

## PART III THE PRACTICE: OPTIONS FOR CREATING POLICIES THAT INTEGRATE ECOSYSTEM SERVICES

How do we translate what we've learned about the value of ecosystem services into effective policy action? There are many options for doing this – in nearly every field of policy making. TEEB discusses in two reports these options and shows examples of successful policies that incorporate the value of nature: the TEEB Report for National and International Policy Makers and this one, TEEB for Local and Regional Policy Makers. What might be the responsibility of the national government in one country may be managed regionally in another. For this reason, regional level policy makers may wish to refer to both TEEB volumes to address the particularities of their situation. (available at [www.teebweb.org](http://www.teebweb.org))

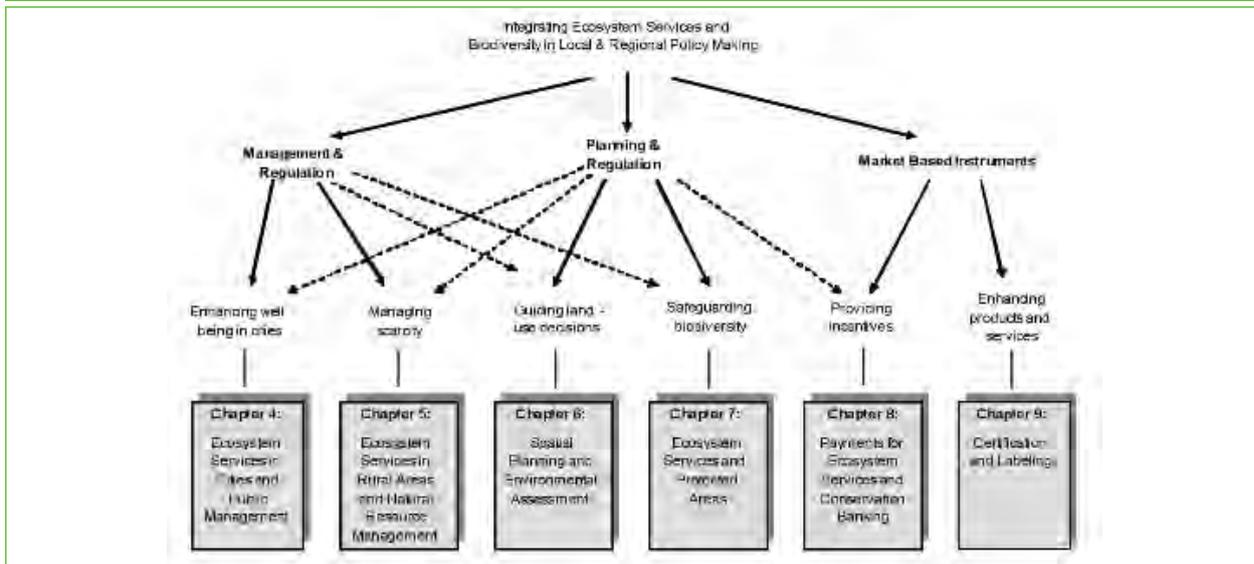
The TEEB Report for **National and International Policy Makers** focuses on several themes for policy action: In the first place, governments can reform accounting systems to better reflect nature's benefits through adequate indicators in national accounts. The obvious way to capture the value of ecosystem services is for government to regulate. Government can forbid, restrict and reward certain actions. Polluters can be made liable for damages caused. In addition, fiscal policy can be adjusted, with taxes levied on

undesirable actions and tax breaks given to companies whose practices are more ecologically sustainable. Other options include legal frameworks for payments for ecosystem services schemes and the reform of harmful subsidies. Finally, governments can directly invest in maintaining and restoring natural capital.

**TEEB for Local and Regional Policy Makers:** The following six chapters in this volume (see Figure 2) explore options that are typically the responsibility of decision makers at sub-national levels. We present, as outlined in the diagram below.

Chapter 4 examines public management and includes a look at the provision of municipal services and public procurement. Chapter 5 focuses on sector policies that concern natural resources (agriculture, forestry, fisheries, tourism) and disaster management. Chapter 6 covers planning, from spatial planning to the planning of projects and policies. Chapter 7 directs attention to the relevance of protected areas for local authorities, outlining both their role and management options. Chapters 8 and 9 present options for using market-based instruments at the local level.

### Opportunities for integrating ecosystem services and biodiversity into local and regional policy



# 4 ECOSYSTEM SERVICES IN CITIES AND PUBLIC MANAGEMENT

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## Key Messages

- **Cities depend on nature.** Many essential services provided by local governments depend on and impact the ecosystems around them, either nearby or further afield.
- **Nature is good for your budget.** Local authorities oversee many crucial public management processes. Using an ecosystem services approach can provide cost-effective solutions to municipal service provisioning, such as land use, water and waste management.
- **Take less, get more.** Increasing urbanization puts pressure on ecosystems and biodiversity. City managers have the potential to shift to a resource-efficient and low-carbon future by influencing modes of production, procurement and incentive policies, and consumption patterns.
- **There are many ways to make a difference.** Local government can act as a role model. It can promote and set incentives and it can improve regulation. They can take initiative in many key areas – urban greening, housing, land-use, urban sprawl, solid waste and waste-water treatment, water supply, energy supply and transport.
- **Integration is key.** Using an integrated management approach to deliver ecosystem-dependent services is likely to be most effective. The ecoBUDGET tool has been designed to enable the integration of ecosystem services into decision-making.

“For too long, we have been of the opinion that there were only two types of capital for development – financial and human capital, the latter being knowledge, skills, creativity and education. We have been living in the illusion that there is nothing like environmental or natural capital, and that we could use the environment, the environmental capital free of charge. Only now, we can clearly see that this idea is no longer carrying and not allowing for development processes, too. We have overspent more than 60 percent of the ecosystem services available, as we luxuriously live based on economic growth without reinvesting in the natural capital stock.”

