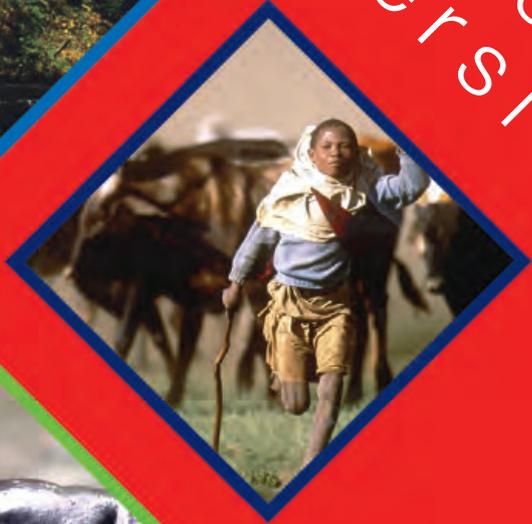


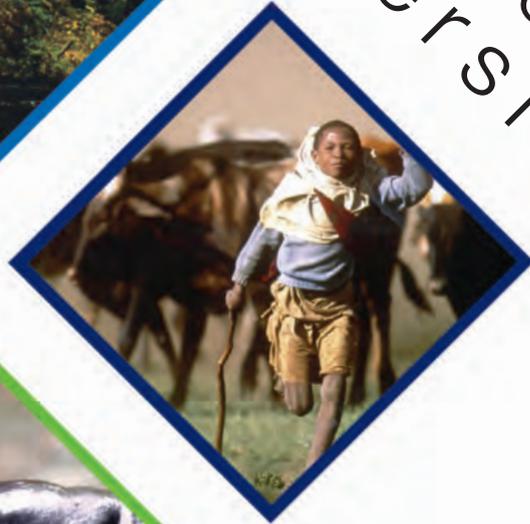
The Economics  
& Of Ecosystems  
Of Biodiversity



TEEB FOR LOCAL AND REGIONAL  
POLICY MAKERS

Photos: Cover and title page, all images UNEP/Topham

# The Economics & of Ecosystems of Biodiversity



**THE ECONOMICS OF ECOSYSTEMS AND BIODIVERSITY  
FOR LOCAL AND REGIONAL POLICY MAKERS**

## Citation and disclaimer

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TEEB (2008) The Economics of Ecosystems and Biodiversity: An Interim Report. European Commission, Brussels.

TEEB (2009) The Economics of Ecosystems and Biodiversity, Climate Issues Update. 32p.

TEEB Foundations (2010) The Economics of Ecosystems and Biodiversity: Ecological and Economic Foundations. Edited by Pushpam Kumar. Earthscan, London.

TEEB in Business (2011) The Economics of Ecosystems and Biodiversity in Business. Edited by Joshua Bishop. Earthscan, London.

TEEB in National Policy (2011) The Economics of Ecosystems and Biodiversity in National and International Policy Making. Edited by Patrick ten Brink. Earthscan, London.

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# PREFACE

Pavan Sukhdev, Study Leader

As a young banker working in Asia's emerging markets through the 1990's, I saw the blossoming of many 'tiger' economies, many fast-growing cities, and I saw entrepreneurs make vast private fortunes. At the same time, I could not ignore the palpable ongoing loss of Asia's ecology and its effect on lives and on its common wealth. The Yellow River ran dry for 9 months in 1997, the Yangtze flooded disastrously in 1998. Vast smoke clouds from burning peatlands in Sumatra repeatedly clogged the air in Singapore, where I lived. But what grabbed the headlines globally was the Asian debt crisis, the collapse of Thailand's stock markets, the riots in Indonesia, and Malaysia tearing up its international currency and replacing it with exchange controls. What was it about Natural Capital that made it so invisible, so unlike the Financial Capital of my world of global markets? Why was private wealth worth chasing, and worth reporting if it was lost, but not public wealth?

These questions made me understand that we really did not measure what we thought we managed: human well-being. Asian economies were declared 'tigers' based on high percentage rates of GDP growth. No account was taken of simultaneous losses of natural capital. This led me to start a private inquiry to account for 'real' growth in India, my home country, as against 'GDP growth': a 'Green Accounting' project was born ([www.gistindia.org](http://www.gistindia.org)). My project partners and I understood that to draw any conclusion about India as a whole would be meaningless: it would be too big, everybody's problem, hence nobody's problem. So we decided to conduct our economic inquiry at the State level – forming a 'Green Indian States Trust' to conduct this inquiry. This was the appropriate level to provide information that was actionable by policy makers.

