

# Insights from The Economics of Ecosystems and Biodiversity Study

# Nature Adds Economic Value to City Planning

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For the first time in human history, over half of the world's population lives in cities. China already has 100 cities with populations of over one million; India has 35 of them. By 2050, the United Nations predicts that up to 80 percent of the global population could be urban. Innovations in city planning and architecture, and an unprecedented step change in infrastructure investment, will be required to transform the worlds' rapid urbanisation over the next two decades into a suite of new models for sustainable urban living. Making the economic case for the conservation of nature is increasingly seen as an integral part of this step change.

Conservation has been on the agenda for many years, but, inspired by the release of the Stern Report on the economics of climate change in 2007, the European Commission and Germany proposed that a study be commissioned to explore the economic case for the conservation of nature and the creation of guidance as to how policy makers and businesses can start to understand and factor in the economic dimension of the services nature provides and the costs and benefits of better management of these services. The Economics of Ecosystems and Biodiversity (TEEB) study was established and hosted by the United Nations Environment Programme. A suite of TEEB reports aimed at national and international policy makers, businesses, citizens, and local and regional policy makers was released between 2008 to 2010. The TEEB study involved over 500 individuals and organisations from around the world, building on extensive work in this field over the last decade, and presenting an approach that can help decision makers recognise, demonstrate, and where appropriate capture the values of ecosystems and biodiversity. Study leader, Pavan Sukhdev, described it as an explicit interven-

tion to end the economic invisibility of nature and to reset the economic compass as we know it.

Understanding the role of nature in relation to human well being requires an understanding of two key terms, "biodiversity" and "ecosystem services". Biodiversity is defined by the 1992 Convention of Biological Diversity as "the variability among living organisms from all sources including terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems"<sup>1</sup>. In other words, biodiversity includes diversity within species populations (genetic variation), the number of species, and the diversity of ecosystems.

Both quantity and quality attributes of biodiversity are important when considering the links between nature, economic activity, and human well-being. In addition to the diversity of species, genes, and ecosystems, the sheer abundance of individual animals and plants, as well as the extent of ecosystems such as forests or living coral reefs, are critical components of natural capital and key determinants of the benefits delivered.

In recent literature, the links between nature and the economy are often described using the concept of ecosystem services, or flows of value to human societies as a result of the state and quantity of natural capital. The Millennium Ecosystem Assessment defined four categories of ecosystem services that contribute to human well being, each underpinned by biodiversity: provisioning services, such as wild foods, crops, fresh water, and plant-derived medicines<sup>2</sup>; regulating services, such as



ABOVE Cityscape of Curitiba, a pioneer city in local action for biodiversity (Photo: City of Curitiba).

filtration of pollutants by wetlands, climate regulation through carbon storage, and water cycling, pollination, and protection from disasters; supporting services, such as soil formation, photosynthesis, and nutrient cycling; and cultural services, like recreation, spiritual and aesthetic values, and education. These categories have been very helpful in helping people understand not only how nature provides for us but also how we can make a better case for the conservation of nature.

From an economic point of view, the flows of ecosystem services can be seen as the “dividend” that society receives from natural capital. Maintaining stocks of natural capital allows the sustained provision of future flows of ecosystem services, and thereby helps to ensure enduring human well being.

The aim of the TEEB study was to provide a bridge between the multi-disciplinary science of biodiversity, economics, and the arena of local government and business practices, as well as international and national policy. One of the TEEB reports is aimed specifically at local and regional policy makers. Over 140 experts from science, economics, and policy from more than 40 countries across the globe were involved in the research, analysis, and writing of this particular report, which was coordinated by Dr. Heidi Wittmer, who heads the working group on governance and institutions for the sustainable use of landscapes at the Helmholtz Centre for Environmental Research at Leipzig in Germany, and Haripriya Gundimeda, Associate Professor, Department of Humanities and Social Sciences, at the Indian Institute of Technology in Bombay, India. The report, titled “TEEB for Local and Regional Policy Makers”, calls

on local policy makers to understand the value of their natural capital and the services they provide, and to apply a focus on nature’s benefits in local policy areas such as urban management, spatial planning, and the management of protected areas.