Klaus Töpfer, Immediate past Executive Director UNEP, cited in UN-HABITAT et al. 2008

→*Public management* is defined as the processes and procedures used to ensure that public and governmental institutions providing public services fulfill all their goals and obligations to promote citizens’ well-being and to manage the →*resources* available (UNEP et al. 2001).

For the purpose of this chapter, focus will be put on local governments, although in many countries, a higher level of government (province or state) has more influence on certain areas of public management. Political parties may differ in the way they address local governance, with some mandates resting at Ministry level, but overall, there is a clear trend towards growing decentralization and local capacity building (‘localization’ of mandates).

This chapter provides an overview of how local governments can improve their performance, service delivery and citizens’ well-being by taking into account →*ecosystem services* in public management. It highlights the **benefits of the ecosystem services approach** (4.1); describes the increasing **pressures on ecosystems** in a rapidly urbanizing world whilst exploring the **potential of urban areas to more efficiently manage resources** (4.2). **Local governments’ options** to act as linked to ecosystem services are discussed (4.3) and tools for integrating ecosystem services into public management through an **integrated management approach** using **ecoBUDGET** as an example are presented (4.4).

## 4.1 BENEFITS OF INCLUDING ECOSYSTEM SERVICES IN PUBLIC MANAGEMENT

Local government leaders and city managers all around the world are constantly working to **improve their citizens’ quality of life**. In so doing, they face the ongoing challenge of how to provide municipal services with increasingly scarce resources (human, financial and natural) and to address issues of →*poverty*, unemployment, and inadequate living conditions.

Whether nearby or further afield, the **natural capital from →ecosystems contributes to delivering municipal services**. A new road requires raw materials and land; a new well provides drinking water; and new

housing uses natural resources in construction. There are also costs to the ecosystem: →*biodiversity* and natural habitats are separated or lost; additional inhabitants convert more fresh water into sewage and increase air pollution. Clearly, municipal action always has implications both on ecosystems and their services. Policy makers often neglect that implementation of their decisions not only requires skilled human and financial resources, but also natural resources and ecosystem services (UN-HABITAT et al. 2008). Particularly during economic and financial crises, local governments try to reduce costs of their service

delivery, and foster economic prosperity in the area – often without reinvesting in nature.

Through public management interventions, local governments can diminish, maintain, or increase the provision of ecosystem services in their administrative area. **Assessing ecosystem services and the benefits they provide in public management is an important step to identify cost-effective management options.** Such assessments can help to identify interventions aiming at (re-)investing, maintaining and restoring natural capital and the ecosystem services it provides that will pay off and help decision makers improve local wellbeing. Ideally, a municipality should base its development and the wellbeing of its citizens' on its own, local resources, hence decreasing its dependence on those further away. Benefits of an ecosystem services based approach to public management include:

- **Enhancing citizens' quality of life in urban areas** – a city with a healthy environment provides a higher quality of life for its citizens. Locally generated ecosystem services, such as air filtration, micro-climate regulation, noise reduction, rainwater drainage, sewage treatment, and recreational and cultural services, have a substantial impact on → *human well-being* in urban areas (Bolund and Hunhammar 1999). By developing strategies (in urban planning, housing, transport) for maintaining or enhancing local ecosystems to provide services in urban areas, local governments can also safeguard the environment for future generations, and profile their city as a sustainable one. Examples include the Toronto Green Belt (TEEBcase Economic value of Toronto's Greenbelt, Canada), a whole variety of green planting initiatives (Box 4.5) or Singapore

Biodiversity Index (Box 4.7).

- **Reducing public management costs** – local governments work with limited budgets and need to find the most cost effective solutions to provide their municipal services. Some services (see section 4.2), such as water supply and water treatment, are highly dependent on healthy ecosystems. Investment in natural capital and ecosystem-based approaches, for example, green infrastructure, can be cost-effective, when compared with man-made solutions. Water treatment (Box 4.1 and TEEBcase Water fund for catchment management, Ecuador) flood protection, climate regulation are some obvious examples.
- **Fostering economic growth in the area** – by emphasizing local ecosystem services and developing policies to support them, local governments can sustainably enhance these services and foster economic prosperity. A healthy and safe environment is likely to attract business and industry with its commensurate job opportunities and wealth creation. The beverage industry, for example, depends on the supply of freshwater. Agribusiness relies on nature's pollination, pest control, and erosion control services while the tourism industry benefits from this ecosystem's recreational value. → *Ecotourism* is a fast-growing sector which generates significant employment and opportunities for local development (see Chapter 5 Section 4). Building green infrastructure (green roofs, green spaces) will provide jobs as well as improve air filtration, CO<sub>2</sub> sequestration and energy saving. Växjö, Sweden has been successful in sustainably managing its ecosystems and fostering growth (see Box 4.9).



#### Box 4.1 Natural vs man-made? Wastewater treatment in Uganda

The Nakivubo Swamp in **Uganda** provides not only wastewater purification of Kampala's sewage but also nutrient retention. The results of an economic evaluation comparing this natural effect with manmade solutions showed a high economic value between US\$ 1 million and US\$ 1.75 million a year, depending on the economic analysis method used. Furthermore, the Wetlands Inspectorate Division and IUCN showed that a sewage treatment plant would cost over US\$ 2 million to maintain each year. Not only was the cost of expanding the sewage treatment plant greater than the value of the wetland, there were associated costs to livelihoods.

Source: Protected wetland for securing wastewater treatment, Uganda. TEEBcase based mainly on Lucy Emerton et al. (see TEEBweb.org)

- **Reducing poverty** – there is a clear connection between livelihoods and ecosystems, which in the case of the poor is even more direct. Natural resources are a basic source of their income generation. Enhancing local ecosystem services can help reduce poverty and provide the basic needs of citizens. In rural areas the poor rely directly on ecosystems for food, water and fuel. Though less pronounced, the same holds true for many cities. Moshi in Tanzania, is introducing energy efficient stoves to save the forest on the slopes of Mount Kilimanjaro. Nature in cities can also offer income opportunities: local people in South Africa have been trained to manage Pilanesburg National Park, which, with its unique wild-life, is also a tourist attraction.



