

## Information and Support

### United Nations Environment Programme (UNEP)

[www.unep.org](http://www.unep.org)

UNEP is the principal environmental organization of the United Nations system. It supports governments and their partners to develop and implement environment policies and activities.

### United Nations Human Settlements Programme (UN-HABITAT)

[www.unhabitat.org](http://www.unhabitat.org)

UN-HABITAT is the United Nations agency for human settlements. It promotes socially and environmentally sustainable towns and cities with the goal of providing adequate shelter for all.

### Convention on Biological Diversity (CBD)

[www.biodiv.org](http://www.biodiv.org)

The CBD is an agreement on the conservation and sustainable use of biological diversity, and fair and equitable sharing of benefits arising from the use of genetic resources. It has a comprehensive approach that encompasses social, environmental and economic issues.

### Global Environmental Facility (GEF)

[www.gefweb.org](http://www.gefweb.org)

The GEF supports activities that protect the global environment, including activities related to the conservation and sustainable use of biological diversity and the fair and equitable sharing of its benefits. UNDP, UNEP and the World Bank are the three Implementing Agencies of the GEF.

### The Equator Initiative

[www.undp.org/equatorinitiative/index.htm](http://www.undp.org/equatorinitiative/index.htm)

A partnership which brings together the United Nations, civil society, business, governments and communities, helping to build the capacity and raise the profile of grassroots efforts to reduce poverty through the conservation and sustainable use of biodiversity.

### Man and the Biosphere (UNESCO)

[www.unesco.org/mab/index.htm](http://www.unesco.org/mab/index.htm)

UNESCO's programme on Man and the Biosphere (MAB) works towards the sustainable use and conservation of biological diversity, and for the improvement of the relationship between people and their environment globally. The MAB Programme is supported by regional or sub-regional networks: AfriMAB, ArabMAB, EABRN, EuroMAB, IberoMAB, CYTED, Northern Sciences Network, REDBIO, SeaBRnet and South and Central Asia MAB Network (SACAM).

## Selected Conventions and Multilateral Environmental Agreements related to biodiversity and ecosystems

### Global

Convention on International Trade in Endangered Species (CITES)

Bonn Convention on Migratory Species (CMS)

Convention on Biological Diversity (CBD)

Cartagena Protocol on Biosafety

Marine Mammal Action Plan (MMAP)

United Nations Forum on Forests (UNFF)

### Regional

Agreement on the Conservation of African-Eurasian

Migratory Waterbirds (AEWA)

Agreement on the Conservation of Small Cetaceans of

the Baltic & North Seas (ASCOBANS)

Agreement on the Conservation of the Black Seas,

Mediterranean and Contiguous Atlantic Area

(ACCOBAMS)

Agreement on the Conservation of Populations of

European Bats (Eurobats)

### WWF - The Global Conservation Organization

[www.panda.org/about\\_wwf](http://www.panda.org/about_wwf)

WWF aims to stop and eventually reverse environmental degradation and to build a future where people live in harmony with nature.

### Birdlife International

[www.birdlife.net](http://www.birdlife.net)

BirdLife International is a global alliance of conservation organizations working together for the world's birds and people.

### Conservation International

[www.conservation.org](http://www.conservation.org)

A U.S.-based, international organization, Conservation International (CI) works to protect the Earth's richest regions of plant and animal diversity.

### IUCN-The World Conservation Union

[www.iucn.org](http://www.iucn.org)

The World Conservation Union helps societies worldwide to conserve nature and to ensure that any use of natural resources is equitable and sustainable. It has set up a taskforce on cities and protected areas.

### Fauna & Flora International

[www.fauna-flora.org](http://www.fauna-flora.org)

Fauna & Flora International (FFI) tackles problems holistically, providing solutions that simultaneously help wildlife, humans and the environment.

### The Nature Conservancy

[www.nature.org](http://www.nature.org)

The Nature Conservancy works to preserve the plants, animals and natural communities that represent the diversity of life on Earth.

### Wetlands International

[www.wetlands.org](http://www.wetlands.org)

Wetlands International is dedicated to the work of wetland conservation and sustainable management.