So my belief in the importance of the local government in addressing the problems of economic invisibility of nature goes back over a decade – and this is why I believe that this Report, TEEB for Local and Regional

Policy Makers, is so vitally important a part of the TEEB suite of reports.

## The TEEB Approach

'The Economics of Ecosystems and Biodiversity' study was commissioned by the G8+5 and launched in 2007 by Germany and the EU Commission. It builds on the analysis of the Millennium Ecosystem Assessment and takes the analysis further by demonstrating the economic significance of biodiversity loss and ecosystem degradation in terms of negative effects on human well-being.

In order to make the economic value that nature provides visible, we need to estimate and disclose values for nature's goods and services (or so-called 'ecosystem services'). These estimated values can inform policy choices, executive actions, business decisions and consumer behaviour.

TEEB suggests a tiered approach to analyzing problems and ascertaining suitable policy responses. We find that, at times, it suffices simply to recognize value – be it intrinsic, spiritual or social. Recognition can stimulate policy response. At other times, policy makers may need to demonstrate the economic value of a service in order to respond – wetland conservation near Kampala, for example, was taken up as an alternative to reclaiming land for agriculture because of the wetland's natural sewage treatment function (Chapter 4 this volume). TEEB also focuses on instruments that capture value by rewarding and supporting good conservation – through measures such as payment for ecosystem services (PES).

Evaluations of any kind are a powerful 'feedback mechanism' for a society which has distanced itself from the biosphere, upon which its very health and survival depends. Economic valuations, in particular, communicate the value of ecosystems and biodiversity and their largely unpriced flows of public goods and

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services in the language of the world's dominant economic and political model.

TEEB does not propose that placing a value on ecosystem services means that they should be traded on the market. Such decisions are socially and ethically complicated. TEEB does not suggest placing blind faith in the ability of markets to optimize social welfare by privatizing the ecological commons and letting markets discover prices for them. What TEEB offers is a toolkit for integrating good stewardship because it's good economic practice.

TEEB has created several publications with different end users in mind – see inside cover. This volume is primarily for local governments and decision makers. It is preceded by a volume on the ecological and economic foundations of TEEB, which synthesizes today's 'state of the art' valuation methodology. It is also accompanied by three other publications: one for national and international policy makers, one for business and enterprise, and a website for citizen. Targeting these large groups of end users we hope will 'mainstream' the economics of ecosystems and biodiversity.

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# ABOUT THIS BOOK

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Examining nature's importance for human well-being is a tricky thing. This planet has so many different faces and places! A report for local and regional policy makers should capture this diversity. We have not succeeded in considering the many particularities in local policy around the world. Within 200 pages this would be squaring the circle. But you may find it an inspiring starting point for thinking policy in a new way: We cannot risk taking nature for granted. Too many opportunities would be lost.

What does it take to explore this message for local policy makers around the world? What we did succeed in was bringing together a group of very experienced professionals from complementary backgrounds to form a dedicated Core Team. This team took much effort in developing the ideas, structuring and finally writing the report, bringing in the expertise of their large networks. Thanks to them, this report took shape.

Walking through local policy areas in different contexts was made possible by several enthusiastic partners: they facilitated more than 30 stakeholder consultations in all continents over the past year. TEEB consultations provided substantial input and corrective feedback to the ideas in this report – even if not all comments could be taken up explicitly. Particularly helpful here was the collaboration with the UNDP initiative “Biodiversity and Ecosystems: Why these are Important for Sustained Growth and Equity in Latin America and the Caribbean”. In addition, the responses to our initial call for evidence helped enlarge the report's focus, and different contributors took great effort in providing valuable case studies.

Once the draft texts were on the table, each chapter was commented by 9 to 16 reviewers from local to international organisations within just a few weeks. Tilman Jaeger (IUCN), Wairimu Mwangi (ATPS) and Nik Sekhran (UNDP) took the pain to revise the entire draft report. We are indebted to all of them for their tremendous support.

The full list of authors, contributors, facilitators, reviewers, editors and resource persons who helped in producing this report are acknowledged on the last page. We would especially like to thank Augustin Berghöfer, who has made it happen: organized the core team calls, co-ordinated the stakeholder review process and initiated the case collection. A special thanks to the Green Indian States Trust for organizing and financing case finalization and review and to the European Environmental Agency for collaborating with us to put them on their online environmental atlas. Finally, we thank the Norwegian Ministry of Foreign Affairs, for their financial support, and the Ministry of Environment in Japan for their help at various stages.