- **Protecting against environmental disasters** – a range of ecosystems act as important buffers for natural hazards, mitigating the damage caused by extreme events such as floods, droughts and landslides. These events are increasing in intensity, as well as frequency, due to climate change (see Chapter 5.5 and Box 6.5). There is an increasing number of examples. Kumamoto City, Japan, for instance, has established a payment scheme for returning 'used' groundwater by flooding agricultural land between crop cultivation periods (TEEBcase Payments for ground water recharge, Japan). Another interesting example of ecosystem based climate adaptation comes from Mumbai, India (Box 4.2).

#### Box 4.2 Flood mitigation in Mumbai, India

During an unprecedented monsoon rainstorm in July 2005, almost a meter of rain fell on Mumbai, India, a city with a population of 19.8 million. Severe flooding resulted, and over a thousand people lost their lives. But loss of life and property damage could have been much greater had it not been for 104 km<sup>2</sup> Sanjay Gandhi National Park, which lies entirely within the city limits. The heavily forested park absorbed much of the rainfall.

Source: Trzyna 2007

- **Alleviation of pressures on the resource base** of other regions, ensuring the future provision of services from areas beyond city administrative

areas. Examples exist from the timber industry and forest management in Brazil: in order to deal with its ecological footprint, the city of Sao Paulo has adopted a policy about using certified timber which is having an immediate positive impact on the Amazonas. Aichi Prefecture, Japan, has established a tap water fee in order to pay for sustainable forest management practices (TEEBcase Water fee for forest management, Japan).

- **Becoming a political frontrunner** – local government pioneers get recognition. Cities that have been proactive in protecting their ecosystems and halting biodiversity loss are internationally renowned (Boxes 4.3 and 4.6).

#### Box 4.3 Cities taking part in Local Action for Biodiversity (LAB) initiative

With the aim of strengthening biodiversity management 21 pioneering local governments from around the world piloted LAB. Between 2006 and 2009, they took part in a coordinated process of biodiversity assessment, planning and implementation. This was underpinned by political commitment through the signing of the internationally-recognized Durban Commitment. The LAB initiative represents a partnership between ICLEI – Local Governments for Sustainability and IUCN – the International Union for Conservation of Nature.

Source: Local Action for Biodiversity, [www.iclei.org/lab](http://www.iclei.org/lab)

## 4.2 PRESSURE AND POTENTIAL OF URBAN AREAS

“The global effort for sustainability will be won, or lost, in the world’s cities, where urban design may influence over 70 percent of people’s Ecological Footprint. High-Footprint cities can reduce this demand on ecosystem services and natural capital greatly with existing technology. Many of these savings also cut costs and make cities more liveable.”

Wackernagel et al. 2006

Cities are growing in size, population and economic power. **More than half of humanity lives in cities, which occupy only 2% of the world’s land surface, yet are responsible for 75% of the world’s natural resources consumed, and waste produced** (Klein Goldewijk and Van Drecht 2006 in OECD 2008). This trend of global urbanization is increasing and within the next two decades, 60% of the world’s population will reside in urban areas (UN-DESA 2007; UN-DESA 2008).

In this scenario, decision makers in developing countries may play an even more critical role than their counterparts in developed ones, when it comes to sustainable use of ecosystem services and biodiversity for development. There are two reasons for this: a) 93% of urbanization is expected to occur in developing countries (UNFPA 2007) and b) although often aware of biodiversity issues, municipalities in the South may be more constrained than their Northern counterparts to manage biodiversity and ecosystem issues, both in terms of their capacity and support from their national authorities. This is highly relevant considering that the majority of the world’s biodiversity is controlled by developing countries.

At the same time, urban development and the urban environment cannot be seen in isolation from each other. Growing cities and changing lifestyles require an increasing quantity of natural resources for their production and consumption needs, which are supplied from rural and remote areas. The **‘Ecological Footprint’** – an →*indicator* that translates consumption

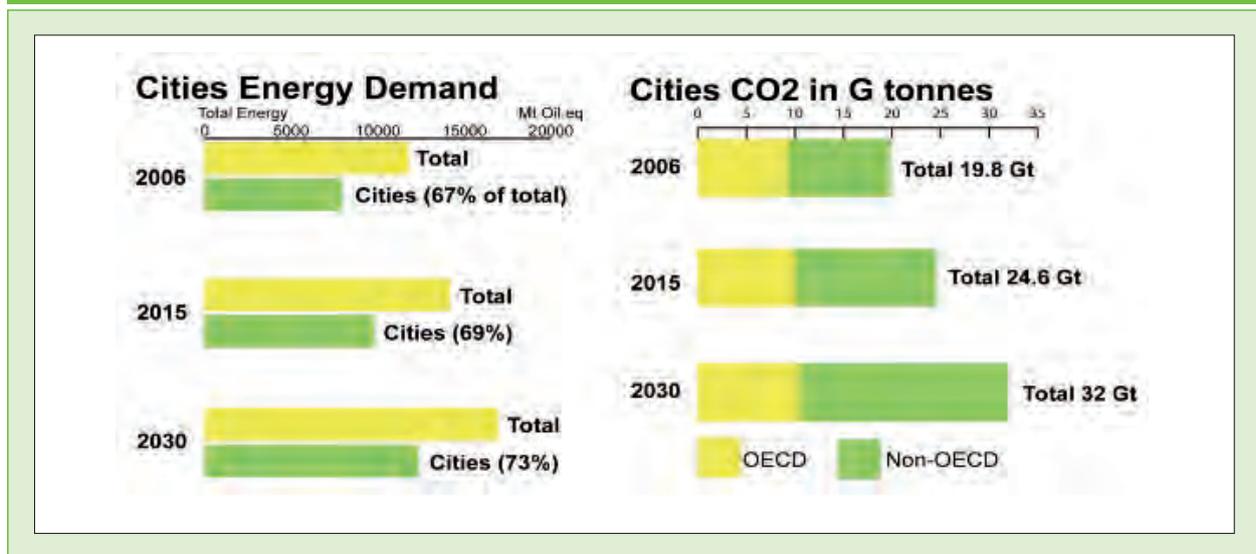
patterns into the surface area needed to sustain the urban consumption, strives to present an indication of this phenomenon. Many cities’ Ecological Footprint greatly exceeds their territory. In Greater London, the Ecological Footprint was 49 million ha at the Millennium, which is 42 times its biocapacity and 293 times its geographical area (IWM 2002). Cities in developing countries will increasingly face similar challenges: Lagos, Bangkok, Guayaquil are following this trend already.

