside from the benefits of greater focus, this is often necessary due to limited time and resources.

At some point, a decision will have to be taken regarding which ecosystem service classification to use. It is often best to start with a relatively broad list of ecosystem services and ensure that all relevant services are initially considered. Tools or checklists, for instance those presented in the Millennium Ecosystem Assessment or TEEB (see MA, Ch. 1; TEEB Foundations, Ch. 3.2), can be used to ensure that no important ecosystems and ecosystem services are overlooked. The Common International Classification of Ecosystem Services (CICES – www.cices.eu) has also been developed mainly for use in natural resource accounting and is internationally standardized allowing for comparison across countries. This may be more or less relevant depending on the intention and use of your study. The EU initiative on Mapping and Assessment of Ecosystems and their Services (MAES) provides a comparison of ecosystem service categories used by the Millennium Ecosystem Assessment, TEEB, and CICES (Maes et al. 2013). Experience has shown that stakeholders often identify a much more differentiated set of services than any of the classifications listed above. To fully understand what matters to people it might therefore be useful to identify relevant services directly with stakeholders.

The involvement of key stakeholders is generally indispensable to ensure that the complete range of ecosystem services relevant to people in your country are properly identified.

Key guiding questions:

For identifying which ecosystem services are most relevant and prioritizing them:

- What are the implications of the policy priorities identified (in Step 1) for the breadth and scope of the study? A study on the overall economic contribution of natural areas to better support a conservation focus would cover a broad range of services, whereas a study to support the conservation of watershed services would focus on water related ecosystem services.
- Which ecosystem services seem particularly important to the functioning of a given area's society and economy?
- Levels of dependence – who depends on the ecosystem services? How? To what degree?
- What are the main drivers (including policies and socio-economic developments) that are currently affecting ecosystem service provision or the loss of ecosystem services? What are the trends?
- Are there trade-offs or conflicts regarding delivery of different ecosystem services (e.g., food production vs. carbon sequestration) or between ecosystem services and other land uses (e.g., mining, roads, etc.)?
- Which synergies for delivery of different ecosystem services exist (e.g., reforestation leading to hydrological and carbon benefits)?
- Which services stakeholders are most concerned about particularly in the case of depletion or damage to these services?
- Which main causes for changes in the delivery of ecosystem services have stakeholders identified?

- At a broad level, have you explicitly considered and identified who are the 'winners' and 'losers' and what are the gains and losses? Who will get the benefits and who will cover the costs?
- How feasible is it to influence the provision and value of ecosystem services through management or policy. Some ecosystem services may be important, but their provision is very difficult to control completely or manage at a given spatial scale. For example the achievement of better water services provision through river management may be seen as important at a local level, but its achievement can also often benefit from responses beyond the local area and even beyond the borders of the country.
- What time and resources are available?

Based on experiences from the UK National Ecosystem Assessment and associated processes, Haines-Young (2011) adds three additional criteria based on bio-physical considerations for selecting relevant ecosystem services:

"The need to identify and report on the changes in the underpinning 'supporting' or 'intermediate services', because these more fully capture the integrity of ecosystems and are often the target of policy or management interventions;

The identification of where the greatest risks to the output of final ecosystem services are, given the possibility of large and irreversible [non-marginal] impacts; and,

The identification of where loss of ecosystem integrity would impose significant restoration costs on future generations."

It is important to note that prioritizing certain ES for assessment does not mean excluding the others entirely. Particularly when communicating results, it is important to be clear about what has been included in each category - for some services you might calculate monetary values, others may be characterized by biophysical quantities, while others described in qualitative terms. Both current and potential future importance and value are generally relevant.

Key outputs

- ❖ An understanding of how different stakeholders value and prioritize ecosystem services.
- ❖ An indication of key concerns with regard to ecosystem degradation or loss, the main drivers and trends, and related stakeholder groups.
- ❖ A list of prioritized ecosystem services which are linked to the objectives of the study.

Readings and other resources

Chapters and specific aspects from the TEEB reports:

- TEEB Foundations, Ch. 1: Typology and list of ecosystem services (Ch. 1.3.2)
- TEEB Local, Ch. 2: Conceptual frameworks for considering the benefits of nature
- TEEB Foundations, Ch. 3: Measuring biophysical quantities and the use of indicators

For a list of ecosystem services and possible indicators, see TEEB Foundations, Ch. 3, Table 3.4.

For a list of biophysical measures, their availability and their ability to convey information, see TEEB Foundations, Ch. 3, Table 3.1. and TEEB National, Ch. 3, Table 3.4.

Other useful sources:

For identifying and prioritizing ecosystem services:

- The Common International Classification of Ecosystem Services (CICES) website – cices.eu
  The EU Initiative on Mapping and Assessment of Ecosystems and their Services (MAES) – see working paper at http://biodiversity.europa.eu/ecosystem-assessments/about-1/an-analytical-framework-for-ecosystem-assessments-under-action-5-of-the-eu/download
- Ch. 3 of Ecosystems and Human Well-being: A Manual for Assessment Practitioners (Ash et al. 2010).
- Ch. 3 of Ecosystem Services: A Guide for Decision Makers (WRI 2008).

3.3 STEP 3: Define information needs and select appropriate methods

Key Messages

- The issues at hand or objectives of the TEEB country study determine the information and further analyses needed and the adequate methods.
- Carefully select models, parameters, assumptions, time horizons, scope and scale of studies according to the purpose of the analysis and target audience.

The types of information your TEEB country study will need and generate will depend on its objectives and audience. Once these have been rigorously defined, information needs should naturally emerge and flow from them. The key then becomes ensuring that clear links are made between objectives and defined information needs. Your choice of methods to generate the needed information will also depends on factors such as the objectives of the study, on availability of data, time, resources and skills, on target audiences, etc. Note that Steps 3 and 4 are closely linked and could almost be regarded as one step. Separating them was, however, favoured in order to highlight the importance of identifying the information that is truly needed and how to generate it prior to starting any actual analysis.

Studies can differ in various ways, such as policy area focus, ecosystem services to be considered, depth of detail, time horizon, spatial scope, or the format of the information. The better such aspects can be defined beforehand, the easier it will be to define information needs, select the appropriate methods to generate the information, and interpret the findings.

Bear in mind that at a broad scale one generally needs to use existing or generate new biophysical and associated socio-economic data or information. For instance, economic valuation of ecosystem services depends on a sound understanding of the biophysical functioning of ecosystems. In this context, it will be crucial to use appropriate indicators, both for bio-physical and socio-economic analysis.

In the context of TEEB Nordic (Kettunen et al. 2013), a comprehensive list of regionally relevant ecosystem services were developed, complemented by a list of possible/commonly used indicators for each service (see Box 3.3 for selected examples). A systematic distinction between direct indicators and useful proxy indicators was made, both for the bio-physical and the socio-economic domain. While the selection of indicators for a TEEB country study needs to match the objectives and/or scale of a given study, the work carried out by TEEB Nordic can serve as conceptual orientation and systematic approach for identifying and selecting indicators that are appropriate for your TEEB country study.

It is also essential to consider that many studies lack influence because they use formats that are incompatible with what decision makers are used to or know how to deal with. An appropriate format for communicating results should be thought of from the outset of any study (see also Sections 2 and 4).

Once information needs and methods have been clarified, it will be possible to identify what fields of expertise are needed within the team tasked with completing the TEEB country study. In most cases, people with the following technical skills will be required:

- Ecosystem services assessment
- Environmental resource economics and/or socio-economic assessment
- Policy assessment
- Stakeholder participation
- Communication (to assist with the simplification of complex scientific and socio-economic concepts in particular)

In some cases it will be necessary to draw on international experts where local capacity is not adequate. If this route is followed, opportunities for international experts to build the capacity of locals should be considered.

Box 3.3: Selected examples of possible and/or commonly used ecosystem service indicators identified in the context of TEEB Nordic

Ecosystem service	Bio-physical indicator (status / availability)		Socio-economic indicator (value)	
	Direct indicators (e.g. reflecting sustainable status)	Proxy indicators (level of use / availability as a proxy for status, with no reflection of sustainability)	Direct indicators (e.g. reflecting sustainable level of use)	Proxy indicators (current value as a proxy, with no reflection of sustainability)
Fishing: fresh waters and marine	Current actual stock / population size of fish in commercial use (estimated) Reproduction rate of the fish in commercial use (estimated)	Size of catch (current) Number of fish species in commercial use (current)	(Market) value / value added1 of catch (sustainable) Number of jobs / employment / businesses / income	Size / value of catch (current) Number / % of fish and other species in commercial use
Game	Population size of game species Reproduction rate of game species	Number of hunted animals (current) Amount of game meat (current used)	(Market) value / value added of game meat Amount of game meat (current used)	N/A
Flood prevention / mitigation	Index of flood protection characteristics, based on topography and area coverage of natural/semi-natural wetlands in risk areas Area coverage (%) of natural / semi-natural wetlands in flood risk areas	Number of flood events/ year/region (in flood risk areas) Duration of inundation periods (in flood risk areas) Land use change along the water-ways under flood risk Regulation in place to protect natural areas important for natural hazard mitigation	Value of protective function, i.e. infrastructure / economic activity / human well-being protected by ecosystem-based regulation (real or estimated) Avoided costs: estimated costs of damage / loss in absence of regulation service Replacement costs: costs related to replacing ecosystem-based regulation, including replacing infrastructure and its maintenance (estimated).	Economic losses associated with flooding (real or estimated) Population living / economic activities situated in areas depending (directly) on ecosystem-based regulation (i.e. facing risks of flooding)
Recreational and tourism enjoyment	Share of land cover with high recreation value (high recreational value defined based on degree of naturalness, presence of protected areas, presence of lakeshores and coastlines, and quality of bathing water) Access to nature (e.g. frequency of forest roads, vicinity of areas)	Number of protected areas Days spent in nature Visitors / national parks or conservation areas	Money / time invested in carrying out activities (e.g. travel costs, accommodations, equipment) Number of tourists / visitors Number of people engaged with an activity	Value of service based on stated preference methods (e.g. willingness to pay derived via contingent valuation) General investment in the conservation / restoration of natural areas, e.g. local / regional / state budgets for maintenance of green areas, extension of national and nature parks / protected areas, afforestation etc.

1 Market value is commonly used as an indicator reflecting the socio-economic value of ecosystem services. However, it is to be noted that ecosystem services, provisioning services in particular but also some cultural and regulating services, often also include consider-able additional inputs that are reflect in the price and/or estimated value (e.g. processing and marketing costs of products, costs of investment in infrastructure in recreational areas). Therefore, in terms of economic valuation value added (i.e. the difference between the estimated value and human input, such as the final price and the production cost of a product) would be a more accurate economic indicator for the monetary value of the service itself. Defining value added is often possible in local contexts, however at national and/or regional level – such in the context of TEEB Nordic – it might not be feasible to obtain such data for different services (e. g. existing national statistics only provide information on market value of fish, crops etc.).
Source: Kettunen et al. 2013

Key guiding questions:

On defining information needs

- What is the purpose for which you wish to generate the different types of information?
  For instance, you may need to demonstrate to decision makers the biophysical relationships between a particular ecosystem and the service it provides to stakeholders. Policy sectors and the public may need to be made aware of the economic impacts of particular ecosystem service degradation. The influence of particular policy or management options on ecosystem services may need to be demonstrated and quantified.
- Have you explicitly made clear the links between your objectives and your information needs? In other words, are you confident that the results of your assessment will indeed be sufficient to meet your objectives and answer the questions you posed at the start?
- Have you confirmed that the question you wish to address has not already been addressed by others (e.g. academics, government departments, consultancies, research institutes) or is in the process of being addressed? If the latter, are there opportunities for synergy and collaboration?
- Is there scope for reorganizing/complementing already existing information (this often increases overall value added)?
- What kind of data are you aiming to generate, and which indicators are you going to use?
  Options here include: qualitative description (e.g. of the importance of regulating or cultural services, for raising public awareness); biophysical quantification (e.g. of trends in ecosystem change under different scenarios, for decision support); monetary valuation (e.g. of selected services that have a clear link to well-being and could inform policy options); and selected indicators (e.g. number of people dependant on a resource, expected health benefits, etc.)
- Do you want to include scenarios in your study, which can be very useful for more clearly defining alternative sets of outcomes or consequences for further assessment? These could include comparisons between different levels of degradation, consumption or production patterns, demographic changes, etc. Stakeholder input / engagement can be used for selecting the relevant scenarios for the assessment of ecosystems and policy options. Usually one scenario will be the 'business as usual' or 'do nothing' which extrapolates the status quo into the future. Make sure scenarios differ sufficiently to be able to show different impacts and options. Annex 3.2 outlines the basic elements and stages of scenario planning.
- Have you considered and defined information needs at various levels – e.g. both for specific examples but also for the overall study?
- Have you considered an appropriate format of information needed for your target audience including indicators, scenarios and results? (see Chapter 4).

On selecting appropriate methods

- Have you conducted a literature review of published and other sources relating to similar projects in order to learn from them and potentially adapt your approach if necessary?
- If you are completing a wide-ranging assessment covering many ecosystems and their services then you may need to define some common methods/datasets;
- Will you be using case studies of individual sites/areas or issues to illustrate key points and values?
- Have you considered the possibility that your assessment may generate unexpected results and does your approach include planning for such eventualities (e.g. flexibility to be built into the study process with regular updates and option for an urgent steering committee meeting to be called)?
- Have you considered the time, resources and capacity available and how this may influence your choice of methods?