### Wildlife Conservation Society

[www.wcs.org](http://www.wcs.org)

The Wildlife Conservation Society saves wildlife and wild lands through science, international conservation, education, and the management of the world's largest system of urban wildlife parks.

### Cities Alliance

[www.citiesalliance.org](http://www.citiesalliance.org)

The Cities Alliance is a global alliance of cities and their development partners committed to improve the living conditions of the urban poor through City Development Strategies (CDS) and slum upgrading.

### United Cities and Local Governments

[www.cities-localgovernments.org/uclg](http://www.cities-localgovernments.org/uclg)

United Cities and Local Governments is the global voice of cities and the main local government partner of the United Nations.

### Global Biodiversity Information Facility (GBIF)

[www.gbif.org](http://www.gbif.org)

GBIF facilitates the digitisation and global dissemination of primary biodiversity data, so that people from all countries can benefit from the use of the information.

### Inter-American Biodiversity Information Network (IABIN)

[www.iabin.net/english/about/background.shtml](http://www.iabin.net/english/about/background.shtml)

IABIN provides the networking information infrastructure (e.g. standards and protocols) and biodiversity information content required by the countries of the Americas to improve decision-making on issues at the interface of human development and biodiversity conservation.

### European Network for Biodiversity Information (ENBI)

[www.enbi.info/forums/enbi/index.php](http://www.enbi.info/forums/enbi/index.php)

ENBI works to establish a strong European network to digitise primary biodiversity data and make it accessible through an integrated shared information infrastructure.

### Millennium Ecosystem Assessment

[www.MAweb.org](http://www.MAweb.org)

The Millennium Ecosystem Assessment (MA) is a United Nations initiative that provides decision makers and the public with scientific information concerning the consequences of ecosystem change and options for responding to those changes.



Nelson A. Dauz/UNEP/Still Pictures

This brochure is published by UNEP and UN-HABITAT to raise awareness and strengthen initiatives within cities regarding local-global linkages. With mandates drawn from the UN-HABITAT-led initiative 'Local Capacities for Global Agendas', established as one of the partnership implementation commitments of the World Summit on Sustainable Development (WSSD), the Millennium Development Goals and UNEP's Bali Strategic Plan, both UNEP and UN-HABITAT work to integrate local level perspectives into global policies. Both agencies emphasize the important role of cities at the national, regional and global levels.

Brochures are also available on *Climate Change*, and *Coastal Area Pollution*

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Peter Frischmuth/Still Pictures

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# Ecosystems and Biodiversity

## The Role of Cities

involvement  
influence  
implementation



UNEP



UN HABITAT

Although cities occupy just 2 per cent of the Earth's surface, their inhabitants use 75 per cent of the planet's natural resources. Cities draw on their surrounding ecosystems for goods and services, and their products and emissions can affect regional and even global ecosystems. Healthy ecosystems and biological diversity are vital for cities to function properly. Ecosystems provide three main kinds of services to the city: provisioning, regulating and enriching. While some of these services are easily measured, such as the provision of food and fresh water, others are harder to quantify, such as the contribution an ecosystem makes to quality of life in aesthetic or spiritual terms. Biodiversity – the diversity among living organisms – plays an essential role in ensuring the survival of life on earth. Clean water, foodstuffs, medicines and quality of life are just a few of the services which biodiversity offers to cities. Recognizing the importance of biodiversity and healthy ecosystems for their survival, cities today undertake many initiatives to utilize and conserve their surroundings efficiently. These actions can reach far beyond the boundaries of the city, affecting biodiversity on a global scale.

Local capacities for global agendas

Biodiversity supports the ecosystem functions essential for life on earth. It provides products such as food, medicines and materials for industry. It is also at the heart of many cultural values. Biodiversity and functional ecosystems give resilience to the biosphere, but as biodiversity is degraded, communities and human society itself become more vulnerable because options for change are diminished. Biodiversity can be seen therefore as a 'life insurance policy for life itself'.