Cities deplete natural resources such as forests, agricultural land, water, air to provide for consumption needs of their inhabitants, as well as demands for municipal infrastructure developments, purchasing decisions and service delivery. According to OECD and IEA (2008), cities globally consume 67% of energy and at the same time emit 70% of greenhouse gases (Figure 4.1). Waste, pollution, and emissions produced affect not only city surroundings but are transported to other regions and can cause global impacts.

This concentrated demand makes cities ripe for a global paradigm shift to a resource efficient and low carbon future (Uhel and Georgi 2009). **Cities have the potential to manage resources more efficiently and protect ecosystem services.** They could delink urban development from resource consumption (less living space and less energy for housing and transport per person). For instance, increasing green spaces in cities would increase quality of life, while contributing also to CO<sub>2</sub> sequestration and thus climate change mitigation.



Figure 4.1 – The global impact of cities: energy demand and GHG emissions



Source: OECD and IEA (2008)

Many cities have a high concentration of biodiversity and high rates of urbanization often overlap with critically endangered ecosystems or ‘conservation hotspots’ (Box 4.4).

In many cases, **the way in which current conservation corridors or major wilderness areas** (such as the Amazon, the Central African forest or the forests of Borneo) **will undergo urbanization will determine whether significant biodiversity will survive or not.** A crucial role in this resides with local governments and their managers and their responsible management of this process. For instance, the Southeastern deforestation border of the Amazon in Brazil is controlled by 16 municipalities (coming together under the denomination ‘Portal of the Amazon’) whose economy is based on timber extraction and cattle ranching. Arguably, the most strategic investment for sustainability will be in building the capacity of these local governments to manage urban and landscape planning, ‘green’ public areas, use ecosystem services and biodiversity sustainably, raise citizen awareness as well as to promote and attract sustainable businesses.



The **benefits** that urban areas derive from ecosystems **are directly linked to public management**, through which the municipal activities and services are made accessible. As an example, the correlations between urban green spaces and urban citizens’ health are provided in Box 4.5.



#### Box 4.4 Cities and biodiversity

**Rome** is one of Europe’s largest cities with the highest number of protected areas. The 19 terrestrial and 1 marine reserve totaling 40,000 ha under protection (31% of the total area) are complemented by 5,000 ha of green public areas.

The municipal area of South Africa’s **Cape Town**, overlaps with the Cape Floristic Region, one of only three areas in the world ranked as an urban biodiversity hotspot.

Source: Local Action for Biodiversity: [www.iclei.org/lab](http://www.iclei.org/lab)

Sustainable ecosystem-based management is a crucial component of urban and regional spatial planning (see also Table 4.1 and Chapter 6). Other government units can also make use of ecosystem services in their work. To name but a few services, urban ecosystems provide:

- Food through urban agriculture which can be enhanced eg in community gardens, through land-use management, urban planning, or urban greening,
- Healthy green areas or trees which increase mental health and exercise opportunity, reduce stress, as well as air and water pollution, to be taken into account by health services, sports, urban planning, urban greening,

### Box 4.5 Urban green spaces contribute to better health and protection

#### Green spaces:

- provide protection from flooding, air pollution, noise, temperature extremes and – if biodiversity friendly – from negative impacts of alien invasive species.
- promote relaxation and reduce stress. They enable sensory stimulation and time spent in natural light.
- provide inviting areas and encourage individual or group-based physical activity. Accessible, appropriately-sized, and biodiverse green spaces are very likely to be used by neighborhoods for exercise.
- promote social interaction and enhance community because they provide free public access to parks and communal facilities.

Source: Adapted from Greenspace 2008

#### Out of these considerations, numerous urban greening or tree planting have been established:

- The city of **Curitiba**, Brazil, amongst other greening activities, has managed to increase green space per person from less than 1 m<sup>2</sup>/capita to 52 m<sup>2</sup>/capita. Local residents planted 1.5 million trees and tax breaks were given to building projects that include green space. New lakes in parks helped to reduce the problem of flooding (ICLEI 2005).
- In **Honduras**, tree-planting and re-vegetation on slopes through schools, housewives' action and community work has been made part of a programme to fight extensive degradation of watersheds and recharge areas around Tegucigalpa. [www.gwptoolbox.org/index.php?option=com\\_case&id=40](http://www.gwptoolbox.org/index.php?option=com_case&id=40)