Key outputs

- ❖ Clarity on what information needs to be generated and how this information will be used to further the overall objectives of the study;
- ❖ Decision made regarding methods to be used, with justifications for the choice provided; and
- ❖ Clear understanding of key data sources and matching of intended methods with data, time, capacity and resources available for conducting the analyses.

Readings and other resources

Chapters and specific aspects from the TEEB reports:

- TEEB Foundations, Ch. 1: Typology and list of ecosystem services (Ch. 2.3.2, p. 13 onwards in report, p. 19 onwards in book)
- TEEB National, Ch. 3: Strengthening indicators and accounting systems for natural capital (Ch. 3, p. 1 in report, p. 79 in book)
- TEEB Local, Ch. 2: Conceptual frameworks for considering the benefits of nature (Ch. 2, p. 28 in report, p. 35 in book)
- TEEB Local, Ch. 3: Tools for valuation and appraisal of ecosystem services in policy making (Ch. 3, p. 41 in report, p. 57 in book)
- TEEB Local, Appendix: Practical advice, FAQs, tools and databases (Ch. 10.4, p. 186 in report, p. 301 in book)

For a list of ecosystem services and possible indicators, see TEEB Foundations, Ch. 3, Table 3.4.

For a list of biophysical measures, their availability and their ability to convey information, see TEEB Foundations, Ch. 3, Table 3.1.

For examples of using biophysical indicators for valuing ecosystem services, see TEEB Foundations, Ch. 3 (p. 128-134 online, p. 134-138 in book).

TEEB Foundations, Ch. 3.2 explains the role of indicators for measuring biodiversity and ecosystem services, and how they can inform environmental policies.

Other useful sources:

For selecting appropriate indicators and methods:

- Ch. 9 and 10 of TEEB for the Nordic Countries (Kettunen et al. 2013)
- Ch. 4 of Ecosystems and Human Well-being: A Manual for Assessment Practitioners (Ash et al. 2010).
- Ch. 3 of Ecosystem Services: A Guide for Decision Makers (WRI 2008).

3.4 STEP 4: Assess and value ecosystem services

Key Messages

- Bear in mind that biophysical information forms the basis for the generation of associated socio-economic value data or information.
- Carefully consider when economic valuation is useful and what statements regarding economic value are appropriate (e.g., related to different choices or scenarios). In most cases marginal values are preferable to total values.
- Trade-offs and synergies between different ES need to be made explicit.
- Dealing with current and intergenerational distributional issues is an indispensable aspect of ES assessment.

The process of assessing ecosystem services needs to be guided by the objectives of the study and the stage of the policy cycle for which inputs are being generated. For a TEEB country study, it is worth bearing in mind that objectives will relate to societal challenges or issues, and that the approach advocated by TEEB is based on ensuring the explicit consideration of the often overlooked values of ecosystems and their services. In broad terms it should:

- Provide an understanding of the links between ecosystem changes and human well-being along with the value of ecosystem services in terms of human well-being.
- Spell out causal relationships between pressures, actions and outcomes for changes in ecosystem services.
- Make explicit the distribution of ecosystem services among different stakeholder groups and the implications of this distribution for the achievement of equity goals.

- Provide a better understanding of the incentives people face in their use and management of natural resources (key inputs in the identification of policy options which are the focus of Step 5).

In order to achieve these aims, you generally need bio-physical, socio-economic data to form the basis for the deriving/calculating ecosystem service values. Often a significant task in assessment will thus be to assemble existing data from numerous sources, distil what is useful and then fill information gaps with focused primary research work. Generating biophysical, socio-economic, cultural and other data will consequently draw on a potentially wide range of techniques and tools. Aside from the provision of data and information, it is also important to provide a clear narrative as part of the assessment. This helps to make data understandable and clarifies the implications of findings in a non-technical way (see Section 4 for more details on presentation and use of results).

Measuring values and trade-offs

Bear in mind that assessment of the value of ecosystem services can be conceptually divided into (1) those which are only qualitative, (2) those which include quantitative measures such as non-monetary indicators and (3) those which also include monetary measures. TEEB highlights the complementarity of all of these approaches. It views monetary valuation as one tool that can be useful in many circumstances whilst also recognizing that monetary valuation is not always appropriate or even possible. Study objectives including intended study audience will play the key role in determining the appropriate way to assess ecosystem services including whether monetary valuation is required or not. For example, if the economic and finance ministries are a target audience, then it is likely that they will find monetary values particularly useful in their debates and decision making processes. On the other hand, if the study is focused on the identification of initial policy options it may be possible to identify these options based on an understanding of the incentives facing users of ecosystem services. Overall conceptual guidance on the decision of whether to include valuation is provided in Box 3.4 which considers the why and how of valuation and economic tools.

Box 3.4: Approaches to ecosystem service valuation

Approach	*Why do we do it?*	*How do we do it?*
Determining the total value of the current flow of benefits from an ecosystem	To understand the contribution that ecosystems make to society	Identify all mutually-compatible services provided; measure the quantity of each service provided; multiply by the value of each service
Determining the net benefits of an intervention that alters ecosystem conditions	To assess whether the intervention is economically worthwhile	Measure how the quantity of each service would *change* as a result of the intervention, as compared to their quantity without the intervention; multiply by the marginal value of each service
Examining how the costs and benefits of an ecosystem (or an intervention) are distributed	To identify winners and losers, for equity and practical reasons	Identify relevant stakeholder groups; determine which specific services they use and the value of those services to that group (or changes in values resulting from an intervention)
Identifying potential financing sources for conservation	To help make conservation financially sustainable	Identify groups that receive large benefit flows, from which funds could be extracted using various mechanisms

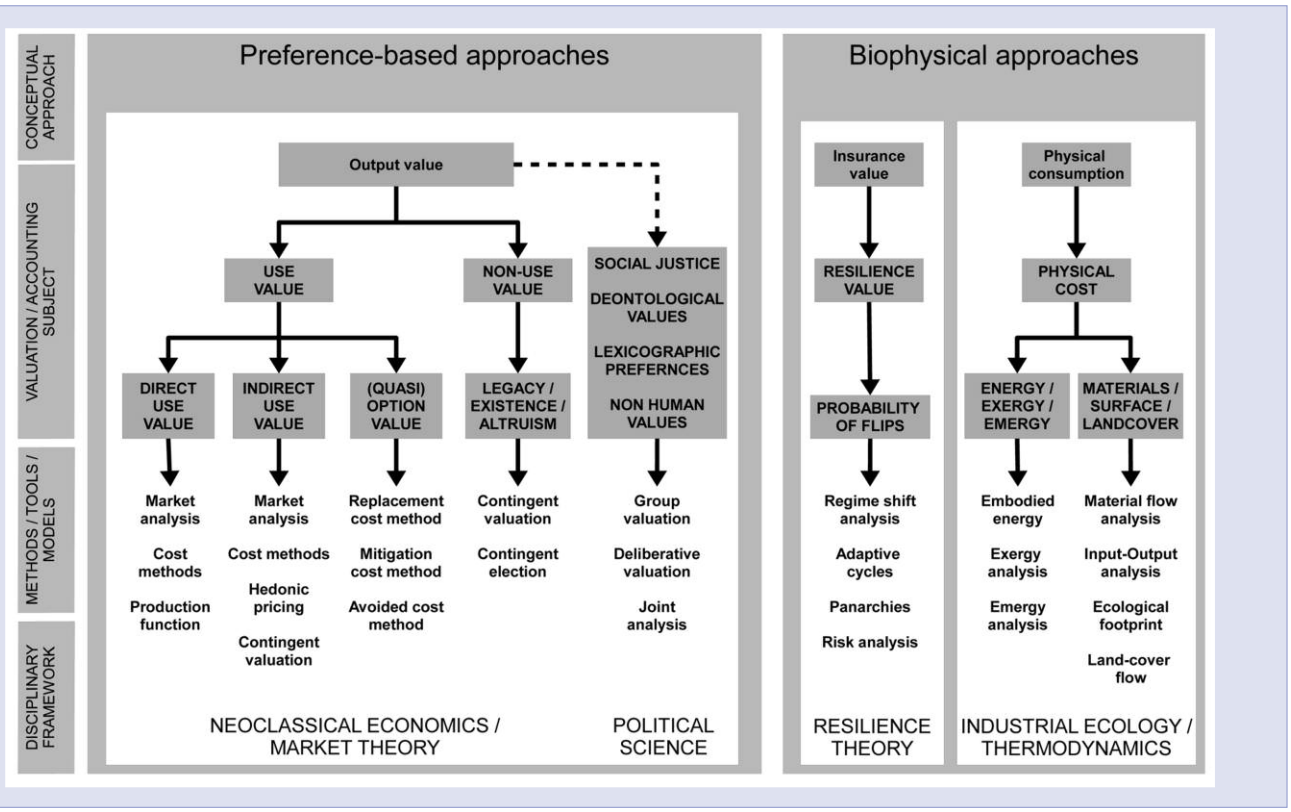
Should monetary valuation be under consideration, the choice of valuation technique(s) is important. Valuation techniques should be applied with careful consideration. Every case has a unique problem statement and techniques used need to fit different types of problems. Some techniques are also more suitable for the valuation of certain goods and services than others. Guiding principles in this regard are outlined in TEEB Local, Ch. 3 with further detailed guidance available from a number of sources, some of which are listed at the end of this section. Annex 3.1 summarizes important issues to keep in mind when using economic valuation of ecosystem services.

Whether using monetary valuation or other metrics, it is likely that the relative importance of an ecosystem service will need to be assessed and that some conceptually sound way will be needed to inform trade-offs. Figure 3.1 summarizes the valuation approaches under the two main categories of bio-physical and preference-based methods. Alternative approaches to making trade-offs between outcomes with or without monetary valuation are also discussed in TEEB Local, Ch. 3.

Distributional considerations

A key advantage of looking at the human-nature relationship through the ecosystem service lens is that it allows for a careful consideration of how benefits from nature are distributed among different stakeholders or groups in society. The consideration of distributional implications and impacts should run as a common thread throughout the study process and has been alluded to in the preceding steps. Formal assessment in this regard is generally a must-have if the equity goals that most countries are likely to have are to be taken seriously and in order to guard against unintended negative consequences for vulnerable members of society. Box 3.5 below shows how the decisions that are commonly made as part of a country's development path result in ecosystem services trade-offs and their associated distributional consequences. It outlines not only how the achievement of a given development goal can result in winners, but also how it can result in adverse impacts and losers.

Figure 3.1: Approaches for the estimation of nature's values



Source: TEEB Foundations, Ch. 5, Figure 5.1

Box 3.5: Ecosystem services trade-offs

Decision	Goal	Example winners	Ecosystem services decreased	Example losers
Increasing one service at the expense of other services				
Draining wetlands for farming	Increase crops, livestock	Farmers, consumers	Natural hazard regulation, water filtration and treatment	Local communities including farmers and some downstream users of freshwater
Increasing fertilizer application	Increase crops	Farmers, consumers	Fisheries, tourism (as a result of dead zones created by excessive nutrients)	Fisheries industry, coastal communities, tourism operators
Converting forest to agriculture	Increase timber (temporarily), crops, livestock, and biofuels	Logging companies, farmers, consumers	Climate and water regulation, erosion control, timber, cultural services	Local communities, global community (from climate change), local cultures
Converting ecosystems and their services into built assets				
Coastal development	Increase capital assets, create jobs	Local economy, government, developers	Natural hazard regulation, fisheries (as a result of removal of mangrove forests or wetlands)	Coastal communities, fisheries industry (local and foreign), increased risks to coastal businesses
Residential development replacing forests, agriculture or wetlands	Increase capital assets, create jobs	Local economy, government, developers, home buyers	Ecosystem services associated with removed ecosystems	Local communities, original property owners and downstream communities
Competition among different users for limited services				
Increased production of biofuel	Reduce dependency on foreign energy	Energy consumers, farmers, government	Use of crops for biofuels instead of food	Consumers (rising food prices), livestock industry
Increased water use in upstream communities	Develop upstream areas	Upstream communities, industries	Water downstream	Downstream communities, industries

Source: WRI 2008 p. 40

Importantly, most decisions that affect biodiversity and ecosystem services require dealing with consequences over long time-horizons. This adds an additional component to the distributional issue: how to deal with consequences for different generations? Annex 3.4 explains the challenges associated with approaching intertemporal decisions within economic analysis. It explains why in particular the choice of a discount rate should be reflected upon and handled with great caution.

