

The Economics & of Ecosystems of Biodiversity



A QUICK GUIDE TO
TEEB FOR LOCAL AND REGIONAL POLICY MAKERS

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THE OPPORTUNITY: DISCOVERING THE VALUE OF NATURE FOR LOCAL DEVELOPMENT

Human well-being and most economic activity depend on a healthy environment. A focus on nature's benefits – ecosystem services – allows us to see the direct and indirect ways in which we depend on the natural environment, providing insight that can substantially support local policy and public management.

Nature's multiple benefits sustain our livelihoods. These include all our food and water; safe places to live; organic materials such as timber, wool and cotton; and many of our medicines. Equally important but less obvious benefits include climate regulation. The forests of the Amazon produce rainclouds for much of South America. Intact wetlands or dune belts ('ecological infrastructure') protect against the impact of floods, storms and other natural hazards. Diverse natural vegetation secures groundwater recharge and protects against soil erosion and dam siltation. Nature also offers breathtaking recreation, cultural inspiration and spiritual fulfillment. Finally, robust natural systems – with a diversity of plants and animals – help provide a buffer against the effects of climate change and other disturbances.

Nature's benefits often provide the most sustainable, cost-effective solutions to meet human needs. Considering ecosystem services in policy making can save on future municipal costs, boost local economies, enhance quality of life and secure livelihoods. This approach also helps tackle poverty by revealing the distribution of scarce and essential resources and services.

Investment in a functioning environment is often considered a luxury rather than life insurance. Why is this so? In many cases ecosystem services are poorly visible. In others, their continuous availability is falsely assumed. The critical role of ecosystem services in our economies is often taken for granted. We don't

necessarily recognize the ways in which they sustain our well-being. Other needs and objectives may also appear to be more pressing and desirable. Many decisions are made without knowledge of their environmental consequences. This is problematic. Wasteful resource use and limited concern for our natural systems drives the loss of our natural capital – and ecosystems have tipping points. When these are reached, restoration and the search for alternatives consume considerable time, money and effort.

Although many pressures are beyond local scope, local policy makers still have to deal with their consequences. Economic analysis indicates that maintaining healthy ecosystems is often the less expensive option – so TEEB suggests a shift in focus. We need to discover, consider and work with the range of nature's benefits. **By appraising ecosystem services we can get the full picture. We can outline the costs and benefits of different policy options, highlighting the best local strategies for enhancing economic sustainability and human well-being.**



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Tropical leaves in the Ecuadorian cloud forest ensure water capture

THE ROLE OF ECOSYSTEM SERVICES IN DIFFERENT POLICY AREAS

Knowledge about ecosystem services and natural capital can help local policy makers address policy challenges in many different areas. This knowledge allows local government regulations to be refined and can influence modes of production and procurement. It can also help create market-based instruments and other incentives for enhancing benefits such as water supply. TEEB's full report offers many reasons and examples for focusing on nature's benefits in local policy.

Urban and Public Management (Chapter 4 of the full report)

Cities depend on nature – and ecosystem services can provide cost-effective municipal services. Many cities around the world, such as New York (USA) and Quito (Ecuador), pay to conserve watersheds in order to secure their drinking water supply. In Curitiba (Brazil) and Mumbai (India), city managers cost-effectively enhance flood regulation by maintaining green spaces for rainwater runoff. In Kampala (Uganda), an assessment of a threatened wetland revealed that the alternative, a replacement wastewater treatment plant, would cost approximately US\$ 2 million annually to treat the city's effluents. Bangkok (Thailand) and Canberra (Australia) have recognized through public policy that urban health and quality of life are improved by planting trees and creating green spaces that enhance air quality. These areas also provide cool spaces and offer opportunities for recreation.

Rural Areas and Natural Resource Management (Chapter 5 of the full report)

Rural development often promotes high market value ecosystem services to the detriment of equally important, but less obvious, regulating services. This pattern need not continue. In Nicaragua, Costa Rica and Colombia, a variety of grasses, shrubs and trees were planted to improve pasture management while generating several co-benefits. This improves habitat

quality, slows soil degradation, and allows farmers to keep cattle in the same area for longer than they previously could – consequently reducing pressure on neighboring forests.

In the Sourou Valley wetland (Burkina Faso) development efforts focussed on agriculture. Recently, a valuation of the wetland's benefits revealed that more than 80% of its value related to a variety of forest products, fodder, and fisheries, whereas agriculture accounted for 3% only. These figures now help re-orient management strategies.

In the northern coastal regions of Vietnam, where more than 70% of the population is threatened by natural hazards, local communities have planted and protect mangrove forests, as a more cost-effective strategy than building and maintaining artificial barriers (sea dykes). An investment of US\$ 1.1 million has saved an estimated annual US\$ 7.3 million in dyke maintenance alone.