*Water, Energy, Health, Agriculture and Biodiversity (WEHAB) Working Group, A Framework for Action on Biodiversity and Ecosystem Management, August 2002*



Rob de Jong

"Biological diversity" means the variability among living organisms from all sources including, inter alia, 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.

*Article 2, Use of Terms, Convention on Biological Diversity*

## Cities, ecosystems and biodiversity

Studies of the ‘ecological footprint’ of cities – the area of land needed to provide a city with the resources it requires to function and to remove its wastes – show that cities affect a geographic area vastly greater than their own surface area. A city’s ecological footprint contributes significantly to biodiversity loss, both locally and at the global level. For example, ecosystem disturbance in just one city on a migratory flight path can affect certain species of birds well beyond the confines of that city.

While not strictly migratory, the Lesser Flamingo moves frequently between the soda lakes of Kenya and Tanzania. The flamingos are a key tourist attraction for the town of Nakuru, in Kenya’s Rift Valley. Urban encroachment on Lake Nakuru, however, has affected water levels in the lake, and the release of untreated industrial waste and sewage is damaging the lake’s ecosystem. These developments are threatening the flamingo population, and leading to fears for the economic future of the town’s tourist industry.

Subsidies have been blamed for the 1997 collapse of hake fishing in Argentina, the near depletion of cod stocks in the North Atlantic, as well as overfishing along the coasts of West Africa, where industrial fleets are replacing artisanal, small-scale fishing.

*Robin, Wolcott and Quintela, Perverse Subsidies and the Implications for Biodiversity, 2003*

Urban demands for specialized foodstuffs, such as tuna and shrimp, can affect fish stocks halfway around the globe. The global fishing industry, buoyed up by subsidies, contributes to damage to seabeds, coral reefs, overfishing of species, and to the unnecessary death of turtles and other animals as bycatch.

Coastal cities which damage their ecosystems can render themselves particularly vulnerable. By over-exploiting the seas as a source of food and as a location for waste disposal, cities compromise the benefits offered by their location.

Closer to home, the way in which a city interacts with its hinterlands shows clearly how biodiversity and ecosystems can be unbalanced by urban demands. This can have unforeseen effects on the health and well-being of the city itself. In Nairobi, Kenya, demand for charcoal threatens the Aberdares forest, which plays an important role in the city’s water catchment and purification system. The health of the forest’s ecosystem is essential if Nairobi’s water supply is to be assured. In Accra, Ghana, Korle

Lagoon absorbs the city’s floodwaters, and receives the waters of several rivers. Water pollution and domestic and industrial discharges have severely affected the lagoon’s flora and fauna, and lagoon fisheries have been almost entirely destroyed, removing an important source of income for local residents. The lagoon’s reservoir function has also been compromised, resulting in more frequent flooding in the city. In Shenyang, China, degradation of the drylands surrounding the city have increased the level of airborne particulates, threatening public health and creating a constant haze of smog over the city.

In each of these examples, urban interests have had a detrimental effect on the ecosystems around the cities, damaging the biodiversity of the surrounding areas, and in turn threatening the viability of the cities themselves. While damaged ecosystems negatively affect urban residents, healthy ecosystems provide cities with a range of services which are essential for their economic, social and environmental sustainability.

## How cities can contribute to a solution

Cities play a key role in global efforts to protect and manage vulnerable ecosystems and biodiversity. Just as the ecological footprint of a city can have a negative impact far beyond the boundaries of the city, certain urban actions can also have a far-reaching positive impact. The arrangement of green areas in a city and their connection with the surrounding countryside are critical to sustainability. Small towns and big cities can make up watersheds – an area of land that catches precipitation and drains or seeps into a marsh, stream, river, lake or groundwater. Watersheds sometimes cross municipal, provincial and even international borders and range from millions of acres draining into major shared water bodies to a few acres that drain into a pond.

Local authorities recognize that appropriate ecosystem management can save cities large sums of money, often avoiding the necessity for mechanical intervention in areas such as water

It has been estimated that implementing a forest protection strategy in the water catchment area of New York will be seven times cheaper than building and operating a treatment plant. Mount Kenya saves Kenya’s economy more than US\$20 million a year through protecting the water catchment area of two of the country’s main river systems.