Key guiding questions:

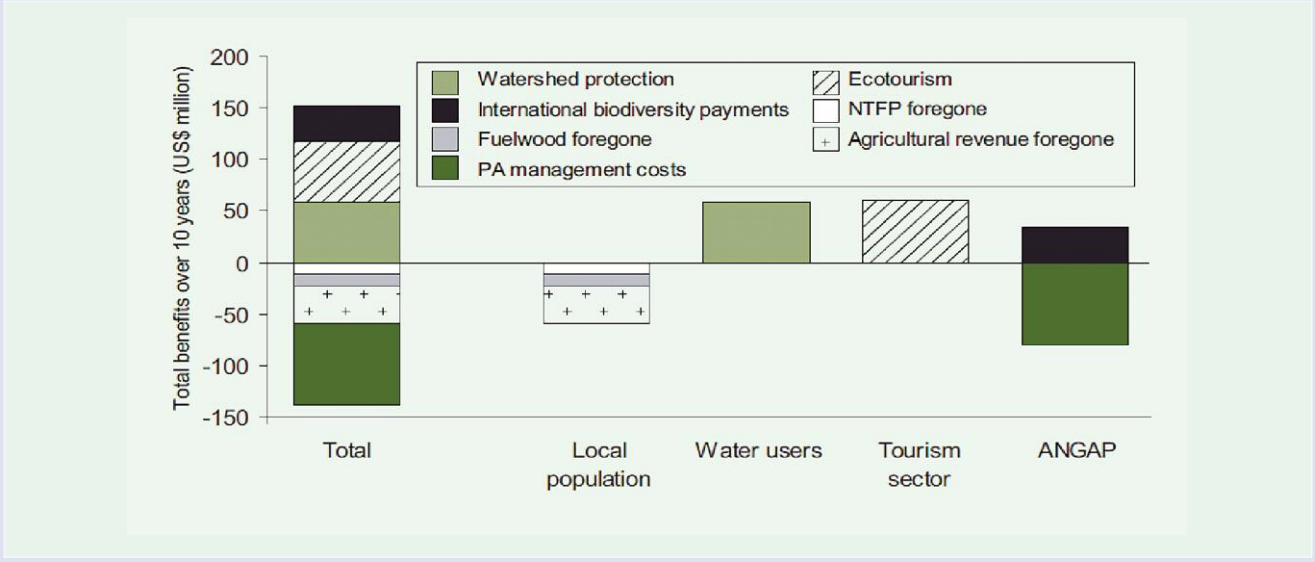
For assessing and valuing ecosystem services:

- Have you considered possible thresholds and tipping points? What would it take to reach them and what would be the implications of this (e.g. trade-offs with other services should be considered)?
- Have you spelled out causal relationships between pressures, actions and outcomes for ecosystem services? Where these are difficult to verify, simple indicators for measuring and monitoring change should be considered. This should ideally include a consideration of how existing policies drive negative outcomes.
- Have you considered land or other resource use alternatives? What are their ecological and economic consequences, and what experiences exist from elsewhere regarding more sustainable resource use?
- Have you considered ES from a system-wide perspective? Particularly where the interactions between ecological processes and socio-economic outcomes are complex and dynamic, ecological-economic systems dynamics modelling or simulation modelling can be used effectively (see Annex 3.3).
- Are trade-offs and distributional impacts for different stakeholder groups considered and made explicit (see Box 3.6 on costs and benefits of Madagascar's protected areas)?
- Similarly, are inter-generational (or inter-temporal) trade-offs and distributional impacts considered and made explicit?
- Is a thorough understanding provided of the incentives people face in their use and management of natural resources?
- Have you disaggregated local users as appropriate, particularly if there are different groups in a local area

Box 3.6: Distribution of the costs and benefits of Madagascar's protected areas

The Figure 3.2 below shows the result of an assessment of the costs and benefits of Madagascar's protected area paying specific attention to their distribution. It shows that local populations, who are also the most vulnerable group, tend to bear the greatest risks with regard to foregone benefits. These risks therefore need to be carefully managed and compensated for (in this case opportunities for increased incomes from tourism present one option at least over the longer term).

Figure 3.2: Distribution of the costs and benefits of Madagascar's protected areas



Source: Pagiola 2004, p. 24

each with their own uses and agendas that may well be in conflict or competition with each other? (See Box 3.5 for an illustration of how the decisions that are commonly made as part of a country's development path result in ecosystem services trade-offs.)

- Have you ensured that, particularly when considering the losers, you have included an assessment of their level of vulnerability and dependence on ecosystem services?
- Have you considered how scenarios and sensitivity analysis could be used in assessments to illustrate the likely consequences of different assumptions and outcomes? (see Annex 3.2)
- If you have used monetary valuation, have you ensured that common valuation pitfalls such as double counting have been avoided? Annex 3.1 outlines common pitfalls to avoid when undertaking a valuation exercise.

Key outputs

- ❖ Assessment of relevant ecosystem services, including the trends in usage, degradation, ecosystem health, and resilience.
- ❖ Understanding of the key drivers of changes in ecosystem service provision, and how stakeholders are affected by the changes.
- ❖ Understanding of how the benefits associated with ecosystem services and the costs associated with their degradation are distributed.

Readings and other resources

Chapters and specific aspects from the TEEB reports:

- TEEB Foundations Ch. 3: Measuring biophysical quantities and the use of indicators (Ch. 3)
- TEEB National, Ch. 3: Strengthening indicators and accounting systems for natural capital (Ch. 3)

- TEEB Local, Ch. 3: Tools for valuation and appraisal of ecosystem services in policy making (Ch. 3, p. 41 in report, p. 57 in book)
- TEEB Local, Ch. 10.4 Practical advice, FAQs, tools and databases (p. 186 in report, Appendix: p. 301 in book)

For examples of biophysical indicators for valuing ecosystem services, see TEEB Foundations, Ch. 3 (Ch. 3, p. 28-34 in report, p. 134-138 in book).

TEEB National, Ch. 3.2 explains the role of indicators for measuring biodiversity and ecosystem services, and how they can inform environmental policies.

For guidance on valuation methods, frameworks and appraisal of ecosystem services see TEEB Local, Ch. 2 and, in particular Table 2.1, represented as Table 2.2 in book, and TEEB Local, Ch. 3, in particular Table 3.1.

Answers to frequently raised questions related to the assessment of ecosystem services can be found in TEEB Local (Ch. 10.4, p. 186 in report, Appendix p. 301 in book).

Other useful sources:
For ecosystem services assessment and use of indicators see

- Ch. 4 of Ecosystems and Human Well-being: A Manual for Assessment Practitioners (Ash et al., 2010). and the UK National Ecosystem Assessment (UK NEA 2011)

For assessing the need for an economic valuation see Ch. 3, p. 36 of WRI (2008).

For conducting economic valuations see:

- World Bank Paper on Assessing the Economic Value of Ecosystem Conservation (Pagiola et al. 2004) and associated IUCN publication on" How much is an Ecosystem Worth?" (Pagiola 2004). Both of these address distributional issues.
- InVEST is a family of tools provided by the Natural Capital Project (2012) to map and value the goods and services from nature, in order to help decision makers better align economics with conservation. [URL]: http://invest.eco-informatics.org.
- UNEP provides a guidance manual for valuation of regulating ecosystem services (UNEP 2010).
- The Netherlands Commission for Environmental Assessment provides influential case studies on the valuation of ecosystem services and strategic environmental assessment (Netherlands Commission for Environmental Assessment 2008).
- Kettunen, M.; Bassi, S.; Gantioler, S. & ten Brink, P. (2009). Assessing Socio-economic Benefits of Natura 2000 – a Toolkit for Practitioner, Output of the European Commission project Financing Natura 2000: Cost estimate and benefits of Natura 2000, Institute for European Environmental Policy (IEEP), Brussels, Belgium, Retrieved August 2th, 2012. [URL]:http://ec.europa.eu/environment/nature/natura2000/financing/docs/benefits_toolkit.pdf.
- DEFRA provides a guidance and strategy document on the use of the benefits/value transfer technique in valuation (DEFRA 2010). [URL]: http://archive.defra.gov.uk/environment/policy/natural-environ/documents/value-transfer-strategy.PDF.
- Van Beukering, P.; Brander, L.; Tompkins, E. and McKenzie, E. (2007). Valuing the Environment in Small Islands - An Environmental Economics Toolkit. [URL]: http://jncc.defra.gov.uk/page-4065#download.
- WRI's (2008) 'Ecosystem Services: A Guide for Decision-Makers' provides guidance on policy oriented valuation, including on the selection of methods.

3.5 STEP 5: Identify and outline the pros and cons of policy options, including distributional impacts

Key Messages

- Choose policy options with care, giving preference to those that are most likely to achieve the desired outcomes within the broad confines of existing policy, governance and institutional frameworks.
- Outline the pros and cons or implications of potential policy options, their relevance for the different perspectives identified in Step 1.
- Be an 'honest broker': Avoid one-sided lobbying for a particular policy option and ensure that the distributional implications and trade-offs associated with policy options are comprehensively considered.

TEEB studies should be policy relevant. This does not mean that the assessments and economic values generated in Steps 3 and 4 can always directly support specific policies or decisions. In some cases for instance in the Namibia example described above, assessing ecosystem services and their values aims to 'make the case' more generally for preservation of biodiversity or for investments in conservation efforts. In those instances, the impact of the (valuation) study on agenda setting or policy processes will depend to a large extent on how policy makers are involved and how the results of the TEEB study are communicated to them (see section 2 above for stakeholder integration in the study process and section 4 for outreach). Other possible uses include accounting, policy appraisal (e.g. CBA), policy instrument design, and compensation/litigation. Table 2.1 in TEEB National discusses the different ways economic valuation can support policy processes.

Step 5 now illustrates how the identification, planning or ex-post evaluation of concrete policy options can benefit from valuation of biodiversity and ecosystem services. Evaluating different policy options within a TEEB study can potentially be very useful for informing policy, and as outlined in Step 4, valuation often makes most sense when different policy alternatives are compared – this means in many cases it makes more sense to first do Step 5 and then Step 4.

In order to start this step, relevant policy options or measures need to be identified and their pros and cons or key implications outlined. These measures can then be appraised further as part of wider policy processes with a view to implementation.

Identifying policy measures

To start out, you will need a thorough understanding of which current policy measures are in place and to what extent they are effective. If they are not fully effective, then you should understand the reasons why the expected outcome or impact is not reached, for instance due to lack of proper enforcement. Again, involving stakeholders in this step can be very useful, as their specific knowledge and perspective will facilitate understanding the challenges encountered.

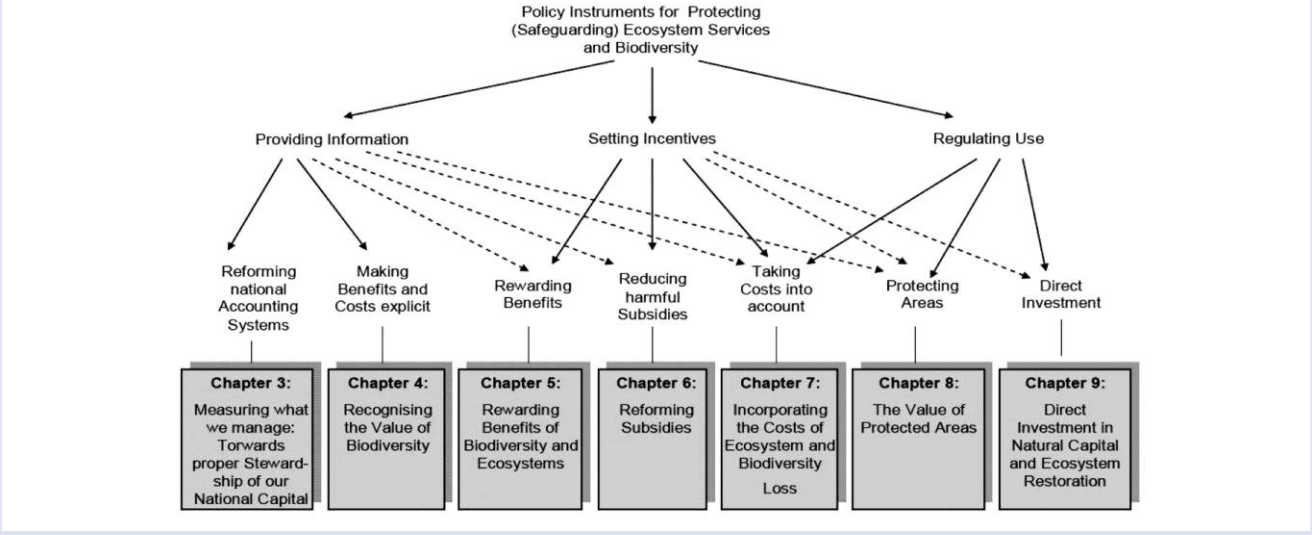
Next, alternative policy options can be assessed. The preceding step (Step 4) will generate much of the basic information needed to identify potential policy options/measures bearing in mind that policy options may have been identified prior to the start of the TCS. It will provide an understanding of the benefit flows associated with ecosystems and the costs associated with their degradation thereby providing a means for identifying policy measures. Further, this step of the study will provide an initial sense of the incentives or motivations that drive the overuse and degradation of ecosystems. It is these incentives that most often need to be addressed or changed by policy measures.

