

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	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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	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 prioritized. 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	<ul style="list-style-type: none">• 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.	<ul style="list-style-type: none">• 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	<ul style="list-style-type: none">• 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.	<ul style="list-style-type: none">• 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 depend 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 added ¹ 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 considerable additional inputs that are reflected 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 biophysical, 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

<i>Approach</i>	<i>Why do we do it?</i>	<i>How do we do it?</i>
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 <i>change</i> 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



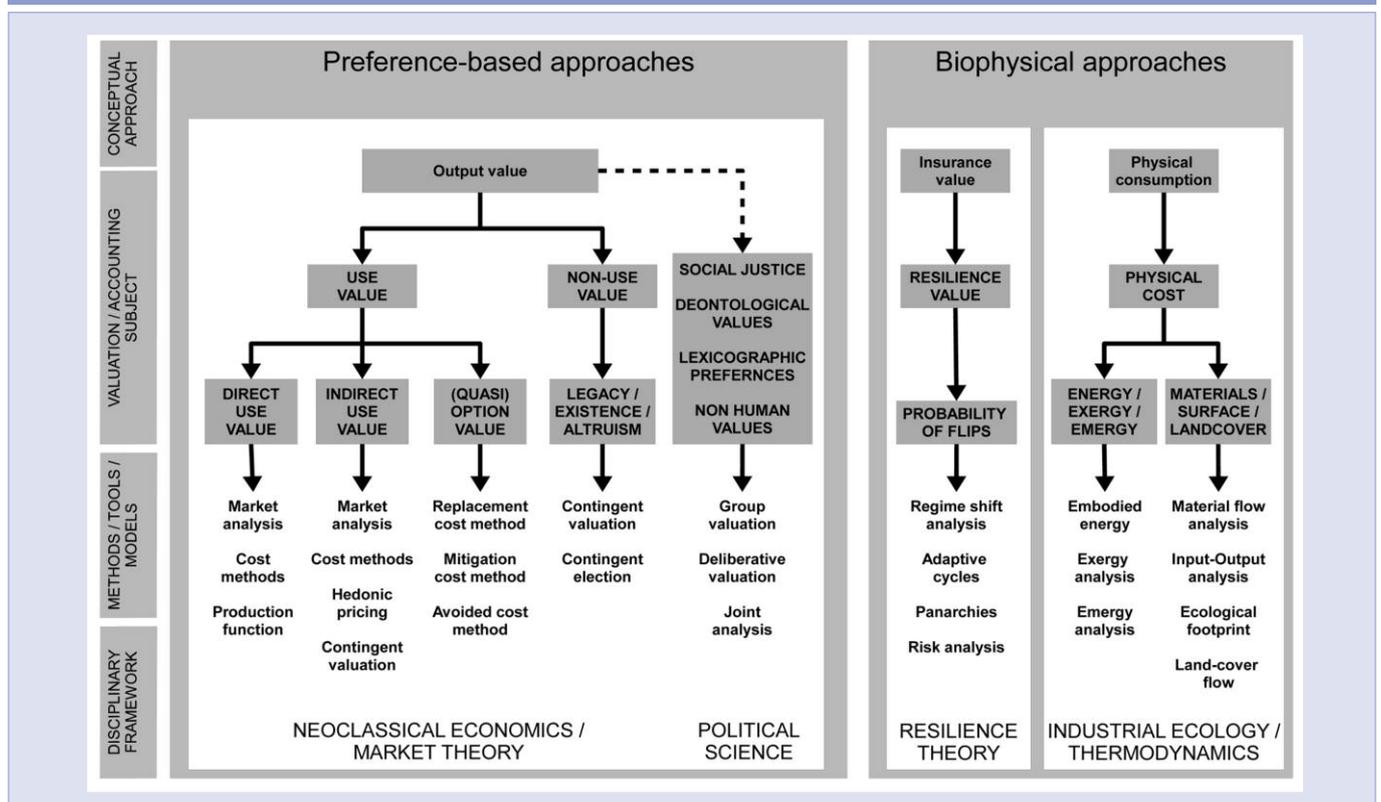
Should monetary valuation be under consideration, the choice of valuation technique(s) is important. Valuation techniques should be applied with careful consideration. Every case has a unique problem statement and techniques used need to fit different types of problems. Some techniques are also more 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.