#### Local initiatives have found many occasions for encouraging tree planting:

- More than 10 million trees have been planted throughout Azerbaijan as part of the United Nations 'Plant for the Planet: Billion Tree Campaign'. [www.unep.ch/roe/WED2010/Press/Baku\\_tree\\_planting.pdf](http://www.unep.ch/roe/WED2010/Press/Baku_tree_planting.pdf), [www.unep.org/billiontreecampaign/index.asp](http://www.unep.org/billiontreecampaign/index.asp)
- **Nationwide efforts** like the initiative of the Keren Kayemeth Lelsrael-Jewish National Fund (KKL-JNF) to plant 7 million trees in Israel – one for each Israeli citizen. Project partner Zara-Mart offers its customers four different ways of contributing a tree to this initiative. [www.kkl.org.il/kkl/kklMain\\_Eng.aspx](http://www.kkl.org.il/kkl/kklMain_Eng.aspx), [www.a-zara.com/index.asp?mainpage=plant\\_a\\_tree](http://www.a-zara.com/index.asp?mainpage=plant_a_tree)
- **Offsetting your vacation CO<sub>2</sub> emissions:** many airlines offer opportunities to offset carbon emission caused by travel by paying an extra contribution to fund, for instance, reforestation projects. The federal state of Mecklenburg-Vorpommern, Germany created a 'climate forest'. Tourists can either buy 'forest shares' or plant trees themselves to offset the emissions caused by holiday-related activities. [www.waldaktie.de/en](http://www.waldaktie.de/en)
- **Urban greening:** Many municipalities have programmes offering to plant trees for weddings, births or new immigrants. Montreal, Canada and Villa Carlos Paz, Argentina have introduced a 'One baby, one tree' programme. [saintlaurent.ville.montreal.qc.ca/En/Intro/enfantarbre\\_ang.asp](http://saintlaurent.ville.montreal.qc.ca/En/Intro/enfantarbre_ang.asp), [www.villacarlospez.gov.ar/amplia\\_noti.php?id\\_noticias=5273](http://www.villacarlospez.gov.ar/amplia_noti.php?id_noticias=5273)
- The University of Leipzig, Germany celebrated its 600th anniversary by planting 600 additional trees on its campus. [www.600baeume.de](http://www.600baeume.de)
- Memorial trees: A vivid and lasting sign of remembrance are memorial forests. An American Forests campaign planted a tree for each victim of the 9/11 attacks. [www.americanforests.org/campaigns/memorial\\_trees/](http://www.americanforests.org/campaigns/memorial_trees/)



**Trees and internet:**

- **Tree benefits calculator:** This web-based application presents the benefits of specific trees in a visual format highlighting the dollar values of the ecosystem services delivered. [www.treebenefits.com/calculator/](http://www.treebenefits.com/calculator/) (for further examples see Annex)
- **Green search engines** like [ecosia.org](http://ecosia.org) help to save trees. The cooperation of yahoo, Microsoft Bing and WWF Germany re-invests 80% of its revenues in projects to protect the Amazon rain forest. [ecosia.org/how.php](http://ecosia.org/how.php)
- **WikiWoods.org:** The German Wikipage connects tree planting events across the country and provides background knowledge on trees, their benefits and how to take part in initiatives. [www.wikiwoods.org](http://www.wikiwoods.org)

- Shelter through moderation of extreme natural events. This concerns urban planning, adaptation to climate change, and disaster management (for further examples see Chapter 5.5).

**For local governments to make the most efficient, cost-effective and responsible decisions, it is necessary to assess the impacts and dependence**

**on ecosystem services, balance the →trade-offs and act accordingly.** Often synergies can be achieved through working with nature rather than against it, by developing and using ecosystem-based approaches, which provide multiple benefits. The City of Manila (UN HABITAT 1998) and more recently, the city of Nagoya have successfully managed to reduce waste, lower cost and protect local ecosystems (TEEBcase Waste reduction to conserve tidal flat, Japan).

## 4.3 OPTIONS FOR LOCAL MANAGERS

Municipal governments have essentially three basic options to act:

1. **acting as role models** in implementing measures to improve performance and processes of administrative departments.
2. **promoting and setting incentives** to stimulate processes of transformation involving all sectors of society.
3. **setting the regulatory framework** and monitoring compliance to enforce sustainable use and management of natural capital.

For example, water supply is one of the most common services provided by local governments. A water saving programme implemented in municipal buildings can show the benefits of technological options available and encourage private companies and citizens to follow the example (role model). Encouraging water saving through pricing schemes or providing other financial support can help citizens reduce their water consumption (promoting). Restricting land-use in ground-water sensitive areas (regulating) minimizes the depletion. Further examples of local governments' activities are given in Table 4.1.

Table 4.1 Local Governments' options to act

Activities	Acting as role model	Promoting and setting incentives	Regulating
<b>Green public places and infrastructure</b>	Create green network with green belts to enhance ecosystems, biodiversity in urban areas and invest in climate change mitigation and adaptation measures	Incentives for citizens to develop private green spaces, green rooftops, community gardens and green walls	Building standards that allows only certified wood for public construction (see WWF 2009)
<b>Low-resource consuming Housing including eg energy, land and water saving construction and technology and supporting climate adaptation and biodiversity measures</b>	Offer low resource consumption public housing options for municipal employees	Partnerships with local housing companies  Financial incentives and support for public housing integrating ecosystem services  Advice and educational programmes; promotion of citizen construction groups integrating ecosystem services  Bonus and off-setting schemes to compensate biodiversity or climate impacts from constructions	City development plan  Zoning plan
<b>Land-use / urban sprawl / sustainable urban development</b>	Locate public services and public buildings in inner-city and neighbourhoods  Land-saving construction of public buildings	Penalties for land-consumers  Promotional campaigns and attractive cultural and social services  Properties stock-exchange  Extension and improvement of public transport along desired routes  Bonus and off-setting schemes to compensate biodiversity or climate impacts from constructions	City development plan, inner-city development, city compaction programme  Sustainable city quarters and developments  Building code for impacts on land/landscape due to construction
<b>Solid waste treatment</b>	Waste to energy, eg biogas production from waste  Reduce municipal waste and recycle	Education programme on how to reduce waste, reuse and recycle  Efficient waste management system, incorporating low waste production, appropriate collection and recycling  Financial incentives, to reduce waste 'Pay as you throw'	Waste regulation that promotes polluter-pays principle  Waste to energy solutions  Kerbside collection  Penalty scheme