Policy measures aimed at ensuring change are discussed in TEEB National, Ch. 2-9 (see Figure 3.3 below) as well as in TEEB Local, Ch. 4-10 (see Figure 3.4 below). Potential measures include the following:

- Legal and regulatory mechanisms (e.g. amended or new laws, bans, zoning changes, planning provisions and restrictions, etc.);

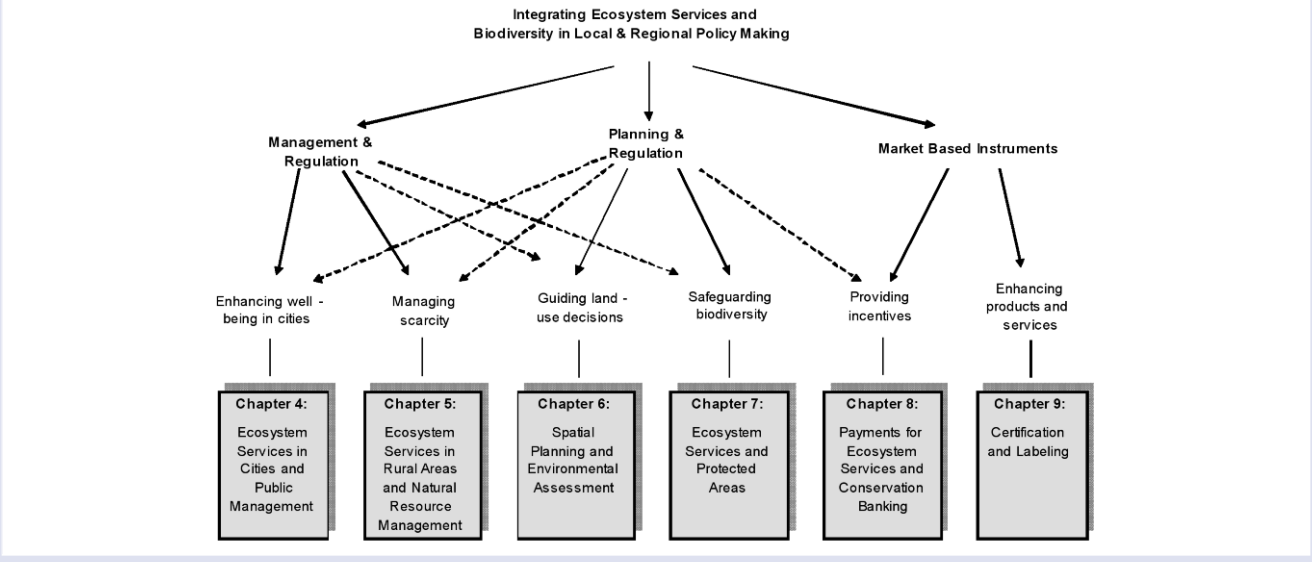
- Assignment and/or clarification of property rights;
- Removal of perverse subsidies and incentives;
- Introduction of economic instruments (e.g. payments for ecosystem services, conservation offsets, conservation banking, pricing, taxes, charges, subsidies, tradable permits, etc.);
- Information provision and awareness measures (e.g. strengthening indicators, accounting systems for natural capital, information campaigns, labelling and certification schemes);
- Education and training initiatives; and
- Measures that rely on moral suasion (e.g. 'name and shame').

Figure 3.3: TEEB National Overview of Policy Options



Source: (TEEB National Ch. 2, Figure 2.1)

Figure 3.4: TEEB Local Overview of Policy Options



Source: (TEEB Local Part III)

In most cases, more than one policy measure has the potential to provide a solution. It is therefore necessary to compare measures in order to decide on the preferred, most effective or most efficient measures. The process of identifying potential measures should focus on broadly identifying promising measures which can then be assessed further. As such, it needs to strike a balance between narrowing the universe of possible measures down as much as possible without rejecting measures prematurely.

Key guiding questions:
To identify relevant policy measures and to decide on the specific design of policies:

- Who benefits from ecosystem services, how and to what degree? Is there a fair justification for making beneficiaries contribute directly to the upkeep of these services?
- Who is most threatened by and vulnerable to ecosystem services degradation? How can they be supported?
- Who is currently or may potentially be protecting or sustainably managing ecosystems? How could they be supported or rewarded for efforts that enhance ecosystem service provision?
- Are there instances where the 'polluter pays principle' is not being implemented but it seems appropriate to do so? How could this be done?
- What are the incentive structures that govern the use of - or benefiting from - ecosystems (including those who use them as a waste sink) and how could these incentives be changed for the better?
- Where and among who does there seem to be a particularly low level of awareness or recognition of the importance and values of ecosystems and biodiversity?
- What are the best possible leverage or intervention points to target in order to maximize the potential for achieving changes?

Outlining key implication of policy measures
Having identified potential policy measures, the focus can shift to broadly considering and outlining their pros and cons or key implications in order to differentiate between them. These measures can then be put forward or recommended as an output of your TEEB country study for further comprehensive assessment, preferably as part of the wider policy evaluation/appraisal framework applicable in your country. For example, if your TEEB country study identifies legal instruments and taxes as both being worth further consideration then the detailed comparison of these measures (and potentially other measures not identified as part of your TCS) should form part of a wider policy evaluation/appraisal process. This process commonly would be aimed at determining which options would be optimal given efficiency considerations, governance approaches, implementation constraints etc. (i.e. the wider and often highly specific considerations relevant to overall policy choice in a country, the assessment of which will not generally be within the ambit of a TCS). In most cases the outputs of the TEEB country study would thus contribute to, but not lead, such a wider policy appraisal process(s). There may, however, be cases where the framework and collective forums put in place by a TEEB country study act as, or evolve into, an organising platform for detailed policy appraisal. As an example of such a wider appraisal process to which a TEEB country study can make a contribution, Annex 3.6 outlines the process and criteria used by the South African Treasury in their evaluation of market-bases instruments in support of environmental fiscal reform.

To assess the implications of potential policy measures you will have to consider carefully which information you need and what methods are most appropriate to use for your specific purposes. In a sense this means revisiting STEP 3, although now focused on the broad consideration and outlining of the key implications of policy options or measures. This broad consideration can then hopefully inform more comprehensive policy assessments/analysis incorporating the wider considerations described above.

Potential tools that could be applied to broadly outline the implications and compare policy options include, for example:
- Scenario-based planning (see Annex 3.2)
- Cost-benefit analysis (CBA) (see TEEB Local, Ch. 3.3, p. 50 in report, p. 72 in book)
- Cost effectiveness analysis (CEA) (see TEEB Local, Ch. 3.3, p. 55 in report, p. 78 in book)
- Multi-criteria analysis (see TEEB Local, Ch. 3.4, p. 60 in report, p. 89 in book)

In those cases where a TEEB country study process incorporates detailed policy appraisal (this will probably be the exception as discussed above), the tools listed above are also applicable but applied to a higher degree of detail. Other more focused tools may also be introduced in such circumstances including, for example, regulatory impact assessment, fiscal impact assessment, policy SEA (Strategic Environmental Assessment), macroeconomic modelling, etc.

Key guiding questions:

When assessing and comparing policy options/measures:

- Are the measures broadly compatible with existing policy, institutional and management frameworks or are changes needed? If so, what challenges have to be overcome and is it realistic to think that they can be overcome?
- Does your assessment of implications for vulnerable people suggest any management or mitigation measures that show promise e.g. in providing appropriate compensation, reducing poverty and exclusion?
- Have you considered ways in which policy options can be made as pro-poor as possible? For example, if environmental taxes are being considered, how can they be made more progressive? If this is not really possible within the tax instrument, are there other measures that can compensate for adverse effects on low income groups?
- Are the measures a departure from those that are commonly used in the country implying limited experience with them? What are the broad implications of this for potential success of and design of the measures? – For example, new measures may entail greater potential for flexibility and adaptive management (learning by doing).
- Has the compatibility of the measures with social and cultural norms been considered and have adjustments been made where necessary?
- Have broadly consistent criteria when comparing policy options been used (i.e. have the same or similar criteria been used in the process of comparing measures and deciding which ones seem most worthwhile)?
- Have potential unintended consequences of the policy options been considered, at least at a broad scale? For example, stringent protection of a given habitat or area may lead to the displacement of pressure onto other areas.
- Although a detailed assessment may not be appropriate, have you broadly considered the relative costs, human resource requirements and other costs/challenges associated with the policy options?

Key outputs

- ❖ Broad outline of currently existing and alternative policy options or measures, along consistent criteria including distributional implications.
- ❖ List of policy options or measures which show promise, providing a broad rationale.
- ❖ If relevant, assessment of ecosystem service provision under different policy scenarios or use options, including the trade-offs involved.
- Recommendations on how to best deal with unavoidable negative distributional impacts that may arise from policy options or changes.

Readings and other resources

Chapters and specific aspects from the TEEB reports:

- TEEB Local, Ch. 3: Tools for valuation and appraisal of ecosystem services in policy making (p. Ch. 3, p. 41 in report, p. 57 in book).
- TEEB National, Ch. 2: Framework and guiding principles for the policy response (Ch. 2, p. 1 in report, p. 47 in book).
- TEEB National, Part III (Ch. 5 – Ch. 9): Available solutions: instruments for better stewardship of natural capital. Chapters outline and discuss all the types of policy options available suing the following overall categories for options: CH. 5 – rewarding benefits through payments and markets, Ch. 6 – reforming subsidies, Ch. 7 – ad dressing losses through regulation and pricing, Ch. 8 – recognising the value of protected areas, Ch. 9 – investing in ecological infrastructure.
- TEEB Local, Part III (Ch. 4 – Ch. 9) in the book parts III and IV Ch. 4 – 10.
- TEEB National, Ch. 2: Taking fairness and equity into account in policy Framework and guiding principles for the policy response (p. 15 in report, p. 63 in book)
- TEEB National, Ch. 3: The need for a 'GDP of the poor' (Ch. 3.5, p. 33 in report, p. 113 in book)

Other useful sources:

For generating and understanding available policy options:

- Ch. 5 of Ecosystem Services: A Guide for Decision Makers (WRI 2008).
- Ch. 4 of Integrated Policy Making for Sustainable Development: A Reference Manual (UNEP, 2009)
- Section 7 of Assessing the Economic Value of Ecosystem Conservation (Pagiola et al. 2004)

For the evaluation of policy options:

- Ch. 5 of Integrated Policy Making for Sustainable Development: A Reference Manual (UNEP 2009).
- U.S. Environmental Protection Agency Guideline for Preparing Economic Analyses (US EPA 2008).
- European Commission Impact Assessment Guidelines (EC 2009).
- Treasury Board of Canada Secretariat Guidelines for Cost-Benefit Analysis of Regulatory Proposals (TBCS 2007).

For ensuring policy options and measure are pro-poor see:
- Environmental Fiscal Reform for Poverty Reduction (OECD 2005).
- UNDP-UNEP Poverty-Environment Initiative Primer on Mainstreaming Local Ecosystem-Based Solutions to Poverty-Environment Challenges (UNPEI 2011).
- Wittmer, H.; Berghöfer, A. and Sukhdev, P. (2012). Poverty Reduction and Biodiversity Conservation: Using the Concept of Ecosystem Services to Understand the Linkages. In: Roe, D.; Elliott, J.; Sandbrook, C. and Walpole, M. (Eds.). Biodiversity Conservation and Poverty Alleviation: Exploring the Evidence for a Link Conservation Science and Practice. ISBN 978-0-470-67479-6.

3.6 STEP 6: Review, refine and report

Key Messages

- Use reviewers from different stakeholder groups, including those in academia and in practical policy formulation and implementation.
- Be aware of and communicate appropriately what the study has not taken into account, and where it may be partial or have its limitations.
- Present and communicate study results in a way that the target audience will understand (see section 4).

Review and refine

Review processes are an important component of any study and need to be formalized and agreed upon before commencing. They provide guidance, help to ensure that study or assessment processes are as rigorous as possible, provide a fresh outside perspective, enhance results, add legitimacy, and can help to ensure greater buy-in to any findings. Reviews generally fall into one of the following categories all of which are often indispensable:
- Academic/expert reviews,
- Stakeholder reviews,
- Client review.

Implementing countries should appoint local experts, stakeholders and reviewers.

In addition to the above types of review a TEEB country study can also be officially endorsed by the international TEEB initiative, if this is considered useful by the study team. UNEP TEEB Office and appointed independent reviewers will accompany the study throughout the different phases and provide guidance where required. Endorsement should be applied for at the very latest by the end of the scoping phase, before beginning with the main study. The Advisory board with the assistance of UNEP TEEB Office will appoint at least one independent reviewer, who will ensure that crucial elements of the recommended TEEB country study process and key TEEB recommendations are addressed in the study (For further details consult teebweb.org.)

It is important that you calculate sufficient time for reviewers to comment and for the authors to incorporate the review comments.

Key guiding questions:

To guide review include:
- Has enough attention been paid at inception to the clear definition of study objectives / policy priorities? To what degree have the original questions and objectives been addressed? Have convincing reasons been provided where objectives have not been addressed and the implications thereof been outlined?
- Has the appropriate level of technical rigour been applied (bearing data and resource constraints in mind)?
- What are the gaps identified and how should they best be addressed (e.g. within another phase of the study or through some other process)? Has the study or any of the assessments within the study raised important questions for future research and, if so, how are these best addressed?

- What comments and inputs were received from stakeholders and were these dealt with in a satisfactory manner?
- Is the interpretation of the data and analyses correct? Linked to this, are the recommendations made by the TEEB country study supported by the data and analyses?
- Have key assumptions been made explicit and adequately incorporated in sensitivity analysis?

Once the review process is complete, its outputs and findings can be used to refine the study (or even make major changes if needed) and conclude it.

Reporting results

How and where results are reported can be as important as the results themselves in affecting changes. It is thus crucial to strategize early on in this regard, to ensure that resources are available and allocate responsibilities. Section 4 provides more detailed guidance on these aspects.

Key outputs

- ❖ Review of study with recommendations either integrated into the study or clear reasons given for non-integration.
- ❖ Final reporting appropriate to the needs of targeted decision-makers and other audiences.

Readings and other resources

For packaging and communicating results and information see Section 5, p. 38 of Making the case for the environment in development planning: A primer for mainstreaming environment in national development planning (UNPEI 2008).

For further examples of questions for review processes see TCS guidance webpage.

4 How to use the findings and recommendations of the TEEB country study

4.1 Stakeholder engagement for using the TEEB country study findings

4.2 Communicate the findings

4.3 Think beyond the TEEB country study

Dissemination of results should be an integral part of a TEEB country study. Policy makers and stakeholders with different, or even conflicting, interests were involved in determining the priorities for your TCS, have ideally contributed their knowledge and were involved in the review of the study. Now policy makers and stakeholders receive the results. By effective communication and outreach you can tremendously increase interest and uptake of your results. In this final dissemination phase, the challenge is to make the TCS results available and accessible to a much wider range of audiences and to create spaces for dialogue on results and recommendations which can lead to interesting and valuable inputs and ideas for policy formulation.