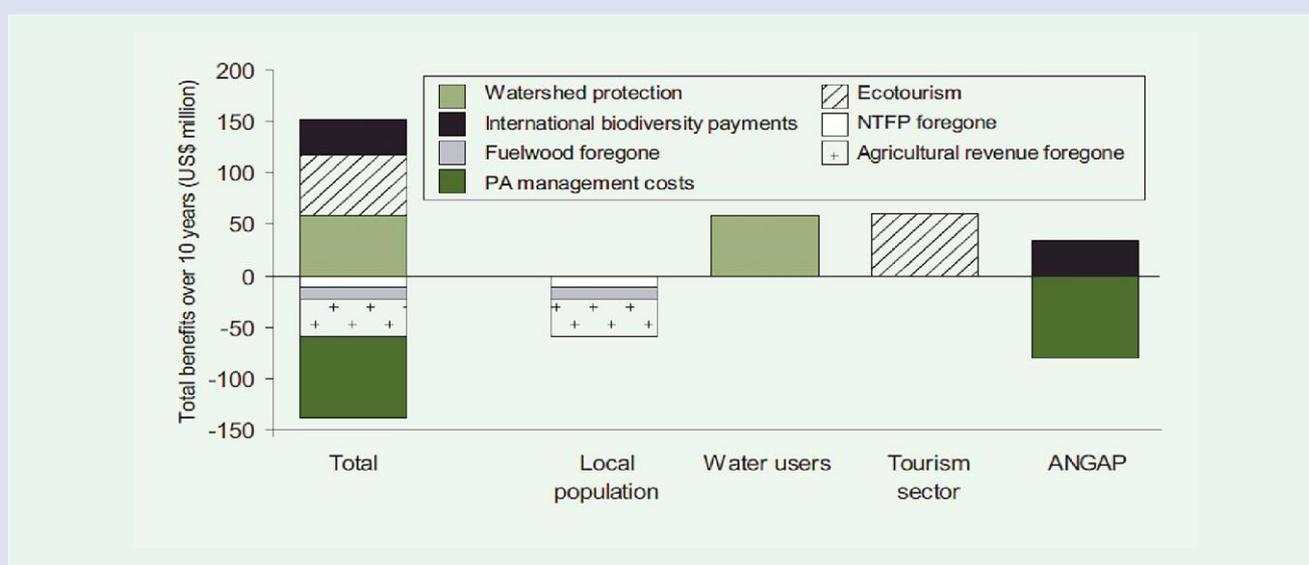
- Have you considered land or other resource use alternatives? What are their ecological and economic consequences, and what experiences exist from elsewhere regarding more sustainable resource use?
- Have you considered ES from a system-wide perspective? Particularly where the interactions between ecological 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-enviro/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.

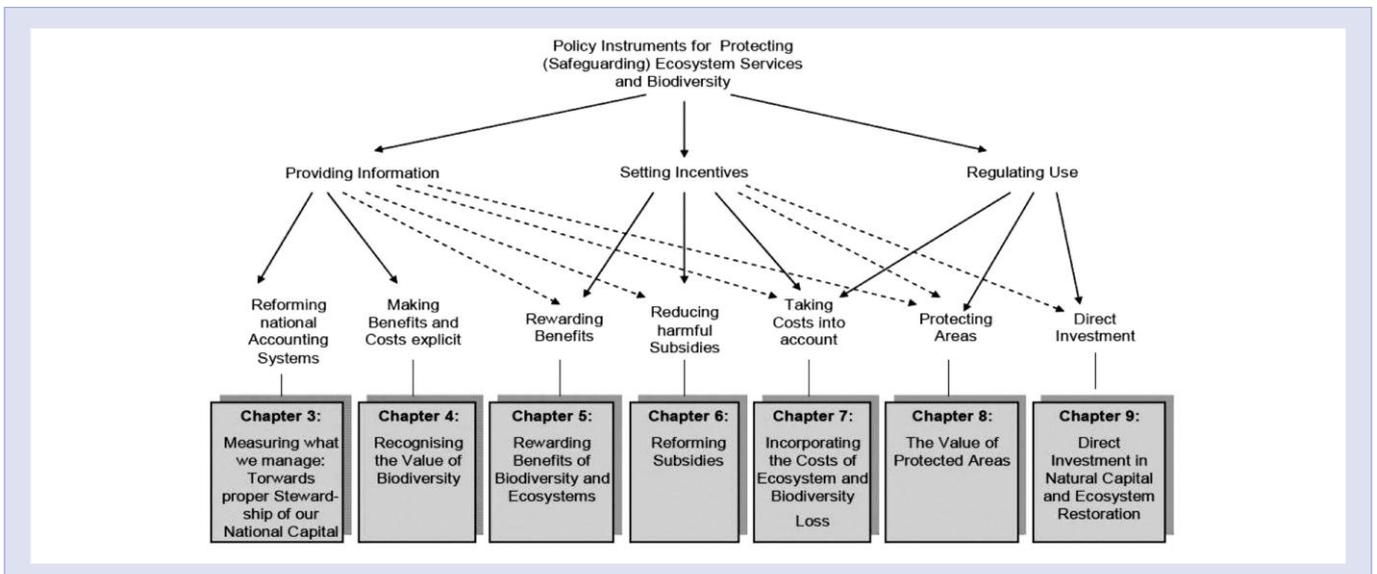
Policy measures aimed at ensuring change are discussed in TEEB National, Ch. 2-9 (see Figure 3.3 below) as well as in TEEB Local, Ch. 4-10 (see Figure 3.4 below). Potential measures include the following:

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



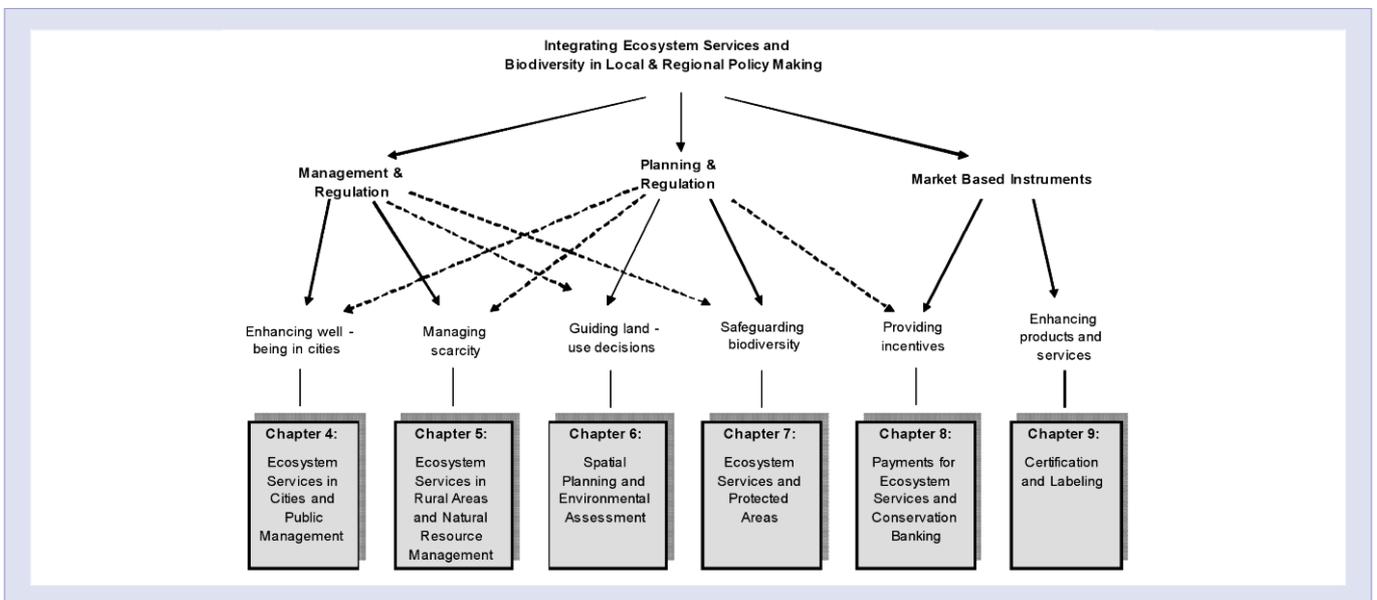
- Assignment and/or clarification of property rights;
- Removal of perverse subsidies and incentives;
- Introduction of economic instruments (e.g. payments for ecosystem services, conservation offsets, conservation banking, pricing, taxes, charges, subsidies, tradable permits, etc.);
- Information provision 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-based 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 using the following overall categories for options: CH. 5 – rewarding benefits through payments and markets, Ch. 6 – reforming subsidies, Ch. 7 – addressing 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.