TEEB for Local and Regional Policy Makers aims to provide an inspiring starting point for thinking about local policy in a new way. The report highlights cities’ dependence on nature and illustrates how ecosystem services can provide cost-effective solutions to municipal services. It shows how, in rural development and natural resource management, ecosystem services with high market value are often promoted to the detriment of the regulating services, which are equally important but less obvious. It investigates planning frameworks and environmental impact assessments that can proactively include a strong focus on ecosystem services and identify the economic potential of this shift in approach.

Speaking at the launch of the report in September 2010, Achim Steiner, Executive Director of the United Nations Environment Programme, commented: “State and provincial governments, local authorities, city and county councils can all make a huge contribution to overall efforts towards a transition to a low-carbon, resource-efficient Green Economy. This is because some 70 percent of humanity’s ecological footprint is now linked with the way resources are consumed in cities. Some local governments are already rising to the challenge as the wide range of case studies and solutions spotlighted show, from land-use planning which incorporates ecosystem service values, to new legislation and payments for ecosystem services. Many more now need to come on board.”



ABOVE eThekweni Municipality (Durban)—applying an ecosystem service perspective to planning (Photo: ICLEI LAB Pioneer).

In developing the report, TEEB also collaborated with the European Environment Agency's online Environmental Atlas to present a series of case studies from around the world that highlight efforts being made to incorporate ecosystems and biodiversity into local policy initiatives. Along with the report itself, the case studies can be accessed via a link on [www.teebweb.org](http://www.teebweb.org).

Presenting case studies is an important part of the TEEB study's approach. The TEEB team wanted to show that the concept of the economics of nature is not a blank page and believed that sharing examples where such economics have been applied and resulted in policy shifts is a valuable part of mainstreaming these ideas in order to create a sustainable future. Among the case studies presented is Singapore's own City Biodiversity Index project developed in association with the Convention on Biological Diversity.

Pavan Sukhdev commented, "By focusing on the various benefits from nature, we can see the direct and indirect ways that we depend on the natural environment and this insight can substantially support local policy and public management. We urge local authorities to read this report and recognise the benefits provided by nature and the economic dimension of their local natural capital."

The TEEB approach highlights the importance of nature, such as parks, surrounding wetlands, and upstream watershed areas, to city living. Parks provide recreation areas and can act as lungs for the city. In 2011, 92 percent of the respondents in a UK study of attitudes towards biodiversity and the natural environment said it was fairly or very important for them to have public gardens, parks, commons, or other green spaces nearby. While 56 percent of respondents said they used public gardens, parks, commons, or other green spaces at least once a week.<sup>3</sup> The city of Curitiba in Brazil is a Local Action for Biodiversity Pioneer city. Amongst other greening activities, the city has managed to increase green space per person from less than one square metre per capita to 52 square metres per capita. Local residents planted 1.5 million trees and tax breaks were given to building projects that included green space. New lakes in parks helped to reduce the problem of flooding.<sup>4</sup>

In addressing issues around its own municipal-owned spaces, the South African municipality of Durban's estimated that the replacement value of the ecosystem goods and services supplied by Durban's 2002 Open Space system was conservatively estimated at US\$ 0.41 billion per annum. This figure does not include the tourism sector which is valued at an additional US\$ 0.44 billion per annum. The municipality is now investigating how to value municipal-owned spaces and include them on its asset register in order to make better provision for ongoing management.<sup>5</sup>

The conservation of nature has also been seen to trigger other benefits for urban environments such as better waste management. For example, in Japan, conservation and waste reduction met in a project to save the Fujimae Tidal Flat, a vital migratory bird stopover site, from being converted to a landfill site to meet the city's waste management needs. The City of Nagoya created a double win by initiating a major waste reduction and recycling programme. This programme started in 1998 and involved extensive community education about correct recycling. The efforts paid off and Nagoya met its target of a 20 percent decrease in waste within two years and won national awards for environmental practice. In the last 10 years, the volume of sorted waste has tripled, the volume of processed waste has gone down by 30 percent, and the volume of landfill has been reduced by 60 percent. Since 2002, the Fujimae Tidal Flat has been listed on the Ramsar List of Wetlands of International Importance.<sup>6</sup>