In this section you will find some good practice tips for achieving stakeholder engagement during dissemination of a TEEB country study. For hands-on advice on communicating with policy makers about research results and policy priorities see the briefs produced by the SPIRAL project: www.spiral-project.eu/content/documents#jump2briefs.

Insights in this chapter build on the TEEB series of reports and similar country based assessments as TCS are not yet completed.

4.1 Stakeholder engagement for using the TEEB country study findings

Key Messages

- Connect with on-going policy debates for translating study results into relevant arguments.
- Revise the stakeholder engagement that was started in Phase 2 to ensure that all those who may be interested in the results are included, even if they have not been involved in the TCS process.

A crucial part of the remit of stakeholder involvement that started in Phase 2 should be to ensure that the methodology and findings are geared to the interests and information needs of decision makers. In many cases this means to jointly with policy makers or with other stakeholders discuss and interpret results. It involves revisiting the policy questions which initially guided study design: how has the policy setting evolved? What is the current decision situation? What arguments can be built with the study result? What case needs to be made?

TEEB country studies will best inform policy debates if they can meaningfully contribute to them: study results need to be related to key points of a debate, in appropriate language, metrics, scale, and timing. This can best be achieved by working together with opinion leaders and those versed in the debate.

There are many case-specific factors that affect policy uptake, some of which are beyond TCS's control (e.g. political agenda). What is in control of the TCS is to select the methodologies, examples, and communication style. For example, some stakeholders may prefer top-down methodologies, while others prefer participatory bottom-up approaches. Each choice with regard to these elements of a TCS has its pros and cons and the choice is specific to the scope of a TCS.

There will likely be a wider range of stakeholders interested in the findings of your TCS than those who have been involved in the process (Phase 2). Seek options for connecting results to other processes:

- Discuss with key opinion formers and leaders in the country from different organizations and sectors to match the coverage of the TEEB country study.
- Continually revisit the windows of opportunity identified in Phase 2 and team up with the process or launches of other studies such as CBD plans, development plans, green economy / low carbon economy policies, poverty alleviation and sustainable livelihood projects, other guidance documents / manuals / training programmes.

- Engage with organizers of events at which TCS can be presented – environment focused days (e.g. World Earth Day) but also more national days like independence days where both the past and the future of a country are discussed. There are several further opportunities to present findings of a TCS e.g.: at universities, youth groups, schools, thematic exhibitions at a national museum, national fairs (e.g. agriculture, tourism) etc.

4.2 Communicate the findings

Key Message

- Communicate the results in ways that are relevant and engaging for different audiences

Three key factors that have played a major role contributing to the high level of interest in the international TEEB study are also relevant for TEEB country studies:

- Five reports published for different audiences brought out targeted key messages (i.e. for national policy makers, regional and local policy makers, business and citizens, see Box 1.1);
- Full use was made of mass, specialist and social media (newspapers, special features, Facebook, Twitter, corporate or individual blogs etc.);
- Reports were released successively release and dissemination of further information and materials was continued, including the findings of other studies and news to inform and maintain interest (via TEEBrief, TEEB4me website, social media, and workshops).

These activities keep TEEB fresh and help new stakeholders not previously involved to begin following the findings. This does not mean, however, that TEEB country studies will need to become an institution that continues at the same or increasing scale beyond the completion of the study, but rather, that TCS should include budgets and make time allowances for dissemination to continue beyond the publication of the results.

Each TEEB country study should have a communication plan agreed at the start and regularly updated to respond to changes, both within the study (e.g. updating or adding new results) and externally (e.g. responding to windows of opportunity that come up).

The following tips are developed from experience and are intended to help TCS teams avoid common mistakes:

Present the findings in a variety of ways to suit different stakeholders

While, it is a good idea to have one big report that contains the whole process and findings, make sure this is not the only product from your TCS. It is recommended to produce a full main report (for the experts) with an executive summary / synthesis report (for decision-makers) and accompanying presentations (for society at large). Box 4.1 gives advice on how best to convey information in support of your case/arguments.

Focus the results to **show the relevance and benefits for each stakeholder** and make recommendations specific to their needs. Think about who is going to read TEEB country study report(s) and what context are they reading it in, e.g. are they generally exposed to discussions around biodiversity and ecosystem services or is the TEEB country study the first time they've engaged with these topics? Are there certain ecosystem services particularly interesting or relevant to them, what are their ways of addressing issues (e.g. more action-oriented / solution oriented vs. more reflexive / analysis oriented)? Carefully select examples the audience can relate to.

Box 4.1: Presenting information and making your case

In its primer on making the economic case for the environment in development planning, UNPEI provides some advice on how to convey a strong and effective message (UNPEI 2008, p. 38):

> "From the start, be clear about the points you want to make and the arguments you are trying to support with economic figures, statistics and examples.
>
> Think carefully and logically about the steps that are required to build this case, and summarize the key data which proves, demonstrates or illustrates each stage of your line of reasoning.
>
> Identify any potential inconsistencies or sources of ambiguity in the data you are putting together, and be prepared to defend the particular interpretations you have made and conclusions you have drawn.
>
> Remember that your argument revolves around the statements you are making, not the qualitative or quantitative data alone. Statistics and figures should be used to back up and illustrate your reasoning, and to confirm your arguments, and always require careful explanation."

Ensure to have **different avenues** through which to release the findings. For example:

- Briefings for government and other relevant stakeholders;
- Press coverage at the appropriate level;
- Launch events / workshops (before and/or after publication);
- Publication of the reports/studies;
- International coverage (e.g. international conferences, workshops, TEEB website and newsletter)

Use **suitable language** targeted to the audience, for example: is it more effective to address a certain audience with active vs. passive, formal vs. informal language?

Don't rely on terminology and jargon to convey a message. It is possible to explain the process and findings of a TEEB process in everyday language. If, however, certain stakeholders prefer more technical language, then engage in this way (see above).

Use specialist writers. It would help if the TEEB country study team included at least one good 'journalistic' writer and/or collaborated with writers and expert amongst stakeholders as well as all the necessary experts. Writers can be seen as 'translators' who are skilled at working between science, policy and private sector and civil society spheres, i.e. they understand the language, culture and logic of all sides, and can help to remove jargon and build bridges.

Focus on the key messages - don't present all the data all at once. Write in a journalistic style by which we mean that the readers can read the first sentence of each paragraph, skip the rest and still understand the key messages. Interested readers can always search the annexes of a report for the full data. Also, avoid using several decimal places: this can give a false sense of accuracy.

Highlight key results and messages by using **imaginative visual tools** and graphics. Make use of charts, graphs, pictures, scatter plots, Venn diagrams, simple tables and infographics, TEEB ecosystem services icons.

Make the most of all types of media

- Ensure press coverage at the appropriate level. Decide whether to use local or national newspapers, specialized journals (of sciences and business), popular magazines, etc.
- Make the most of the social media (Facebook, Twitter, own blog, contribution to others' blogs) and ensure to provide continuous coverage over a reasonable time period rather than 'once-off ' posting or publications.

Continue to regularly update the TEEB country study website designed in the scoping phase

- A TCS website will be a main reference for most stake holders. The website should be the main database providing all of the different report materials.

- A newsletter to be distributed to stakeholders can be useful to remind them about the TCS on a periodic basis and inform them of latest updates in the TEEB country study and on additions in the website (e.g. new report formats, events, press coverage).

Use champions to spread the messages from TEEB country study

- Include 'champions' in each sector who can communicate the process and the results of the TEEB country study in their sectors. Champions should be sought amongst the leaders of the sectors who are opinion formers and trend setters (e.g. CEOs of large companies, union leaders, newspaper columnists and even artists and celebrities in addition to politicians and academics). Be sure to be balanced (for example, use not only NGOs or not only CEOs), so the results do not appear biased by one particular kind of group or person.

International Coverage

- International conferences, workshops and international press coverage can be useful for finding new opportunities for influencing new stakeholders (e.g. neighbouring countries or regions) and can help create interest at the national level as well.

4.3 Think beyond the TEEB country study

Key Message

- Think beyond the end of the TCS, both for taking its recommendations forward and for continuing the research and engagement process it set in motion.

Make the most of the TEEB country study findings

A TCS is designed and run to be policy relevant, not policy prescriptive. It will provide evidence of the pros and cons of policy options that were identified as worthwhile by the stakeholders. It is a starting point. More work will likely be needed before the TCS policy recommendations can be implemented in full. However, TCS will be more effective in influencing the rest of the policy development process if it makes clear recommendations about the next steps:

- Help stakeholders prioritize which policy options to take forward for further analysis – It is likely that TEEB country study will broadly consider several options in several policy areas. The guiding questions under Step 5 can help to guide discussions with stakeholders in the identification and broad prioritization of policy options to take forward in further analysis.

- Bear in mind that in real world policy making, there are many other factors to consider when deciding which policy area(s) to prioritize, such as: the cost of implementing policy options, existing interest / political support, financial resources, time, data requirements and so on. Thus, prioritization does not always mean tackling 'worst things first' or protecting 'the most valuable things first'.

- Recommend the issues that should be included in a full impact assessment of the selected policy option(s) – As outlined under Step 5 above, the outputs of the TCS will, in most cases contribute to, but not necessarily lead, the wider policy appraisal process(s) or full impact assessment of policy options. This requires a more detailed understanding of the options including the analysis of their environmental effectiveness, economic impacts, distribution of the costs and benefits, social and political acceptability, etc. (see also Annex 3.6 for a case example from South Africa). Some countries have official regulation or guidance on what a policy impact assessment should do. In this case, your TCS should try to produce results in formats compatible with such assessments.

The TEEB country study team could face the following challenges: Most countries have well established policy design, assessment and implementation processes. TCS aims to provide evidence for these and help connect different policy areas to create positive synergies. There is, therefore, a delicate balance between providing policy-relevant evidence and being seen as policy prescriptive – where the latter is unlikely to be helpful.

Box 4.2: Case Example UK NEA: choosing the right time and content for maximum policy impact

An ecosystem assessment is carried out at the interface between science and policy (or between 'knowledge' and 'action') and therefore its primary role is to inform policy decisions (UNEP 2009a). However, the policy impact of assessments is not often assessed (IPBES 2013).

After the release of the UK NEA's key findings, the impact on policy became immediately visible. This could be partly attributed to good timing as the final stage of the UK NEA coincided with the development of the Government's Natural Environment White Paper (NEWP). The NEWP outlines the Government's vision for the natural environment of England over the next 50 years. The UK NEA played an important role by contributing to the evidence base in the NEWP, which was used to formulate priority actions for the Government to ensure the sustainable management of the country's environment. Recognizing the value of the UK NEA, the NEWP set out a number of commitments. These included supporting "a further phase of ground-breaking research", "to investigate the mix of future actions most likely to secure the most benefits for nature and for people "it will also develop practical tools to assist decision makers in applying the lessons of the UK NEA" (Defra 2011). The follow-on phase of the UK NEA is currently underway and is addressing some of the knowledge gaps identified in the first phase, which it will report in early 2014.

The UK NEA illustrates that timing of the process can strengthen the impact of an assessment. This is in terms of both delivery of the assessment and identifying opportunities when policy may change, as opposed to producing policy-relevant information when there are no immediate plans for policy to be revised (Wilson et al. under review). The importance of having the correct authorizing environment and close engagement with key stakeholders is also highlighted in the UK NEA (IPBES 2013).

In addition to these considerations when planning an assessment, it is well documented that increasing the likelihood that knowledge within an assessment will have influence can be attributed to three other characteristics: relevance, credibility and legitimacy (IPBES 2013; Ash et al. 2010). These characteristics are described in more detail in the context of the UK NEA in (Wilson et al. under review).

Presentation of the results of an assessment can assist, or hinder, the communication of findings to decision makers. The UK NEA presented the information in various forms, from concise high level messages to detailed, technical documents. In addition, key graphics were carefully developed with a range of audiences in mind (UK NEA 2011).

If stakeholder engagement is not effective from the beginning of the TCS process, presenting the policy options for further recommendation will likely invite hostility rather than collaboration. Make sure to reconnect with stakeholders and include further relevant groups to support the uptake of TCS recommendations.

Finally, the planning of a TCS should include time and budget for engaging in and monitoring the policy assessment process that follows it. This is crucial to ensure that the process and momentum survives beyond the production of results and remains relevant and useful.

An advisory board or an independent monitoring team (representing a balance of interests) can advise also during the phase of implementation of policy options and could help increase transparency of, and hence, trust in the entire process.

Keep the TCS process alive beyond the production of the findings

A TCS does not stop with the publication of its final reports. One of its key outputs is to create a community of stakeholders whose continued engagement should be facilitated by the TEEB team or others. The following are some ways for such facilitation. It's not an exhaustive list and each TEEB country study team should think about the ways most suitable and effective for their country:

- Organize events open to external audiences to present the TCS process and findings;
- Present TCS process and findings at events organised by others (locally, nationally and internationally);
- Organize annual (or initially more frequent) meetings in which stakeholders can come together and report on their progress with TCS findings;
- Publicly report the progress of the further work that follows the TCS findings;
- Keep TCS website and its use of social media alive so that visitors are encouraged to keep coming back for more information. This should include all relevant news in the areas covered and not only on what the TCS initiative does.
- Support others in working with TCS results by relating your results to their concerns and jointly deriving possible implications for their work.
- Provide training for stakeholders that are likely to take the results forward. This can be done through training sessions, meetings, presentations and summary materials. It is important that interested stakeholders are aware of how the TCS was carried out and what its results mean.