TEEB for local and regional policy makers uses three formats: this report, a collection of more than 100 two-page case studies (available at [TEEBweb.org](http://TEEBweb.org)), and a book, published by Earthscan in 2011, which is geared to environmental management students – the experts of tomorrow.

Many people have mentioned to us: “We need capacity building! Give us training in how to assess nature's values.” This report meets the request in a slightly different way: You can learn what tools are available, how they work and what experiences others have had with them. Throughout the book you will be referred to further guidebooks and manuals. But in addition – and after many discussions with people applying these concepts – we feel it is important to point you to some nuts and bolts, to the limitations as well as to the potential of valuing nature (summarised in the last chapter).

We sincerely hope that with this orientation you are well-equipped for appraising nature's benefits.

Heidi Wittmer and Haripriya Gundimeda

Coordinators  
TEEB for Local and Regional Policy Makers

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# EXECUTIVE SUMMARY

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This report 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 local policy makers who want to include these benefits in their policies in order to help create a sustainable future for local communities.

## I. THE OPPORTUNITY: THE VALUE OF NATURE FOR LOCAL DEVELOPMENT

All economic activity and most of human well-being is based on a healthy, functioning environment. By focusing on the various benefits from nature – ecosystem services – we can see more clearly the direct and indirect ways that human well-being depends on the natural environment. Nature's benefits are multiple and include all our food; our water; safe places for living; materials such as timber, wool and cotton; and many of our medicines. Healthy natural systems regulate our climate, protect against hazards, meet energy needs, prevent soil erosion, and offer opportunities for breath-taking recreation, cultural inspiration and spiritual fulfilment.

For local development, considering ecosystem services in policy making can help save on future municipal costs, boost local economies, enhance quality of life and secure livelihoods. This approach also helps tackle poverty as it discloses the distribution of scarce and essential resources and services upon which people depend.

So far, nature's benefits have played a minor role in policy. Policies and public investments for a functioning environment are often considered a luxury rather than life insurance. Why is this the case? It is largely due to the fact that many ecosystem services are poorly visible and their continuous availability is often falsely assumed. Also, many of nature's benefits are public goods – such as pollination – belonging to all, so there is little incentive to take action on behalf of 'everyone'. Finally, other needs and objectives may seem more pressing and decisions are often made without knowing the environmental consequences.

This is a problem because our natural capital is diminishing. Wasteful use of resources and limited concern for natural systems drive its loss. Ecosystems have their tipping points. After this point, restoration or seeking alternatives for benefits lost, can consume considerable time, money and effort. It takes years for a replanted mangrove belt to provide effective coastal protection again. While many pressures are beyond the local scope, local policy makers still have to deal with their consequences.

TEEB suggests a shift in focus. Economic analysis indicates that maintaining healthy ecosystems is often a better, less expensive, option. Appraising ecosystem services provides a full picture, outlining the costs and benefits of different policy options and highlighting the best local strategy for enhancing human well-being and economic sustainability

## II. THE TOOLS: APPRAISING ECOSYSTEM SERVICES

When appraising nature's benefits we should seek answers to these questions: **Which** ecosystem services are central to my local/regional society and economy? **Who** depends on these services? Which services are at risk? **How** will a policy action affect these services? Local knowledge and dialogue among colleagues and stakeholders can generate first answers that help orient policy.

This report provides a hands-on overview of frameworks for considering nature. These frameworks structure our take on nature in economic, ecological or developmental terms.

On that basis, different tools allow for appraising and valuing ecosystem services. Qualitative tools describe the connections between ecosystem services and human well-being. They also capture the appreciation people attach to nature's benefits. Quantitative tools examine amounts, intensities and impacts of different

ecosystem services. Monetary tools attach monetary values to both the presence and loss of ecosystem services.

The report also introduces three decision support methods by which appraisal and valuation of ecosystem services can directly inform policy choices: cost-benefit analysis, participatory appraisal and multi-criteria analysis. The strengths, weaknesses and requirements of each are discussed.

### TEEB's stepwise approach

A stepwise approach helps navigate through the different assessment options available. This approach is not a fixed recipe, but is intended to guide policy makers in designing their own processes for appraising and considering nature's benefits in their policy decisions:

- (i) Specify and agree the policy issue with stakeholders to avoid misunderstandings during decision making and implementation.
- (ii) Identify which ecosystem services are most relevant to the policy issue in order to focus analysis.
- (iii) Define the information needs to tackle your issue and select appropriate methods for assessment.
- (iv) Assess ecosystem services, expected changes in their availability and distribution.
- (v) Identify and appraise policy options based on your assessment.
- (vi) Assess distributional impacts of policy options on different groups in your community.