*World Bank-WWF Alliance for Forest Conservation and Sustainable Use, Running Pure: The Importance of Forest Protected Areas to Drinking Water, 2003*

Otters have returned to waterways in more than 100 towns across the United Kingdom, reflecting improvements in water quality and increases in available food. Their return began with the phasing out of chlorinated hydrocarbon pesticides which, together with other chemicals, built up in fish, the otters’ main food supply.

*BBC News, 2002*

In 2001, the City of Chicago, USA, created a green roof on top of Chicago’s City Hall, with the aim of combating rising local temperatures, cooling the building and reducing its energy costs and soaking up stormwater for gradual release. While providing a wildlife habitat was never a primary objective of the project, by 2003 the roof had seen a 12 per cent rise in the number of birds using the roof, and an increased variety of species. The roof has also provided a habitat for a wide variety of insects.

*Chicago Wilderness Magazine, 2004*

As urban agriculture grew in the Washington USA metropolis from 1978 to 1998, the variety of tomatoes available in the market increased from eight to seventy-four. Urban agriculture is the conservator and generator of biodiversity in agricultural crops from poultry to lettuce. One acre of urban agriculture, using urban waste as an input, can save five acres, or more, of rural marginal agricultural land or rain forest. Urban agriculture produces food and energy crops close to the market demand, some within the neighbourhood. This proximity of production to consumption reduces traffic, storage, and packaging as sources of the pollution that erodes biodiversity. The average distance travelled for a food item on a supermarket shelf in New York was determined in 1995 to be 2,000 kilometres.



Florence/UNEP/Still Pictures

*Jac Smit, Urban Agriculture and Biodiversity, www.ruaf.org/1-1/11-12.pdf*

quality. Around a third of the world’s largest cities obtain a significant percentage of their drinking water from protected areas. This protection directly benefits biodiversity and the viability of surrounding ecosystems.

Urban planning and building regulations can prevent construction on vulnerable land such as wetlands. Although here the primary impetus stems from a desire to reduce the risk of flooding and to drain stormwater, such regulations also support biodiversity by maintaining natural ecosystems close to the city, improving the quality of life for urban residents, and providing essential space for urban wildlife.

Urban measures to increase energy efficiency can also benefit biodiversity. For example, energy efficient ‘green roofs’, designed to reduce energy costs and to minimize stormwater runoff, attract an array of bird and insect life. Urban parks, green median strips and tree planting offer urban residents more pleasant surroundings, and provide a refuge for wildlife. Urban protected areas, such as parks, nature reserves and greenbelts, are often particularly important in urban settings for wildlife and for people.

Urban agriculture can contribute to soil conservation, urban hydrology, microclimate improvement and urban biodiversity.



Rob de Jong

Where urban crops are produced for the local market, this markedly reduces the distance that food has to travel before it reaches the end consumer.

Even suburban gardens can support miniature ecosystems necessary for biodiversity – a recent study of 61 gardens in Sheffield, United Kingdom, ranging from tiny backyards to plots of land ten times larger, found 4,000 invertebrates, 80 kinds of lichen and more than 1,000 types of plant.

## Networking

While international agreements such as the Convention on International Trade in Endangered Species and the Convention on Biological Diversity are negotiated at the global level, the input of cities is highly important in ensuring implementation at the local, national and regional levels. Cities can raise biodiversity issues in regional thematic networks such as those established under UNESCO’s Man and the Biosphere Programme (MAB), which focuses on the sustainable use and conservation of biological diversity, and the improvement of the relationship between people and their environment globally.

City networks also provide local authorities with a forum for the exchange of biodiversity information with other cities. Participation in international city networks such as United Cities and Local Governments (UCLG) or ICLEI-Local Governments for Sustainability allows cities to influence global level policy-making, raising issues that are important to them and speaking with one voice from a global platform.