The insights provided by a careful examination of the benefits of ecosystem services can significantly contribute to improved management in the realms of forestry, fisheries, agriculture, nature tourism and protection against natural hazards.



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Spatial Planning and Environmental Assessments (Chapter 6 of the full report)

Planning frameworks and environmental impact assessments can proactively include a focus on ecosystem services. Such a perspective reveals how planned infrastructure development, such as dams and roads, affect local populations and wider society. It also allows for the identification of the economic potentials (rather than the constraints) of safeguarding and maintaining these services.

In Sumatra (Indonesia) a spatial analysis of crucial ecosystem services helped local authorities determine where to award concessions for plantations and in Napa (California) the enlargement and optimization of flood retention areas revitalized the city centre and raised property values – in addition to reducing flood risks.

Protected Areas (Chapter 7 of the full report)

A focus on ecosystem services is instrumental in locally integrated protected area management. In order to secure local benefits of conservation, the management of protected areas needs to be connected with the management of the surrounding landscape.

In Tubbataha (Philippines) and Velondriake (Madagascar) marine protected areas have improved the income of people in surrounding areas by balancing and coordinating the use of different ecosystem services among conservationists, fishers and tourism operators.

An analysis of ecosystem services also shows both who bears costs and who enjoys benefits. In the Wolong

Biosphere Reserve (China), such an analysis helped to identify an unequal distribution of local tourism benefits, which had been an obstacle for effective giant panda protection.

Payment Schemes and Market-based Instruments (Chapters 8 and 9 of the full report)

Locally adapted payment mechanisms for ecosystem services, as well as certification and labelling schemes, provide incentives that reward good stewardship of natural capital.

In Toyooka (Japan) a payment scheme provides an incentive for farmers to engage in chemical-free rice production. This helped reintroduce the once critically endangered oriental white stork, today an important attraction for tourists. The opportunity for ecolabelling (certified organic rice with a premium price) has also increased local revenues of rice production. In Moyobamba (Peru) assessing people's willingness to pay for improved water supply led to the adoption of an acceptable local water fee to pay upstream farmers for conserving the watershed.

The carbon market also presents economic and conservation opportunities. Indigenous people in the Talamanca Reserve (Costa Rica) rehabilitate cocoa plantations with funds from a regional market for carbon and biodiversity – which also increases cocoa production. In Mecklenburg-Vorpommern (Germany) the regional government supports the restoration of formerly drained peatlands because these areas' carbon capturing and storage values are expected to exceed returns generated from agriculture.

Box 2: Addressing Practical Questions

TEEB for Local and Regional Policy Makers seeks answers to practical questions that arise when you adopt a focus on ecosystem services (Chapter 10). For example:

- **What do I need to know when commissioning an assessment?**
- **How can I assess ecosystem services without scientific resources and skills?**
- **How do ecosystem service assessments relate to other assessments?**
- **How can I make the most of ecosystem service assessments?**
- **How do I involve stakeholders in using results of ecosystem services assessments?**
- **How can I ensure that monetary estimates do not backfire?**
- **How can I address conflicts over ecosystem services between beneficiaries?**
- **How does this focus affect other motivations to protect nature?**

TEEB'S STEPWISE APPROACH TO APPRAISING NATURE'S BENEFITS

A stepwise approach helps policy makers navigate through available assessment options. Importance of each step depends on the situation - this approach

is not a fixed recipe. It is intended as a guide for designing context-specific processes for appraising and considering nature's benefits (Table below).

Table 1: Six steps for including ecosystem services in local/regional policy

Steps	Strategies and tools
Step 1: Specify and agree on the policy issue with stakeholders	This ensures that all important aspects are being considered and avoids misunderstandings during decision making and implementation <ul style="list-style-type: none"> Initial stakeholder analysis and participatory appraisal methods elucidate different perspectives and opinions on the policy issue (Chapter 3). Management frameworks such as ecoBudget facilitate mainstreaming concern for ecosystem services in different public management areas (Chapter 4).
Step 2: Identify which services are most relevant	For a first appraisal, discuss these questions with colleagues (Chapters 2 and 10): <ul style="list-style-type: none"> Which ecosystem services are central to my local/regional society and economy? Who depends on them most? Which services are at risk? How do policies affect them?
Step 3: Define information needs and select appropriate methods	Before commissioning an assessment determine what kind of information on which ecosystem services you need. This depends on how you want to use results (Chapter 3 and 10). Options: <ul style="list-style-type: none"> 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 provisioning services, for fine-tuning a payment scheme
Step 4: Have ecosystem services assessed	<ul style="list-style-type: none"> Frameworks that conceptualize ecosystem services (Chapter 2). Instruments for valuing ecosystem services (Chapter 3) Options for ecosystem services analysis within spatial planning and environmental assessments (Chapter 6). Manuals, tools and databases (Annex)
Step 5: Identify and appraise policy options	Insights from the assessment can feed into policy in different ways (Chapters 3 and 10): <ul style="list-style-type: none"> Inform debate within a participatory process, Provide the basis for a cost-benefit analysis Serve as input for a multi-criteria analysis
Step 6: Assess distributional impacts	Changes in availability or distribution of ecosystem services affect people according to their dependence. These sometimes hidden effects need to be anticipated (Chapters 2 and 10). Options: <ul style="list-style-type: none"> Sustainable Livelihoods Approach to determine dependence poverty assessment tools