Table 4.1 Local Governments' options to act

Activities	Acting as role model	Promoting and setting incentives	Regulating
<b>Water supply and wastewater treatment</b>	<p>Manage local and regional ecosystems to enhance water supply and treatment</p> <p>Water saving programme in public buildings, utilisation of rainwater</p>	<p>Partner with other levels of government, private sector and citizens in order to find effective water management for the entire catchment</p> <p>Set up payments for ecosystem service schemes for watershed protection</p> <p>Promote water saving devices and rainwater utilisation</p>	<p>Water quality standards</p> <p>Building code on natural rain water sinks</p> <p>Surface sealing codes</p>
<b>Energy supply</b>	<p>Implement energy efficiency and carbon reduction measures in the different public buildings and in management sectors</p> <p>'Passive house' standard for public buildings</p>	<p>Awareness-raising campaigns to reduce consumption</p> <p>Subsidy programme or tax incentives for promotion of rational energy use</p> <p>Solar roof programme</p>	<p>Building code on 'passive house' standard</p> <p>Mandatory connection to urban district heating and cooling network, urban development plan</p>
<b>Transport</b>	<p>Replace fleet of municipal cars with low-emission vehicles</p> <p>Well performing public transport system</p> <p>Job ticket for municipal employees</p>	<p>Raise awareness of sustainable transport options and their potential impact</p> <p>Improve attractiveness of public transport, cycling and walking</p> <p>Car sharing programme</p> <p>Promotion of biofuels</p>	<p>Limit construction of new roads in favour of investment in public transport and cycle lanes</p> <p>Traffic Development Plan: parking space management, tram</p>

Source: prepared by ICLEI for TEEB

To prepare, implement and evaluate their decisions in any of these options, there is a **vast array of instruments** used by local governments to help manage natural capital and reduce the negative effects on ecosystem services. These include planning, partnering and facilitating, monitoring, reporting. Specific tools which can be used include environmental indicators

and targets, baseline inventories (carbon emission inventories, vulnerability assessments), urban planning and building codes, thematic action plans (such as Action Plans for Biodiversity and Climate Change Action Plans), biodiversity and ecosystem services guidebooks.

## 4.4 INTEGRATED MANAGEMENT FOR RESPONSIBLE PUBLIC MANAGEMENT

“Decision-making needs to reflect and respond to the many interconnections that lie in the fundamental drivers of urban development, yet the reality is that major gaps still need to be filled. (...) Even if overall sustainable development strategies based on an integrative concept are in place, sectoral and vested interests remain dominant where decision-making, administration and budgets are fragmented (lacking institutional integration) and decision-makers are not aware of the benefits of an integrated approach.” (EEA 2009)

To deliver ecosystem-dependent municipal services effectively, **local governments need to integrate their public management of →natural capital** due to:

- the great interconnectivity between different types of ecosystem services (recreational, climate regulation, pollution reduction, air filtering, spiritual services),
- the connection between cities’ activities and regional, national or even global natural capital, eg through emitting or mitigating greenhouse gases,
- the impact of local governments’ decisions on a future time or future generations,
- the uncertainty of local governments’ decisions in a rapidly changing environment,
- the need to involve a variety of →*stakeholders*, eg when developing and implementing a biodiversity strategy or a climate adaptation strategy.

### THE INTEGRATED MANAGEMENT SYSTEM (IMS)

Ecosystem services and biodiversity can be integrated into public management and all local governments’ decisions through cyclic, integrated management and planning. Various approaches have been developed – such as Integrated Development Planning (IDP) and City Development Strategies (CDS) methods. Recently, 25 European cities and towns in the framework of the project Managing Urban Europe-25 have been developing an →*integrated management system* (EC 2007). This approach employs experiences from participatory processes, such as Local Agenda 21,

and environmental management systems such as the European Environmental Management and Audit Scheme – EMAS, or the international →*standard* ISO 14000 series (Box 4.6).

An Integrated Management System (IMS) follows five major steps that are repeated in regular cycles (EC 2007; UBCCE 2008; see Figure 4.2). An Ecosystems Services Assessment should be carried out as a **baseline review** documenting the current state of sustainability and the administrative situation, legal requirements and political priorities. Through facilitated public participation, a **target setting** exercise will develop goals for various aspects of local development and ecosystem management. Actions and initiatives identified according to current technologies and lifestyles then implement these targets. **Political commitment** is needed throughout the cycle but becomes most crucial to mandate the implementation of targets and to reflect related actions in the municipal budget (UBCCE 2008). The target timeframes provide for future monitoring and evaluation of the process. **Implementation** of actions will be based on political priorities and **monitoring** will gather information on the functionality of the system and progress towards targets. In the last step, **evaluation and reporting** will assess the information collected and analyze the success and draw-backs of the process. This provides the basis for a city council to decide on how to continue in the next cycle. Once the mechanism is established, the process is reiterated in subsequent years.

### Box 4.6 Local Agenda 21, EMAS and ISO 14001

**Local Agenda 21** (LA 21) was introduced with the UN Summit on Environment and Development in Rio, 1992. It called for participatory planning processes coordinated by local authorities to develop action plans for local sustainable development. Since introduction, Local Agenda 21 has been a success story for stakeholder involvement. By 2001 there were 6,500 LA 21 processes world-wide (ICLEI 2002).

The **European Environmental Management and Audit Scheme (EMAS)** is a voluntary management instrument for public and private organizations, in the European Union and the European Economic Area, to evaluate, report and improve their environmental performance. To date, this is being applied by more than 140 public authorities at all governmental levels including regional, national and European, located in the following Member States: Austria, Belgium, Germany, Denmark, Spain, France, Italy, Sweden and the United Kingdom. ([ec.europa.eu/environment/emas](http://ec.europa.eu/environment/emas))

**ISO 14001** was developed and maintained by the International Organisation for Standardisation (ISO). ISO 14001 specifies requirements for an environmental management system to enable an organization to develop and implement policy objectives and targets which includes significant environmental aspects. ([www.iso.org/iso/iso\\_14000\\_essentials](http://www.iso.org/iso/iso_14000_essentials)).

Figure 4.2 Sustainability Cycle



Source: ICLEI 2007

The integrated management approach is based on **appropriate information, consultation and involvement of citizens and stakeholders at all steps of the cycle**. It has been successfully established in a variety of local governments: Ludwigsburg, Germany; Province of Siena, Italy; Lahti, Finland; Kaunas, Lithuania. With IMS, the effort lost in running several parallel management systems can be turned into sustainable

and multiple benefits. Integrated, cyclic management is highly adaptive and robust, and thus is responsive in addressing uncertainties.

There are various instruments that can be used to feed into an IMS, for example, those of environmental accounting or the City Biodiversity Index proposed by Singapore (Box 4.7).

