# 100 Facts about Urban Nature

## *Urbanization is both a challenge and an opportunity to manage ecosystem services globally.*

1. In 1950 there were only 2 megacities with 10 million inhabitants or more. Today there are 21 megacities.[1]
2. In 2005, cities occupied 2 percent of Earth's surface, but the inhabitants used 75 percent of the planet's natural resources.[2]
3. In the next four decades all of the world's population growth is expected to take place in urban areas.[1]
4. Africa and Asia alone will experience four-fifths of all urban growth in the world between 2000 and 2030.[1]
5. Eight percent of terrestrial vertebrate species have been labeled as endangered as a result of rapid urban development.[3]
6. Loss and degradation of urban forests have been shown to increase problems of water, air, and soil pollution.[4]
7. Urban areas are expanding most rapidly along coasts, which are the most vulnerable places for cities to grow.[5]
8. For each new resident, rich countries add an average of 355 square meters of built-up area, middle-income countries 125 square meters, and low-income countries 85 square meters.[3]
9. The increasing conversion of agricultural land for residential, commercial, and infrastructural uses causes irreversible transformations that negatively affect the natural functions of soils.[6]
10. Urbanization is a major contributor to the loss of prime agricultural land.[7]

## *Rich biodiversity can exist in cities.*

1. The median distance from a protected area to a city in eastern Asia is predicted to fall from 43 kilometers in 1995 to 23 kilometers by 2030.[3]
2. Eighty-eight percent of the protected areas likely to be affected by new urban growth are in countries of low to moderate income.[3]
3. Backyard gardens can harbor significant biodiversity: a study of 61 gardens in the city of Sheffield, UK, found 4,000 species of invertebrates, 80 species of lichen, and more than 1,000 species of plants.[2]
4. The biodiversity in urban areas may exceed that of surrounding landscapes.[8]
5. Urban ecosystems are often linked to non-native species, which can hold promising associated ecosystem services, social benefits, and contributions to biodiversity conservation.[9]
6. Cities can be important habitats for a diverse bee fauna;[10] bees in urban and suburban settings have a richer, healthier diet than bees in modern intensive farmland settings.[11]
7. Urban forests play an increasingly important role in resting and food hunting by migratory birds, and even small patches of forest make a difference.[12]
8. Medium-sized carnivores such as the red fox, coyote, Eurasian badger, and raccoon living in or around urban areas achieve higher population densities than they do under natural conditions.[13]
9. Findings indicate that relative brain size is a key factor predisposing animals to successful establishment in cities.[14]
10. Cities typically develop in places that are the most biologically diverse.[5]

## *Biodiversity and ecosystem services are critical natural capital.*

1. Ecosystem services that render tangible economic benefits include flood regulation, noise reduction, and air-quality improvements.[15]
2. The dunes at Walvis Bay, Namibia, are vital to the growing human population for development and ecotourism; the lichens on the gypsum plains of the dunes prevent wind and water erosion, bind soils, provide a food source to local communities, and are used by game animals.[16]
3. In Accra, Ghana, water pollution has almost entirely destroyed the Korle Lagoon fisheries and thereby removed an important source of income for local residents.[2]
4. Table Mountain National Park in Cape Town, contributed R377 million to South Africa's GDP between 1998 and 2003; investments provide employment opportunities in conservation, enhance the park's ecology, and in turn increase returns to the City of Cape Town.[16]
5. In Beijing, the water stored in one hectare of urban green area reduces the water runoff and stores enough water to create an economic benefit equivalent to three-quarters of the maintenance cost of the city's green spaces.[17]
6. In Lanzhou, China, a 2,789-hectare urban forest area provides climate regulation—cooling and evapotranspiration—valued at RMB 85,800,000 (US$ 14,000,000) annually.[18]
7. In Mayesbrook Park, East London, gross annual supporting services of nutrient cycling and wildlife habitat totaled approximately 31,000£ following restoration of an urban stream.[19]
8. In the USA, city parks increase the value of nearby residential properties by an average of 5 percent; excellent parks can provide a 15 percent increase.[20]
9. In 2007, park-derived tourist spending in San Diego, California, amounted to $144.3 million—$40,033,000 of which was estimated to profit the local economy.[20]
10. Implementing a forest protection strategy in the water catchment area of New York City was estimated to be seven times cheaper than building and operating a water treatment plan.[2]