The city of New York relies on the watershed in the nearby Catskills for the supply of drinking water for its entire population. The Catskills watershed system has the largest water surface of all water supplies in the United States that are not mechanically filtered. Environmental protection became an irresistible option for New York City in 1989, when officials were faced with an order from the US Environmental Protection Agency to build a filtration plant at a cost of US\$ 6 to 8 billion, plus a


further US\$ 300 to 500 million a year for running costs. Instead, planners chose to invest US\$ 1 to 1.5 billion in protecting their natural asset, the 2000-square-mile upstate watershed, which they are legally authorised to manage in order to continue to provide clean and disease-free water for their residents.

The watershed system had worked through most of the twentieth century when the Catskills area was a wilderness and when what are now the city's northern suburbs were sparsely populated. However, as the end of the twentieth century approached, the area was under increasing environmental pressure from tourism, golf courses, weekend homes, sewage discharge, and run-off from fertilisers and pesticides.

Over the years following the EPA order, New York City undertook a range of measures, including: a ban on new buildings; buying up land at the watershed to create buffer zones for nature to do its water purifying work; and cracking down on watershed farming activities. They constructed new storm sewers and septic systems, and updated existing sewage plants. This investment was in addition to about US\$35 million already budgeted to help upstate farmers limit their pollution. The programme of action was controversial yet effective, and the Catskills still provides water to New York today.<sup>7</sup>

Within the context of an increasingly resource-constrained world, Dr. Heidi Wittmer said that although many pressures are beyond local scope, local policy makers still have to deal with their consequences: "By appraising ecosystem services, we can create a more complete picture of issues and options that face local policy makers. We can outline the costs and benefits of different policy options, highlighting the best local strategies for enhancing economic sustainability and human well being in cities around the world."

Wittmer added that the TEEB report has provided a six-step plan to help local policy makers appraise and consider nature's benefits. Steps include: specifying and agreeing on the policy issue with stakeholders; identifying which services are most relevant; defining information needs and selecting appropriate methods; assessing ecosystems service; identifying policy options; and assessing the distributional impacts of possible policy decisions.

Following the release of the TEEB for Local and Regional Policy Makers report, TEEB went on to partner with ICLEI-Local Governments for Sustainability to create the *TEEB Manual for Cities Ecosystem Services in Urban Management*. The publication builds upon the TEEB reports and tailors the information specifically for an urban context. It highlights how a focus on ecosystem services and their valuation can create direct benefits for urban areas and can be performed even with limited resources. The manual can be downloaded from [www.teebweb.org](http://www.teebweb.org). 

1 Convention on Biological Diversity. "Convention Text." [www.cbd.int/convention/articles.shtml?a=cbd-02](http://www.cbd.int/convention/articles.shtml?a=cbd-02)

2 Millennium Ecosystem Assessment. 2005. Millennium Ecosystem Assessment, General Synthesis Report. Washington DC: Island Press.

3 Department for Environment, Food and Rural Affairs. 2011. "Attitudes and knowledge relating to biodiversity and the natural environment, 2007-2011." <http://www.defra.gov.uk/statistics/files/Statistical-Release-13-April-2011-biodiversity1.pdf>

4 ICLEI. 2005. "Orienting Urban Planning to Sustainability in Curitiba, Brazil," Case study 77, ICLEI-Canada, Toronto. <http://www.iclei.org/index.php?id=11546>

5 Richard Boon, Manager, Department of Biodiversity Planning, Environment Management, Unit of Development Planning and Management, eThekweni Municipality.

6 Environmental Affairs Bureau, City of Nagoya.

7 Daily, Gretchen, and Katherine Ellison. 2002. *The New Economy of Nature*. Washington DC: Island Press.