Expand the scope of TEEB country study

TEEB country study team should keep the following typical areas of extension in mind when designing the process and dissemination (the list is of course not exhaustive):

- Address the gaps in knowledge, data, institutions etc. identified by TCS. For example, the UK National Ecosystem Assessment identified 11 priority areas that needed further research. Funding was sought for these and found – as the areas were of interest to a variety of funders to make better use of the evidence provided by the UK NEA. A second phase (UK NEA Follow on) started soon after the UK NEA (compare Box 4.2 above).
- Geographical expansion of TCS. If, for example, the original TCS was for a region of a country, other regions will likely show interest in repeating the TCS for their own region. It is therefore useful to invest the time and effort to involve decision makers from other regions, especially at key milestones of the TCS process. However if this is not possible, presenting the TCS results to them could still inspire further involvement.
- Content expansion of TCS. Stakeholders interested in ecosystems, economic sectors and policy areas which are not studied in the original TCS will likely show interest in applying the TCS process to their areas. For example, if you did a forestry TCS, other sectors in contact with forestry (i.e. those who sell to / buy from forestry as well as those who have physical boundaries and are hence beneficiaries of its ecosystem services) may want to engage in the TCS process or do a similar study for themselves, which may also better prepare them for negotiation with forestry.

Once the TCS process delivers inspiring results, decision makers will likely want to see other scenarios explored. In our experience TEEB can develop rapid momentum and the good team spirit has compensated for the immense amount of hard work that was often required to meet expectations. To take this further, a lot of exiting work lies ahead. We hope this manual has provided some useful support and look forward to your feedback and learning about your experiences.

Glossary

Biome: A large geographic region, characterized by life forms that develop in response to relatively uniform climatic conditions. Examples are tropical rain forest, savannah, desert, tundra.

Biodiversity (a contraction of biological diversity): The variability among living organisms, including terrestrial, marine, and other aquatic ecosystems. Biodiversity includes diversity within species, between species, and between ecosystems.

Certification: A procedure by which a third party gives written assurance that a product, process or service is in conformity with certain standards.

Conceptual framework: Is a concise summary in words and pictures of the relationships between people and nature including key components of interactions between humans and ecological systems. Conceptual frameworks assist in organising thinking and structuring work when assessing complex ecosystems, social arrangements and human – environment interactions (UK NEA 2011).

Ecological stability (or ecosystem health): A description of the dynamic properties of an ecosystem. An ecosystem is considered stable or health if it returns to its original state after a disturbance, exhibits low temporal variability or does not change dramatically in the face of a disturbance.

Ecosystem: A dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.

Ecosystem function: A subset of the interactions between ecosystem structure and processes that underpin the capacity of an ecosystem to provide goods and services.

Ecosystem health: see Ecological stability

Ecotourism: Travel undertaken to visit natural sites or regions without harming them.

Equity: Fairness in the distribution of rights and of access to resources, services, or power.

Governance (of ecosystems): The process of regulating human behaviour in accordance with shared ecosystem objectives. The term includes both governmental and nongovernmental mechanisms.

Human well-being: A context- and situation-dependent state, comprising basic material for a good life, freedom and choice, health and bodily well-being, good social relations, security, peace of mind, and spiritual experience.

Indicator: Information based on measured data used to represent a particular attribute, characteristic, or property of a system.

Institutions: The rules that guide how people within societies live, work, and interact with each other. Formal institutions are written or codified rules, such as the constitution, the judiciary laws, the organized market, and property rights. Informal institutions are rules governed by social and behavioural norms of the society, family, or community.

Label: A label or symbol indicating that compliance with specific standards has been verified.

Natural capital (or Natural health): Natural capital are natural assets in their role of providing natural resource inputs and ecosystem services for human-wellbeing.

Opportunity costs: Foregone benefits of not using land/ecosystems in a different way.

Public goods: A good or service in which the benefit received by any one party does not diminish the availability of the benefits to others, and where access to the good cannot be restricted. Examples include clean air, beautiful landscapes, protection from flooding.

Resilience (of ecosystem): Capacity of an ecosystem to tolerate disturbance without collapsing.

Stakeholder: A person, group or organization that has a stake in or is affected by the outcome of a particular activity.

Standard: Documented agreements containing technical specifications to be used consistently as rules, guidelines or definitions, to ensure that materials, products, processes and services are fit for their purpose.

Trade-off: A situation (e. g. Management choice) that that involves losing something (e.g. one ecosystem service) in return for gaining something else (e.g. another ecosystem service).

Vulnerability: Exposure to contingencies and stress, and the difficulty in coping with them.

VALUES:

Valuation: The process of expressing a value for a particular good or service in a certain context (for example, of decision-making) usually in terms of something that can be counted, often money, but also through methods and measures from other disciplines (sociology, ecology, and so on). (Natural Capital Committee 2013)

Value: The contribution of an action or object to user specified goals, objectives, or conditions. (Natural Capital Committee 2013)

Altruistic value: The importance which individuals attach to a good or service out of selfless concern for the welfare of others.

Bequest value: The importance individuals attach to a resource that can be passed on to future generations.

Intrinsic (Inherent) value: The value of someone or something in and for itself, irrespective of its utility for someone else.

Total economic value (TEV): The value obtained from the various constituents of utilitarian value, including direct use value, indirect use value, option value, quasi-option value, and existence value.

Chapter 1
Annex 1.1: TEEB, WAVES and United Nations Committee of Experts on Environmental-Economic Accounting (UNCEEA)

The Economics of Ecosystems and Biodiversity (TEEB)
TEEB synthesizes knowledge from ecology, economics, policy, and social sciences to provide recommendations to end users (namely national and local governments and businesses) to measure, value, and mainstream biodiversity and ecosystem services into their respective decision making processes.

Conventional economic aggregates generated through national accounting, such as GDP, do not reflect the extent to which production and consumption activities may be using up environmental assets and limiting the capacity for these assets to generate ecosystem services in the future. In the operating space of public policy, TEEB recommends reforms to, inter alia, public policies for subsidy reform, land use management, protected area management, investment in natural infrastructure restoration, and national accounting to include natural capital using the SEEA. These generic recommendations are being taken forward at the Country level by TEEB country studies, for which this Guidance Manual for TEEB Country Studies provides guidance.

Valuation is just one, albeit a very important, component of TEEB implementation. Furthermore, TEEB recognizes that valuation may not necessarily be monetary – the context of decision-making would determine which methods and what degree of monetary valuation is appropriate (TEEB Synthesis, and Chapter. 3 guidance manual). TEEB recommendations emphasize the need to examine more than just values or prices, and therefore focus on other public policy instruments such as subsidies, investment in public goods/ ecological infrastructure, and poverty eradication incentives (TEEB Local).

Wealth Accounting and the Valuation of Ecosystem Services (WAVES)
The World Bank's Wealth Accounting and the Valuation of Ecosystem Services (WAVES) project aims to mainstream natural capital accounting in national accounting systems and policy analysis, including ecosystem services. To do this, WAVES generates demand and supports the institutional structure for implementation of the System of Environmental-Economic Accounting Central Framework (SEEA CF) described in more detail below. The SEEA 2012 has been developed under the coordination and management of the UN Committee of Experts on Environmental-Economic Accounting (UNCEEA), established by the UN Statistical Commission in 2005. A Policy and Technical Experts Committee was set up to provide guidance to WAVES on ecosystem accounting. The aim is to develop the relevant policy perspective for ecosystem management and governance and strengthen the national statistical system for measurement of the national economy and environment. During WAVES' preparatory phase (January 2011 to June 2012), a global partnership and a multi-donor trust fund was established. Work plans were prepared for implementation of the natural capital perspective in five developing countries and, following the Rio+20 Summit, plans to expand WAVES to other countries are under development (see www.wavespartnership.org/waves/about-us for further information). WAVES also works in close collaboration with the United Nations Committee of Experts on Environmental-Economic Accounting (UNCEEA) to advance the SEEA implementation by countries.

United Nations Committee of Experts on Environmental-Economic Accounting (UNCEEA)
In 2013, the United Nations Statistical Commission adopted the flexible and modular implementation strategy of the SEEA Central Framework (SEEA 2013) and tasked the UNCEEA, with the United Nations Statistics Division as Secretariat, with its execution. The SEEA CF is the international statistical standard, on par with the System of National Accounts and describes a multi-purpose conceptual framework (Figure provides a stylized representation of the relationships between economy and environment) for recording interactions between the economy and the environment. The white cover publication of SEEA CF is available at http://unstats.un.org/unsd/envaccounting/White_cover.pdf (EC et al. 2012). An assessment of environmental-economic accounting was conducted in 2006 and is available at: http://unstats.un.org/unsd/statcom/doc07/Analysis_SC.pdf (United Nations Statistics Division 2007). Since that time, additional countries have implemented components of the SEEA CF. It used for economic data, for organising information on (a) individual environmental assets (such as water resources, timber resources, mineral and energy resources, aquatic resources, land and soil resources); (b) the flows of natural inputs and residual

flows (e.g. emissions) between the environment and the economy and of products within the economy (for example, flows of energy, water and materials); and (c) economic transactions that can be considered environmental (such as environmental protection expenditure, environmental taxes and environmental subsidies). Approximately 50 countries have implemented various components of the SEEA CF.

Recognizing the need for a consistent and complementary methodology for measuring ecosystems in a holistic manner and their linkages to economic and human activity, the SEEA Experimental Ecosystem Accounting (EEA) (SEEA 2013a) extends the accounting principles of the SEEA CF to provide guidelines for recording both the material and the non-material benefits from the use of ecosystem assets (for example, benefits from the ecosystem services of water purification, storage of carbon, and flood mitigation). Selected modules of ecosystem accounting, in particular focusing on the measurement of carbon, nutrients, biodiversity, ecosystem services, and ecosystem condition, will provide, in due course, important indicators for policy analysis that complement the information from the SEEA CF.

Linking TEEB, WAVES and UNCEEA through SEEA

TEEB (in its Interim Report, 2008, in Climate Issues Update, 2009 and in the Synthesis Report, 2010) recommended the development of natural capital accounts to improve the information base for decision making. As the UNCEEA, in consultation with WAVES and other partners, moves forward with national implementation plans and strategies for the SEEA CF, countries will start making progress toward this recommendation.

Objectives of TEEB country studies (i.e. not related to National Accounting) include framing new regulations, formulating changes to land-use planning, subsidy reforms, investment in ecological infrastructure, PA evaluation, setting up local and national PES schemes, etc). Developing coherent, multidimensional public policy goals requires a monitoring and reporting system that would benefit from the use of the SEEA framework. This approach reflects central themes from TEEB's eleven recommendations (see Ch. 1.1) for decision-makers, including making nature's values visible, assessing value of ecosystem services and integrating these into decision making, and measuring better to manage better.

Following the TEEB approach requires questions to be asked – and answered - such as "What are relevant ecosystem services? From which biomes and ecosystems do they emanate? Whom do they benefit and to what extent?" These questions are also fundamental to the SEEA EEA conceptual framework. The process of attaining comparable answers to such critical questions will benefit from the adoption of a common conceptual framework, and the SEEA offers such a framework.

Multidimensional indicators regarding economic development and environmental sustainability are relevant in tracking country progress toward interdependent policy goals identified through the TCS process. The recent draft of SEEA CF Applications and Extensions (SEEA 2013b) provides an overview of possible applications of SEEA data series and describes how the SEEA CF can support the development of environmental-economic indicators. The statistical framework provided by SEEA supported by the UNCEEA implementation strategy, the WAVES policy strategy and other global policy partnerships create a consistent structure for TEEB in advancing its recommendations at the national, regional and global levels.