**Box 4.7: Singapore City Biodiversity Index (CBI) /Singapore Index (SI)**

The CBI is referred to as the Singapore Index (SI) on Cities Biodiversity. It has been developed as a self-assessment tool which allows local authorities to measure their performance not only on biodiversity itself, but also on ecosystem services and governance of natural resources. The Singapore City Biodiversity Index measures performance and assigns scores based on three categories:

The Index comprises 3 components:

1. Native Biodiversity in the City (including the percent of natural areas in the city, number of native plant, bird and butterfly species in the city, etc.);
2. the Ecosystem Services Provided by Biodiversity in the City (including carbon sequestration, recreation and educational services, etc.); and
3. Governance and Management of Native Biodiversity in the City (including budget commitment to biodiversity conservation efforts by cities, biodiversity conservation project and programmer carried out by city authorities, private sectors, non-governmental organisations, academic institutions, etc.).

Emphasis has been placed on selecting indicators that would more accurately measure positive actions taken by the cities rather than dwell on consequences that result from adverse activities beyond the control of the present generation. Twenty-five indicators were selected as this number optimised the comprehensiveness and robustness of the index without it being onerous. The CBI is currently being tested in 15 cities. The User's Manual for the Singapore Index on Cities' Biodiversity will be updated regularly on the website of the CBD, [www.cbd.int](http://www.cbd.int).



*Source: Singapore city biodiversity index, TEEBcase by Lena Chan*

The following section will provide a concrete example of how an integrated system could look using the tool *ecoBUDGET*.

### **ecoBUDGET**

*ecoBUDGET* has been developed based on natural capital management, and political and community involvement. It is a particular instrument that has been designed to explicitly address the integration of ecosystem services in decision-making based on the IMS principles described above. It provides a method to plan, control, monitor, report on and evaluate the consumption of natural resources (land, water, materials) including service functions (such as climate stability, air quality including noise and state of biodiversity). Box 4.8 and Box 4.9 provide experiences from the Philippines and Sweden.

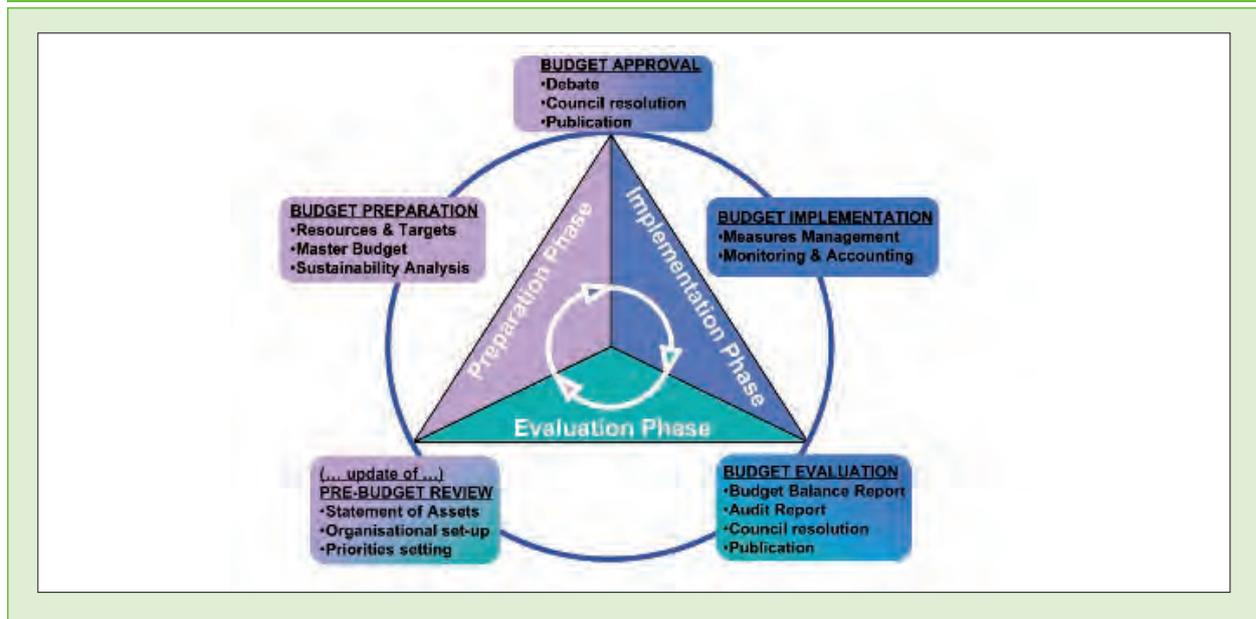
*ecoBUDGET* follows the **cyclical approach of local financial budgeting**, familiar to local decision makers, and has been developed for, and tested by, local authorities (Figure 4.3). The traditional budgeting accounting system is complemented by an environmental budget, in which ecosystem services or natural

resources are measured in physical units instead of monetary value (ICLEI 2004). Due to its participatory character, *ecoBUDGET* offers the potential for applying the participatory budgeting approach.

The aim is to **keep environmental spending within limits of an environmental 'Master Budget'**. The Master Budget identifies environmental targets oriented to the sustainable management of natural capital. Once approved by the Council, the targets become politically binding. At year-end a Budget Balance indicates the city's achievement against its targets.

Being a political instrument, a key feature in the *ecoBUDGET* cycle is **systematic involvement of political decision makers and urban managers**, allowing political steering in the use of environmental resources. *ecoBUDGET* embraces all environmental resources, not only the impact of delivering municipal services, but environmental spending by the entire community including industries, households, education and health institutions and transport companies.

Figure 4.3 – The ecoBUDGET Cycle



Source: ICLEI 2007

#### Box 4.8 Using ecoBUDGET in the Philippines

The municipality of Tubigon in the province of Bohol, Philippines, has 44,434 inhabitants and an economy based on agriculture, fishery and tourism. The viability of the municipality's (and the province's) economy clearly depends on the health of its ecosystems: fertile soil, clean water, high biodiversity, adequate forest cover, and healthy mangroves, seagrass, and coral reefs. In 2005, with a high level of involvement from the private and non-government sector, the municipality began implementing ecoBUDGET in order to tackle major threats to its environmental resources and to evaluate the impact of its existing environmental initiatives.