APPLYING THE STEPS - AN EXAMPLE

This case illustrates how the stepwise approach could be applied: The Kala Oya river basin in Sri Lanka has a traditional irrigation system with human-made wetlands for water storage (known as water tanks). Increasing water demand and unsustainable land use have led to reduced water inflow and an increased sediment load.

Step 1: Two challenges were identified by the regional authority, IUCN and residents: (i) competing water demands between traditional users, hydro power and modern agriculture; and (ii) the need for improved tank management.

Step 2: It became clear that, apart from the water tanks' benefit for rice cultivation, they provided other important ecosystem services – fish stocks, lotus flowers, fodder and drinking water.

Step 3: What information was needed? First, assessing the value of the tank's provisioning services would offer insights about people's dependence on them. It was decided to use participatory appraisal methods, market prices and labour costs. Secondly, three regulating/habitat services were selected for a qualitative

trend analysis (using literature and expert judgment): water recharge, soil retention and habitat.

Step 4: So far, rice production had been considered the principal tank benefit. Now, results showed that rice accounted on average for about US\$ 160 per hectare per year - but other provisioning services, including water supply, accounted for an average value of about US\$ 2,800. This was important for future water allocation negotiations.

Step 5: To improve tank management, four scenarios were examined (see table): Probable future costs and benefits were jointly considered with qualitative information on the regulating/habitat services. Scenario 4 was the best option with regard to all criteria.

Step 6: Scenario 4 was also the most expensive option, requiring labor for silt removal. As intact tanks secure water supply for 93% of households, these costs were accepted locally.

Cost-Benefit Assessment of Alternative Tank Management Scenarios					
Scenario	Net Present Value in US\$ '000			Indirect use trends (Index)	Natural Capital in 30 years
	Cost	Incremental tank benefits	Quantifiable net benefit		
S1: Do nothing	0	0	0	-7	↓ ↓
S2: Raise spill	0.4	24.2	23.8	-4	↓
S3: Raise spill and rehabilitate tank reservation	35.8	64.6	28.8	6	↑
S4: Remove silt and rehabilitate tank reservation	62.8	120.7	57.9	7	↑ ↑

Source: Water tank rehabilitation benefits rural development, Sri Lanka. TEEBcase based on Emerton and Vidanage et al., see TEEBweb.org.

A Free Sourcebook

“TEEB for Local and Regional Policy Makers” highlights the enormous potential for securing and enhancing human well-being by taking nature’s benefits into account. It provides orientation, guidance and inspiration for those who want to include these benefits in their policies.

“TEEB for Local and Regional Policy Makers” is a free 200 page sourcebook. It hopes to inspire further thinking – to provide a starting point for adopting ways to make your natural capital flourish. It will soon also be available in different languages.

In addition to the report, www.teebweb.org hosts a collection of short case studies which illustrate how a focus on ecosystem services has helped to improve well-being and prosperity in different settings around the world.

What are ecosystem services?

Our economic, physical, mental and cultural health depends on the health of ecosystems. Their services can be defined in the following ways: **Provisioning services** are the materials that ecosystems provide such as food, water and raw materials. **Regulating services** are the services that ecosystems provide by acting as regulators. This includes regulation of air and soil quality, as well as flood and disease control. **Habitat or supporting services** underpin almost all other services. Ecosystems provide living spaces for plants and animals – and maintain their diversity. **Cultural services** are the non-material benefits of ecosystems – from recreation to spiritual inspiration to mental health.

Provisioning Food



Provisioning Raw Materials



Provisioning Fresh Water



Provisioning Medicinal Resources



Regulating Local Climate



Regulating Carbon Sequestration



Regulating Extreme Events



Regulating Waste Water Treatment



Regulating Soil Erosion and Fertility



Regulating Pollination



Regulating Biological Control



Habitats for Species



Habitats for Genetic Diversity



Cultural Service: Recreation



Cultural Service: Tourism



Cultural Service: Aesthetic appreciation



Cultural Service: Spiritual Experience



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