Annex 1.2: Strategic Goals and Aichi Targets related to TEEB and their corresponding COP decisions

TEEB RELATED									
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.	CBD Decision XI/15, Para. 4 (a)	CBD Decision XI/22, Para. 5	CBD Decision XI/30, Para. 2	CBD Decision XI/30, Para. 3	Ramsar Resolution XI/7	Ramsar Resolution XI/20	
	Target 2	By 2020, at the latest, biodiversity valueshave 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.	CBD Decision XI/7, Para. 3 (a)	CBD Decision XI/8, A, Para. 5	CBD Decision XI/22	CBD Decision XI/30, Para. 2	CBD Decision XI/30, Para. 12 (b)	Ramsar Resolution XI/2	
			CBD Decision XI/7, Para. 4 (c)		CBD Decision XI/22, Para. 5	CBD Decision XI/30, Para. 3	CBD Decision XI/30, Para. 12 (c)	Ramsar Resolution XI/20	
	Target 3	By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio economic conditions.	CBD Decision XI/4, II, Para. 13		CBD Decision XI/30, Para. 9		CBD Decision XI/30, Para. 12 (b)		
							CBD Decision XI/30, Para. 12 (c)		
	Target 4	By 2020, at the latest, Governments, business and stake-holders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.	CBD Decision XI/7, Para. 3 (a)		CBD Decision XI/8, A, Para. 5		CBD Decision XI/30, Para. 2		
			CBD Decision XI/7, Para. 4 (a)		Ramsar Resolution XI/20		CBD Decision XI/30, Para. 12 (b)		

TEEB RELATED					
	Strategic Goal C Improve the status of biodiversity by safe-guarding ecosystems, species and genetic diversity	**Target 11**	By 2020, at least 17% of terrestrial and inland water, and 10% of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes		
	Strategic Goal D Enhance the benefits to all from biodiversity and ecosystem services	**Target 14**	By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safe-guarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable	CBD Decision XI/19, Para. 14 (a)	Ramsar Resolution XI/3
		Target 15	By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification	CBD Decision XI/19, Para. 14 (a)	CBD Decision XI/19, Para. 17 (i)
	Strategic Goal E Enhance implementation through participa-tory planning, knowledge management and capacity building	**Target 19**	By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.	CBD Decision XI/22, Para. 5	Ramsar Resolution XI/7
		Target 20	By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization, should increase substantially from the current levels. This target will be subject to changes contingent to resource need assessments to be developed and reported by Parties.	CBD Decision XI/4, II, Para. 13	CBD Decision XI/30, Para. 9

Chapter 2
Annex 2.1: Case example: TEEB Netherlands

TEEB Netherlands was launched in 2011 and coordinated by the Ministry of Economic Affairs with a and the first phase (2011-2013) included six separate initiatives:

1) **TEEB NL: Regional Cases** focused on developing a range of case examples across different biomes and locations. The cases looked first at what methods have been used to date to take account of the value/importance of natural capital including spatial planning, mapping, quantification, valuation and decision making tools (e.g. role in EIA, or CBA). Then the team explored possible ways to capture the values for government, businesses and society (led by Alterra WUR).
2) **TEEB NL Commodity/Product Chains** aims to support the objective of reducing Netherlands' environmental footprint. It focused on looking at the environmental impacts of different production processes in different countries for five products – soya, palm oil, forestry-timber, coffee – and the range of policy instruments that could eventually be applied in the product chain from supply to purchase in the Netherlands (done by PBL).
3) **TEEB NL Business** looked at the different effects on a company's bottom lines comparing current practice with more environmentally friendly practice and how ecosystem services could be integrated into decision making. It aimed at supporting business awareness of dependency, impacts and opportunities for ES and Business. Cases came from: agriculture (dairy farms, cattle breeding, soy), arable farming (potato), fishery (aquaculture), horticulture, water (water supply), life sciences (herbal remedies and cosmetics), tourism (camping), creative sectors (architecture) and chemical industry (biobased programmes) (by KPMG).
4) **TEEB NL Cities** developed a spreadsheet tool for city decision makers to understand the value of green infrastructures investments within their city boundaries (by Witteveen+Bos).
5) **TEEB for the Dutch Caribbean** carried out valuations looking at the value of ESS in the three Dutch Caribbean Islands: Bonaire, St Eustatius and Saba. It included an analysis of benefits and impacts of cruise tourism and of non-use values of ecosystem services (led by Imares WUR and IVM).
6) **TEEB for green space and health.** The report Green, healthy and productive, examines the potential costs and benefits of nature for our health for the city of Amsterdam and for the Netherlands as a whole (by KPMG).

The above was a first phase of TEEB Netherlands. The Analysis of Caribbean islands was an actual valuation study, the NL Cities tool aimed to produce a tool useful to city decision making. The other studies were scoping studies or first assessments.

Initiation and governance: TEEB Netherlands was launched by three Ministries together, though catalysed and driven by the Ministry of Economic Affairs. The aim was to see how the TEEB-method can be turned into an operational method for the Netherlands and what value can be added into policy domains.

- The three ministries (Ministry of Economic Affairs, Ministry of Infrastructure and the Environment, Ministry of Foreign Affairs) each suggested that certain projects be part of the first phase of TEEB Netherlands. Representatives of these ministries were in a funders group that reviewed the projects, provided feedback and guidance.
- In addition to the funders group, a scientific advisory board was set up comprising the ministry representatives, evaluation agencies and institutes. This was primarily national, but with an international contribution to facilitate links to practice in other countries. It gave advice on methods, comments on approach and outputs, and identification of development needs, both for the individual projects and for TEEB NL more widely.

Outputs: Currently there are three final products – TEEB Cities, TEEB Business and TEEB Health, and one of the studies of TEEB Caribbean Netherlands (Bonaire) has been finished. Work on TEEB Physical, and on TEEB Supply Chains should be ready in 2013 and the two remaining TEEB Caribbean (Saba, Eustatia) will be ready in 2014. The outputs can be found http://en.biodiversiteit.nl/teeb and http://www.teebweb.org/netherlands/

A synthesis report is planned that pulls together insights from the 6 studies and also gives recommendations for a possible second phase.

Lessons and Insights for TEEB guidance manual:

- Having different ministries supporting different parts has helped to create buy-in to the process and drive the choice and design of value-adding outputs.
- Regular funder meetings and scientific advisory board meetings have contributed to improving the design, links and progress of the work as well as identifying future steps.
- Having links to other TEEB practices and experience internationally helped offer input and guidance on approaches and methods.

Annex 2.2: Ecosystem-based climate change mitigation and adaptation options: a lower cost solution?

Healthy ecosystems—for example, forests and bogs—contain substantial carbon reservoirs and are vital to regulating the global climate. While climate change poses an immense challenge today, the continued degradation of these ecosystems threatens to greatly increase greenhouse gas emissions and intensify the negative effects of climate change in the future. The sustained supply of certain ecosystem services—such as stream flow regulation in drought prone areas—will be critical in buffering human populations from the adverse impacts of climate change, which include coastal flooding, droughts and other hazards. Healthy and diverse natural ecosystems are expected to be more resilient in the face of climate change than ones that have been degraded.

Restoration and sustainable management of carbon pools in natural ecosystems can make important contributions to climate regulation. Recognition of this has, for example, led to GEF-funded projects in South East Asia and Europe working to reduce carbon emissions from peatlands. Peatland degradation has the potential to emit greenhouse gases, which – according to different estimates—could have a global warming potential that is equivalent to 13-30 percent of the global emissions from fossil fuel combustion (UNDP 2013).

It is important to acknowledge that not all climate protection measures generate co-benefits to the same extent and that some actually result in harm to ecosystems and biodiversity, such as biofuel crop production, afforestation of biodiversity rich habitats, or monocultures. It is therefore preferable to make use of such ecosystem-based adaptation and mitigation measures which can at the same time contribute to biodiversity conservation and ecosystem service maintenance (Plesník 2009).

Existing cost effective solutions for climate mitigation and adaptation include:

- **Natural hazards management and ecosystem-based adaptation to climate change:** During typhoon Wukong in Vietnam in 2000, areas planted with mangroves were relatively unharmed while neighbouring provinces without mangroves suffered significant losses of life and property (Brown et al 2006). Also, mangrove restoration by volunteers cost US$1.1 million, but saved US$7.3 million annual expenditure on dyke maintenance and benefited the livelihoods of an estimated 7,500 families in terms of planting and protection (TEEB NAT Ch. 1 in report, building on IFRC 2002).
- **Climate change mitigation:** A TEEBcase from the Mecklenburg-Vorpommern region in Germany (Förster 2010) shows how 30,000 hectares of peatland were restored over the period 2000 to 2008, leading to emission savings of up to 300,000 t CO_2-equivalent at an avoidance cost of CO_2 ~ 8 to 12 €/t CO_2. If the rewetted peatlands are used for extensive grazing, reed production or alder forest costs can decrease to 0 to 4 €/t CO_2 (Förster 2010). In the state of Sao Paulo (Brazil) natural forest will be restored on approximately 5,576 ha of land around four reservoirs created by hydroelectric plants. This is expected to sequester 0.67 Mt CO_2e by 2012 and 1.66 Mt CO_2e by 2017, along with increasing critical habitats and creating vital wildlife corridors, connecting the newly forested lands with existing conservation areas (World Bank 2009).

Source: ten Brink et al. (2012), Box 4.3

Chapter 3
Annex 3.1: Crucial aspects to consider when applying economic valuation

Aspect	What does this mean and why is it important to consider?
Marginal vs. average/total values	Value data that measures marginal changes, for instance to compare the economic value effects between different alternatives or scenarios (policies, land uses, management options, etc.), tends to be more meaningful and less open to mis-interpretation. Average or total values can also be useful in conveying overall importance of ecosystem services.
Uncertainty	Most estimates are by necessity approximate, due to data availability, knowledge gaps, technical limitations of valuation methods, and inherent uncertainty or ignorance about ecosystem dynamics. Reporting value should reflect the approximate nature of results and take care not to convey spurious precision, possibly also by providing sensitivity analyses or reporting value ranges or confidence intervals instead of single numbers.
Value (or benefits) transfer	Value (or benefits) transfer is a method by which the economic values that have been generated in one context are applied to another context for which values are required. This can save resources, but appropriateness depends on a number of factors outlined in guidance on the application of value/benefits transfer such as DEFRA (2010). These typically include ensuring that: • the source valuation studies are of sufficient quality; • ecosystem services valued in the studies are identical or highly similar; • the context is identical or highly similar.
Non-commensurability of value components.	Different types of economic value of ecosystem services (e.g., direct non-consumptive use and consumptive use values, option, existence and bequest values) can only be compared very carefully and under very specific circumstances. Aggregating them over time and space is usually not appropriate.
Context dependence of valuation results.	The values attributed to ecosystem services depend on social, cultural and economic context, and will differ between people and over time. Also, demand-based valuation methods (including both market and non-market values) depend on the size and "ability to pay" of the relevant stakeholder population. Meta-analysis and benefits transfer approaches need to take this into account for comparing or aggregating values across locations or different scales.
Distributional effects (inter- and intra-generational)	Economic valuation almost always entails value effects for different groups of people, including values for different generations. For considerations of social or intergenerational justice it is important to spell out these distributional effects.
Monetary vs. non-monetary valuation methods	Monetary valuation methods for ecosystem services are dominant in valuation applications. Deliberative and participatory methods, including those that use non-monetary or even qualitative value, are sometimes more appropriate.

Irreversibility	Ecosystems may approach critical thresholds, where ecosystem change is irreversible or reversible only under prohibitive costs. Economic valuation techniques have difficulties to capture this aspect. 'Safe minimum standards' or precaution are typically suggested in this case.
"Total" Economic Value (TEV)	Total Economic Value (TEV) is a conceptual approach for categorizing the different economic dimensions of how nature's ecosystem services contribute to human well-being. However, the notion of 'total' should be interpreted with caution. Imagine you are determining the economic value of a coral reef. How many of the different economic value components of the TEV concept have you really assessed? In general, this will be a small subset, due to lack of data or resources, but also the fact that value components such as option value, bequest value, or existence value are very difficult to assess in practice. Hence, saying that 'the total economic value of the coral reefs is $X', is inappropriate. In most circumstances, one can avoid confusion and criticism by being specific about the type, context, and method of economic value calculations. For instance, statements such as "economic activity related to tourism in protected areas currently contributes $ X billion to GDP" or "decrease of flooding due to conservation measures in this watershed area has been estimated to save costs of $ X million/year" are more appropriate than the claim to know a "total economic value".
Illusion of the comprehensive treatment of biodiversity values	Economic valuation results are sometimes phrased such that they suggest a comprehensive and authoritative treatment of the value of our natural environment. However, economic valuation necessarily deals with biodiversity values within an economic framework, which does not necessarily incorporate all potential values or determine any total absolute value of an ecosystem. For particularly aspects of nature or for culturally important sites or practices, economic value may be less relevant. This limited scope of economic valuation should be kept in mind and communicated appropriately.
Double-counting	The values of one ecosystem service are sometimes captured, reflected or incorporated in another. Care should always be exercised that values are not replicated or repeated in different estimates. For example, the value of clean water might be measured by the avoided health care costs or by a survey of consumer WTP for clean water. But consumer WTP for clean water is due (at least in part) to their desire not to fall sick, so these two results should not be added together. If they are, the value of clean water will be overestimated.

Sources: Pagiola (2004), TEEB Foundations (2010a), Emerton (1998), eftec (2006)/

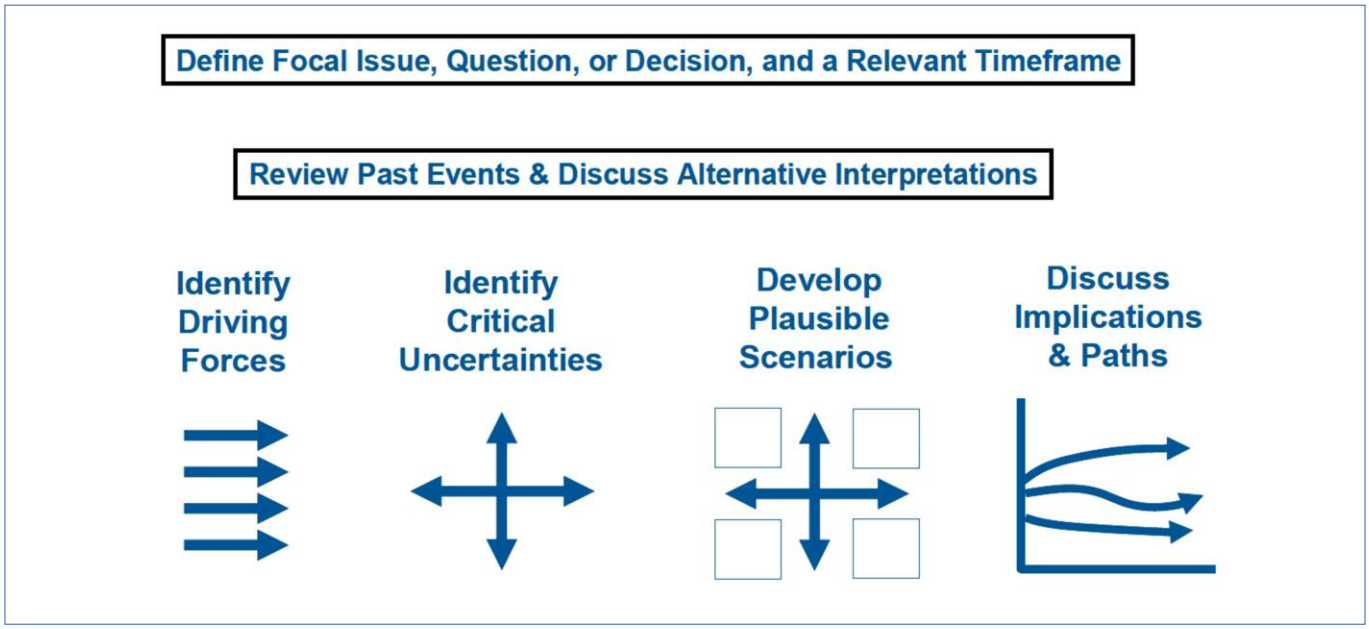
Annex 3.2 Scenario planning basic elements and stages

Scenario planning was originally developed by the business sector and has since found wider application as a way of explicitly considering drivers, future uncertainties and potential shocks thereby making a contribution to the formation of more robust strategies. According to the OECD (2006, p. 156), "The goal of scenario planning is to assist strategic planners and policy analysts to make more resilient choices through understanding a wide range of possible futures and designing pathways to arrive at desired positions. Key stages in this process include:

1. Agree on the wide range of issues to address;
2. Identify participants preferably senior government officials involved in policy making, heads of civil society organizations(CSOs), local community leaders, etc.
3. Workshops and interviews of a 'brain storming' nature;
4. Identify uncertainties and drivers of change;
5. Develop matrices to describe possible combinations of critical uncertainties;
6. Elaborate on scenarios for each of the above combinations – again, through group discussion; and
7. Describe requirements to move towards a preferred vision and constraints to be overcome in getting there."