After a process of consultation, the first step in June 2005 was the production of a shortlist of environmental priorities by the 48-member Municipal Development Council. Over the next few months, several dissemination events took place to keep the public informed and involved in the development of the draft Master Budget. By December, the Budget was enacted by the Council based on six environmental resources: Drinking Water, Forest Cover (Upland Forestry and Mangrove Cover), Timber/Fruit Trees, Coral Reefs and Seagrass Beds, Quarry Materials and Good Built Environment.

A local implementing team (LIT) of nine municipal staff from different departments, coordinated by the municipal planning and development department, together with a team from Bohol provincial government, prepared an annual workplan for each municipal sector. During 2006, a variety of initiatives implemented included reforestation of timber, fruit trees and mangroves, establishment of a new marine protected area and the implementation of an ecological solid waste management program.

After one year, Tubigon had met most of its short-term targets and had realised ecoBUDGET's potential as a platform for linking its municipal vision, plans, strategy, resource allocation and performance measures in order to promote sustainable development. The city is successfully addressing the aspects of sustainable tourism and strengthening local fishery by protecting coastal zones, mangrove areas and coral reefs through their ecoBUDGET. Tubigon has also learned that successful ecoBUDGET implementation requires a long-term vision, well-defined targets, appropriate indicators, high level of political commitment and community involvement.

Source: *EcoBUDGET Guide for Asian Local Authorities*. ICLEI 2008. [www.ecobudget.com/fileadmin/template/projects/ecobudget\\_ASIA/files/ecobudget\\_final.pdf](http://www.ecobudget.com/fileadmin/template/projects/ecobudget_ASIA/files/ecobudget_final.pdf)



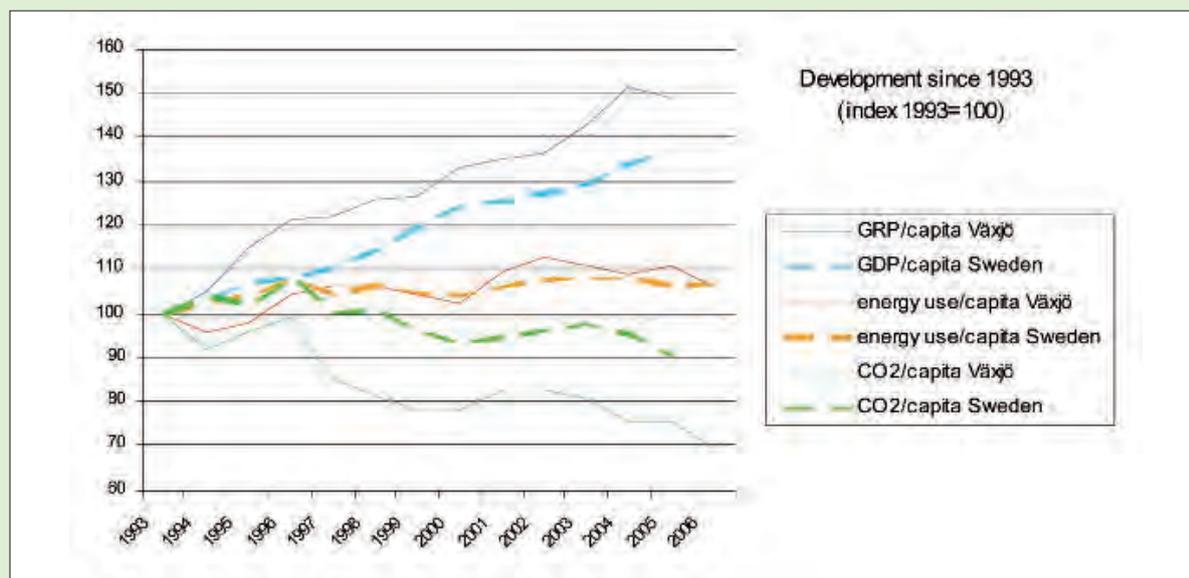
### Box 4.9 Using ecoBUDGET in Sweden

In Sweden, **Växjö's** biggest industries are forestry and wood production, with forests covering 60% of its geographical area. It is a pioneer of using wood biomass for fuel and has been using ecoBUDGET as a management tool to meet its environmental target to become Fossil Fuel Free.

Using forest waste collected from within 100 km of the city, more than 90% of the energy for heating is renewable. Between 1993 and 2008 the emissions of carbon dioxide from Växjö have decreased by 35% per capita and the city was able to increase its GDP/capita by 50%. Collective environmental thinking over the last few decades has resulted in economic profits as well as cleaner air and water. Växjö officials are proud that the municipality is well on its way to further achievements.

Source: [www.vaxjo.se/VaxjoTemplates/Public/Pages/Page.aspx?id=1664](http://www.vaxjo.se/VaxjoTemplates/Public/Pages/Page.aspx?id=1664)

Figure 4.4 Energy consumption, GDP and CO<sub>2</sub> emissions of Växjö, Sweden



Source: Figure provided by the City of Växjö, Sweden



## 4.5 ACTION POINTS FOR LOCAL GOVERNMENTS

Local governments depend on natural resources and their ecosystems when delivering services – drinking water, clean air, a healthy environment and treatment of waste and sewage. Explicitly **assess the ecosystem services used** for and impacted in municipal service provisioning.

This can help to **identify cost effective options** for investing in natural capital through sound ecosystem management. This will also lead to a healthier environment for citizens, thus attracting business and industry, and can help to reduce poverty for those who depend most on natural resources for their livelihoods.

An **integrated management system** provides good grounds for local governments to internally organize themselves and externally influence and regulate the management of ecosystem services, biodiversity and at the same time **address community needs**. This integration will help to systematically incorporate natural capital in decision making and ensure that environmental management is not seen as a 'stand alone' with no connection to the council's core activities.