## III. THE PRACTICE: ECOSYSTEM SERVICES IN POLICY AND MANAGEMENT

Knowing their natural capital and the services it provides can help local policy makers in rural and urban management, in spatial planning, and in protected areas management. It allows to refine government regulations and to develop market-based instruments. This report explores reasons for and examples of applying a focus on nature's benefits in these local policy areas.

Cities depend on nature. Ecosystem services can provide cost-effective solutions to municipal services, such as wastewater treatment by wetlands. City managers can enhance the flow and benefits of ecosystem services by influencing modes of production, procurement and creating incentives.

In rural development, we often promote ecosystem services with high market value to the detriment of regulating services that are equally important, but less obvious. Local officials play a key role in implementing, adjusting and informing sustainable practices in forestry, fisheries, agriculture and tourism.

Planning frameworks and environmental impact assessments can proactively include ecosystem services. This allows the identification of economic potentials, rather than simply identifying constraints.

Protected areas can be an important local as well as national asset. To enhance local benefits, protected areas need to be connected with the management of the surrounding landscape. A focus on ecosystem services is instrumental in zoning, management and fundraising.

Locally adapted payment schemes for ecosystem services, as well as certification and labelling, can reward good stewardship of natural capital. What works well in theory may be demanding in practice. A successful market-based instrument should build on transparent, credible governance and incorporate effective monitoring and enforcement.

## IV. THE LESSONS: HOW TO MAKE IT HAPPEN

Three issues, beyond the appraisal of ecosystem services itself, need attention if you wish to make natural capital work for local development:

- (i) The distribution of rights to nature's benefits. Policy changes often affect service distribution or access – and this needs to be considered during decision making.
- (ii) The optimal use of available scientific and experience-based knowledge. The ecosystem services framework provides a common language to capture diverse views.
- (iii) Well-informed facilitation of participatory processes. Stakeholder engagement is needed to bring all these facets together, to prioritize and to develop feasible and effective local policy action.

This report is to be treated as a catalyst for further thinking – a starting point for adopting ways to make your natural capital flourish. In addition to the examples used in this report, [www.teebweb.org](http://www.teebweb.org) hosts a collection of more than 100 short case studies which illustrate a focus on ecosystem services in diverse settings.

# GUIDANCE FOR READING THIS REPORT

**TEEBcase:** The TEEBcases are examples that illustrate how ecosystem services have already been taken into account in local and regional policy making. Coming from all over the world, these cases were collected by different means: the stakeholder consultations; the TEEB Call for Evidence; literature review, or indication by practitioners and researchers in the field. All case descriptions contain full references, were reviewed by independent experts, and are going to be available at **TEEBweb.org** (check the website also for additional cases not cited in the report).

**Glossary terms:** The terms indicated with an arrow (→) are further defined in the glossary.

**Ecosystem Services Icons:** Described in Box 1.4 in Chapter 1, these icons are used along the whole report to indicate where specific ecosystem services are mentioned or discussed. When the arrow points to the left (←) the reference to the ecosystem service is found in the left column, to the right (→) indicates a service mentioned in the right column.

<i>Provisioning Food</i>		<i>Regulating Pollination</i>	
<i>Provisioning Raw Materials</i>		<i>Regulating Biological Control</i>	
<i>Provisioning Fresh Water</i>		<i>Habitats for Species</i>	
<i>Provisioning Medicinal Resources</i>		<i>Habitats for Genetic Diversity</i>	
<i>Regulating Local Climate</i>		<i>Cultural Service: Recreation</i>	
<i>Regulating Carbon Sequestration</i>		<i>Cultural Service: Tourism</i>	
<i>Regulating Extreme Events</i>		<i>Cultural Service: Aesthetic appreciation</i>	
<i>Regulating Waste Water Treatment</i>		<i>Cultural Service: Spiritual Experience</i>	
<i>Regulating Soil Erosion and Fertility</i>			

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## FOR FURTHER INFORMATION

### Ecosystem services guides for decision makers

WRI (2008) *Ecosystem Services: A guide for decision makers*. This easily accessible report provides frames the link between development and ecosystem service, points out risk and opportunities and explores future trends in ecosystem services. [http://pdf.wri.org/ecosystem\\_services\\_guide\\_for\\_decisionmakers.pdf](http://pdf.wri.org/ecosystem_services_guide_for_decisionmakers.pdf)