Scenario planning is thus a potentially useful tool, both in the assessment of ecosystem services futures (Step 4) as well as the assessment of policy options designed to bring about changes (Step 5). The figure below outlines the basic elements in the scenario development process.

Figure 3.1: The scenario development process



Source: www.scenarios2strategy.com

Annex 3.3: Ecological-economic system dynamics (SD) models

Ecological-economic system dynamics (SD) models can be used for analysing complex problems and systems. SD models were originally developed for use in industrial problems, but are now widely used in the social, technological, environmental and agricultural spheres. There are a number of software applications that can be used for SD modelling including STELLA, Vensim, DYNAMO, iTHINK and Powersim. Examples of the application of SD models in the environment and development sphere include:

The World Agroforestry Centre (ICRAF) has developed a model called FALLOW (Forest, Agroforest, Low-value Landscape Or Wasteland) in order to assist with holistic decision-making around land use changes and related issues. ICRAF describes FALLOW as a landscape-dynamics model, that can be used for impact assessment and scenario studies, assisting the negotiation process between stakeholders in a changing landscape by visualizing possible/likely consequences of factors such as changes in commodity prices, population density and human migration, availability of new technology, spatial zoning of land use, pest and disease pressure or climate.

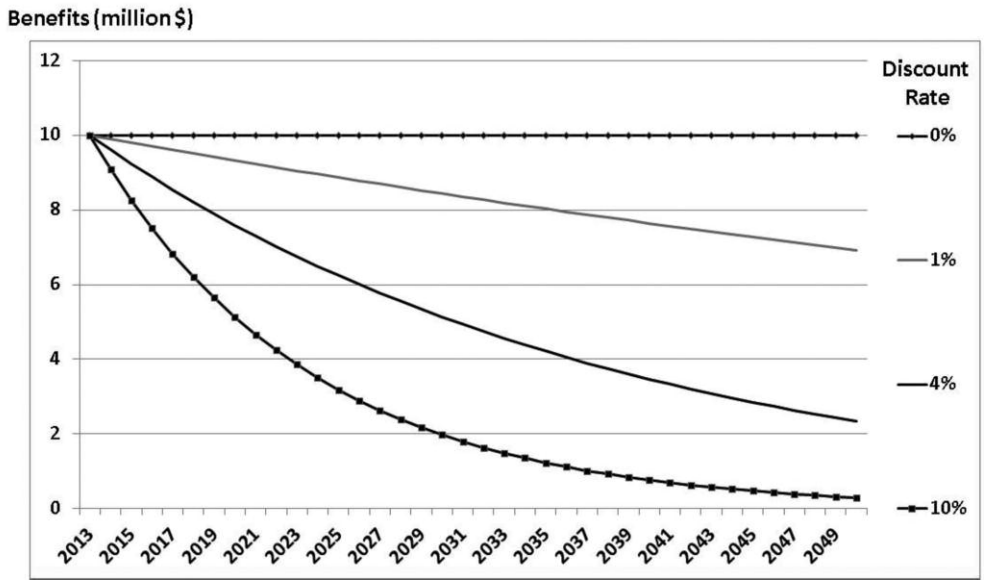
Sources: http://www.worldagroforestry.org/sea/products/AFModels/fallow/Fallowa.htm

Annex 3.4: Economic analysis of inter-temporal choice and discount rates

Economic analysis as decision support for inter-temporal decisions usually applies benefit-cost analysis (BCA) for understanding and comparing the desirability of different alternative trajectories (e.g., expected trends, policy scenarios). Economic models for inter-temporal choice typically employ social welfare functions that aggregate, for each alternative scenario, all income flows that are expected to accrue over time. Discount rates are used to calculate for each future income its equivalent in terms of "present value" today. Summing up all discounted future cost and benefits then determines today's "net present value" (NVP), that is, one single number for each alternative future scenario. Clearly, however, the choice of the discount rate has a huge influence on the NVP results. **When using economic analysis tools for intertemporal decisions, it is crucial to a) understand the sensitivity of results to the choice of discount rate, b) to be aware how challenging it is to determine an appropriate rate, and c) not to forget that some considerations will remain outside the economic modelling framework.**

Sensitivity analysis using various discount rates can help understand the extent to which the choice of the discount rate influences the results. Figure 3.2 illustrates the effect of different discount rates over time. A 4 per cent rate applied over 50 years would imply that an amount gained (or lost) 50 years' from now is valued only as one-seventh in net present value (NPV) terms. A 10 per cent discount rate would even lead to less than 1 per cent of the future value. On the other hand, applying a 1 per cent rate would lead to an NVP value of around 60 per cent of the value that is generated in 50 years. Clearly, this comparison reveals how a lower discount rate implies giving greater weight to future costs and benefits in the calculations. It is for that reason that low discount rates are often thought to be 'pro-conservation', while higher discount rates would be more likely to lead to long-term degradation of resource stocks. However, low discount rates may also be more likely to result in the approval of large infrastructure projects with high up-front costs and longer repayment (benefits) periods. They can also encourage borrowing, therefore spurring current consumption and growth, which may not be 'pro-conservation'.

Figure 3.2: Impact of different discount rates on future values when discounted to the present



(based on $US10 million flow of benefits per year), Source: Patrick ten Brink, own representation

Be aware of which inter-temporal considerations play a role for the social discount rate, and choose your rate(s) with caution. First, do not confuse the "social" discount rate for social welfare calculations with the financial market discount rate (e.g., the interest on treasury bonds). Financial market discount rates may be an appropriate benchmark for NPV calculations supporting individual or corporate investment decisions. The social discount rate, on the other hand, will typically include very different considerations, such as:

- how to weigh the consequences for future generations vs. the present one (intergenerational justice),
- how to weigh consequences for the rich vs. the poor (including today's poor vs. the rich of tomorrow, etc.),
- the expected economic growth rate, including the possibility of technological breakthroughs or catastrophic events,
- the expected population growth rate, and
- the probability of complete eradication of the human species (e.g. due to a nuclear ca-tastrophe, a disease, or a disease).

Also, it may be argued that different discount rates should be used for natural and human-made capital.

Do not forget that some considerations that are potentially relevant for intertemporal choice are difficult or even impossible to capture with economic social welfare calculus, even with a discount rate. Such considerations are, for instance,

- consequences that are challenging to evaluate in monetary terms (e.g., loss of human lives, species extinction, the well-being of non-human species),
- the possibility that future generations may have different preferences than the current one,
- the evaluation of irreversibility (e.g., destroyed ecosystems or extinct species) and how to deal with the strong uncertainties about future consequences from today's impacts on the environment (e.g, with a precautionary approach), and
- non-consequential ethical considerations, such as basic human rights or a duty to preserve life on earth.

In short, **there are no purely economic guidelines for choosing a discount rate. Responsibility to future generations and the natural world is a matter of ethics, and about best guesses for many aspects of a fundamentally uncertain future**. This is not to say that applying discount rates in economic cost-benefit analysis is meaningless, but that it should be handled with care. A variety of discount rates, including zero and negative rates, could be used depending on the time period involved, the degree of uncertainty, ethical responsibilities to the world's poorest and towards future generations, and the scope of project or policy being evaluated.

Useful references: Quiggin, J. (2008); Gowdy J., Howarth R. B., and Tisdel C. (2010)

Annex 3.5: Useful Databases for Ecosystem Assessments

EBM – Ecosystem-Based Management – Tool Network
The Ecosystem-Based Management (EBM) Tools Network (www.ebmtools.org/) is originally a platform for coastal and marine planning and management tools in the United States but has been broadened to other topics and geographical areas. The EBM-Network provides an interactive forum for practitioners and tool experts around the world to share information about tools relevant for EBM implementation.
Topics which can be discussed within this forum include:

- Finding tools for specific management or conservation projects or purposes,
- Connecting with other practitioners that have used tools to learn about their strategies and experiences,
- Getting suggestions or best practices for using tools effectively in an ecosystem-based management project,
- Finding collaborators for EBM tool projects.

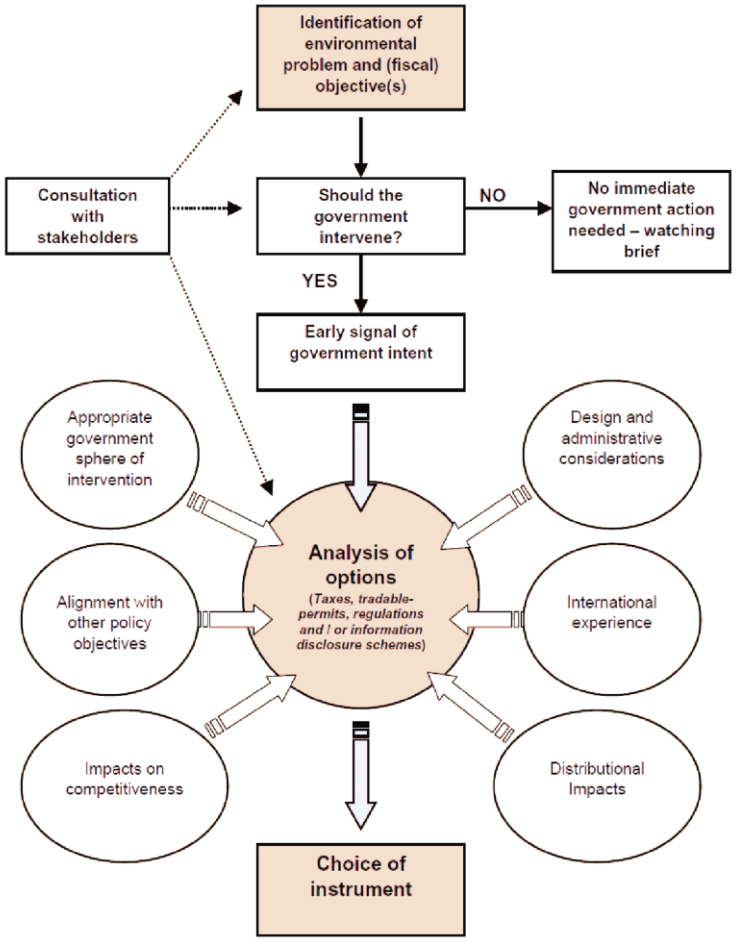
The EBM Tools database (www.ebmtools.org/) is an extensive database which is one of the most encompassing sources of information available in the context of EBM. The database is helpful especially on methods and software that help practitioners to incorporate scientific and socio-economic information into decision making. The EBM Tools database is subdivided in the categories: Tools, Projects, Resources, Organizations and Practitioners.

IPBES - Catalogue of Assessments on Biodiversity and Ecosystem Services
The currently developed Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) created the database: **Catalogue of Assessments on Biodiversity and Ecosystem Services** (http://ipbes.unepwcmc-004.vm.brightbox.net/). The IPBES database provides information on existing and ongoing assessments of biodiversity and ecosystem services from the global to the sub-national scales. Within the database the categories: **Geographical scale, Systems assessed, Ecosystem services/functions assessed and Tools and approaches used** can be searched for. The IPBES database can help to learn lessons from existing and ongoing assessment processes for your TCS. Furthermorea new relevant assessments can be added to the catalogue.

Annex 3.6: Process and criteria for considering policy options – an example from South Africa

In 2006 the National Treasury of the South African government completed an assessment of market-based instruments to support environmental fiscal reform. The assessment culminated in the production of a draft policy paper including the framework below for considering policy options (see figure 3.3). The framework clearly illustrates the complex nature of evaluation processes for policy options and the diverse considerations that are typically relevant in such processes. In a similar vein, WRI (2008) suggested the following design criteria for selecting policies: political viability, legal authority, economic viability, effectiveness, equity and institutional capacity

Figure 3.3: Framework for considering policy options



Source: NTRSA 2006

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