## Support

By linking urban activities to ecosystem protection and biodiversity conservation, cities can access various types of support. The Global Environment Facility (GEF) helps developing countries fund projects that protect the global environment. This includes action that supports conservation and sustainable use of biological diversity and the fair and equitable sharing of its benefits. Cities, in cooperation with their national governments, can access support from GEF for measures that will have positive impacts on globally significant biodiversity. Cities in states which are parties to the Convention on the Conservation of Migratory Species may be able to participate in concerted action among the range states of threatened migratory species. The United Nations’ new partnership-based Equator Initiative, which works to build the capacity and raise the profile of grassroots efforts to reduce

poverty through the conservation and sustainable use of biodiversity, has established Equator Ventures, a unique investment programme which concentrates on finance and capacity development for biodiversity enterprises.

Many non-governmental organizations, such as WWF - The Global Conservation Organization, also fund biodiversity conservation activities. The non-profit organization Conservation International, for example, dedicates part of its annual budget to funding initiatives by partners which share its objectives.

Numerous organizations, both intergovernmental and non-governmental, provide technical support on biodiversity. UNEP’s World Conservation Monitoring Centre (UNEP-WCMC) can provide expertise, tools, techniques and information, and works to establish networks to promote conservation and information exchange. WCMC also focuses on global biodiversity assessment and analysis, and provides support for policy and agreements at national, regional and international levels. The World Conservation Union (IUCN) supports a worldwide partnership to conserve the integrity and diversity of nature and to ensure that any use of natural resources is equitable and ecologically sustainable. Cities can also take advantage of the wealth of information on biological diversity collected by information networks such as the Global Biodiversity Information Facility.

## How cities can influence the development of global policies

Urban experiences in ecosystem conservation and biodiversity protection can strengthen national policies, and allow national governments to use local experiences to improve global policies for ecosystem and biodiversity conservation. A free flow of information from the city to the national level can be supported by appropriate decentralization, and by the participation of cities in national meetings. With the coordinated input of local authorities, global agendas can be formulated to respond to urban needs and to take advantage of urban strengths.

The need to approach biodiversity from a socio-economic perspective was underlined at the World Summit on Sustainable Development. By integrating ecosystem and biodiversity issues



**Ecosystem Services** provide three main kinds of services to the city, which can be grouped into the following key areas:

*Provisioning*  
e.g. food, fuels, fresh water, genetic materials

*Regulating*  
e.g. air and water purification, flood and drought mitigation, soil fertility, crop pollination, biodiversity maintenance, climate stabilization

*Enriching*  
e.g. spiritual uses, aesthetic values, social relations, education and scientific value

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Jerry Bergman/UNEP/Still Pictures

into policy documents such as City Development Strategies (Cities Alliance) or Poverty Reduction Strategy Papers (International Monetary Fund, World Bank), and by participating in UNEP’s Global Environment Outlook (GEO) process in cities, local governments can ensure that biological diversity is included in local and national development strategies from the start. The GEO process, designed to analyse the state of the environment, assesses the effects of cities on the local, national and global environment.

The Equator Initiative programme, ‘Making the Community to Policy Connection’, helps to improve institutional frameworks and the ‘enabling environment’ for poverty alleviation and biodiversity at local, national and global levels. This programme helps community representatives to influence policies which will affect them by ensuring that they have access to decision-makers in national, regional and international fora.

## Conclusion

The loss of biodiversity and the degradation of natural resources will severely constrain efforts to meet the Millennium Development Goals. Unsustainable production and consumption patterns, together with harmful subsidies, a failure to utilize environmental impact assessments properly and a lack of understanding of the importance of biodiversity among urban citizens, managers and decision-makers are just some of the causes underlying biodiversity loss in and around our cities. While biodiversity loss and damage to ecosystems are global issues, in practice it is local and national actions which have the potential to address the situation.

Linkages between the local, national, regional and global levels are essential if the needs and abilities of cities are to be fully included in the negotiation of biodiversity conventions and multilateral environmental agreements. Ecosystems and biodiversity around the world are already threatened, and action at the city level is essential. Biodiversity issues must be included in cities’ formal work programmes and action plans. With the cooperation and support of partners at all levels, including the United Nations, future actions in the cities to preserve ecosystems and biodiversity will play a vital role in global efforts to conserve life on earth.