### National ecosystem assessments

Chevassus-au-Louis, B. et al. (2009) *Approche économique de la biodiversité et des services liés aux écosystèmes*. This comprehensive report on ecosystem services and biodiversity points out policy implications and opportunities. (in French) [www.strategie.gouv.fr/IMG/pdf/Rapport\\_18\\_Biodiversite\\_web.pdf](http://www.strategie.gouv.fr/IMG/pdf/Rapport_18_Biodiversite_web.pdf)

WRI (2007) *Nature's Benefits in Kenya: An Atlas of Ecosystems and Human Well-Being*. This illustrated report summarizes the current state and future trends of Ecosystems in Kenya. [http://pdf.wri.org/kenya\\_atlas\\_fulltext\\_150.pdf](http://pdf.wri.org/kenya_atlas_fulltext_150.pdf)

CONABIO (2009) *Capital Natural de Mexico*. This very comprehensive report (5 volumes) presents the current knowledge on biodiversity, the state of conservation, policy implications, and future scenarios. [http://www.biodiversidad.gob.mx/pais/pdf/CapNatMex/Capital%20Natural%20de%20Mexico\\_Sintesis.pdf](http://www.biodiversidad.gob.mx/pais/pdf/CapNatMex/Capital%20Natural%20de%20Mexico_Sintesis.pdf)

UKNEA/UNEP-WCMC (forthcoming) **United Kingdom** National Ecosystem Assessment. Following the example of the Millennium Ecosystem Assessment the study assesses the natural capital of the United Kingdom <http://uknea.unep-wcmc.org>

Further regional and local ecosystem assessments from around the globe are available on the Millennium Ecosystem Assessment website [www.millenniumassessment.org/en/Multiscale.aspx](http://www.millenniumassessment.org/en/Multiscale.aspx)

### Climate Change

The World Bank (2009); *Convenient Solutions to an Inconvenient Truth: Ecosystem-based Approaches to Climate Change*. The report highlights ecosystem-based measures of adaptation to and mitigation of climate change. [http://siteresources.worldbank.org/ENVIRONMENT/Resources/ESW\\_EcosystemBasedApp.pdf](http://siteresources.worldbank.org/ENVIRONMENT/Resources/ESW_EcosystemBasedApp.pdf)

UNEP (2009) *The Natural Fix: The role of ecosystems in climate mitigation* This brochure with many figures and maps illustrates the contribution of the various ecosystems the climate change mitigation. [http://www.unep.org/pdf/BioseqRRA\\_scr.pdf](http://www.unep.org/pdf/BioseqRRA_scr.pdf)

### Poverty and gender

UNDP-UNEP (2008) *Making The Economic Case: A Primer on the Economic Arguments for Mainstreaming Poverty-Environment Linkages into National Development Planning* [www.unpei.org/PDF/Making-the-economic-case-primer.pdf](http://www.unpei.org/PDF/Making-the-economic-case-primer.pdf)

IUCN (2009) *Training manual on gender and climate change*. This easily accessible report provides information on gender mainstreaming in climate change adaptation; including 18 case studies. <http://www.iucn.org/dbtw-wpd/edocs/2009-012.pdf> Factsheets, reports and handbooks on the link between gender issues, ecosystems and climate change are available on the Global Gender and Climate Alliance website <http://www.gender-climate.org/resources.html>

Alkire S, ME Santos. 2010. *Acute Multidimensional Poverty: A New Index for Developing Countries*. OPHI working paper no. 38. Oxford Poverty & Human Development Initiative (OPHI). This academic report introduces the Multidimensional Poverty Index (MPI); incl. many graphs and figures. [www.ophi.org.uk/wp-content/uploads/ophi-wp38.pdf](http://www.ophi.org.uk/wp-content/uploads/ophi-wp38.pdf)

### Option values of biodiversity

Biomimicry is an emerging discipline that studies nature's best ideas and then imitates these designs and processes to solve human problems. Inspiring examples are available at [www.biomimicry.net](http://www.biomimicry.net)

### Identifying Policy Responses

Millennium Ecosystem Assessment 2005. *Response Assessment*. The Report assessed the effectiveness of various types of response options, both historical and current, examining the strengths and weaknesses of various response options that have been used to manage ecosystem services. It also identifies some promising opportunities for improving human well-being while conserving ecosystems. <http://www.millenniumassessment.org/en/Responses.aspx>

UNDP - United Nations Development Programme (2010) *Biodiversity and Ecosystems: Why these are Important for Sustained Growth and Equity in Latin America and the Caribbean*. This report examines economic trends and policy initiatives focusing on natural capital in South America (launch: September 2010)