## *Maintaining functioning urban ecosystems can significantly enhance human health and well-being.*

1. Humans depend on ecosystems to meet their basic needs of food, water, clean air, shelter, and relative climatic constancy.[21]
2. Green spaces play a significant role in human health by reducing stress.[22]I
3. n Shenyang, China, degradation of the dry-lands surrounding the city has increased the level of airborne particulates.[2]
4. In the UK, the option to exercise in natural settings helps people achieve more than the recommended amount of weekly physical activity.[23]
5. Reduced contact of people with nature, for example because of low biodiversity surrounding homes, may increase allergy prevalence.[24]
6. In Sacramento, California, city residents who exercise in parks tend to have lower medical costs. In 2007 the average medical cost difference between active park users and inactive users was $250 for adults under age 65 and $500 for adults 65 and older.[20]
7. Visual contact with vegetation has been shown to improve health, reduce postoperative recovery times, increase employee satisfaction, and reduce stress.[25]
8. Activities such as fishing or camping in green areas were reported by parents of children experiencing ADHD to improve behavior in 85 percent of cases.[26]
9. Children who live in neighborhoods with more street trees may have a lower incidence of asthma.[27]
10. The higher the level of species richness that visitors to urban green spaces believe they are surrounded by, the higher the visitors' level of perceived well-being.[28]

## *Urban ecosystem services and biodiversity can help contribute to climate-change mitigation and adaptation.*

1. Mitigation strategies seek to reduce global warming over the long term, whereas adaptation strategies protect local communities from sudden and immediate dangers.[29]
2. Adaptation and mitigation strategies may conflict, which can be overcome by strategic planning.[29]
3. Coastal cities can render themselves particularly vulnerable by overexploiting the seas and using the seas for waste disposal.[2]
4. In 2005, the trees of Washington, D.C., removed 244 tons of carbon dioxide, nitrogen dioxide, ozone, particulate matter, and sulphur dioxide, at a savings value of $1,130,000.[20]
5. In Mumbai, India, the cost to treat health problems caused by air pollution forms a sizable proportion of people's annual income, particularly in poor households.[30]
6. Climate change poses the greatest risks to the poorest populations, who have contributed the least to greenhouse gas emissions.[31]
7. Information "overload"—meteorological information that is too detailed and precise to be of significant use to local planners—is one reason for the low impact of urban climate on planning.[32]
8. The cooling of city offices in London to mitigate the urban heat island effect is expected to increase the offices' $CO_2$ emissions fivefold until 2050.[33]
9. Urbanization accounted for 20 percent of China's total temperature increase between 1980 and 2009.[7]
10. Building disaster resilience in Indonesia has been driven by existing policies, frameworks, and the participation of non-government stakeholders.[34]

## *Increasing the biodiversity of urban food systems can enhance food and nutrition security.*

1. Urban demands for specialized foodstuffs, such as tuna and shrimp, can affect fish stocks halfway around the globe.[2]
2. Urban agriculture can contribute to soil conservation, urban hydrology, microclimate improvement, and urban biodiversity.[2]
3. One acre of urban agriculture, using urban waste as an input, can save more than five acres of rural marginal agricultural land of rainforest.[2]
4. The benefits of local self-reliance in food to individuals, the environment, and communities outweigh the costs.[35]
5. Pollinator services affect a third of the human food supply.[36]
6. As cities encroach on high-quality cultivated land, unused land that is often of low quality is claimed for cultivation, thereby threatening food supplies to the world's growing population.[7]
7. Production practices dependent on external inputs (e.g., chemical fertilizers, pesticides, herbicides, and water for crop production) damage the environment, undermine the nutritional value of foods, and result in loss of biodiversity.[37]
8. Increasing problems of obesity, non-communicable diseases, and malnutrition are direct results of simplified and energy-rich diets.[37]
9. Crop rotations, intercropping, and growing a diversity of crops benefit crop performance, nutrient availability, pest and disease control, and water management.[37]
10. In Nicaragua, maintaining trees in fields provides medicinal products, fuel-wood, fencing material, and water-regulation services.[37]

## *Ecosystem services must be integrated in urban policy and planning.*

1. In Rizhao, China, government policy and financial support for research and development have resulted in 99 percent of households using solar water heaters, thus saving on energy costs.[38]
2. Many non-demographic factors such as land-use policies, transportation costs, and income will shape the size of global urbanization in the coming decades.[1]
3. Urban planning and building regulations can prevent construction on vulnerable land such as wetlands.[2]
4. In Bangalore, India, urban greening efforts have been short-term and marked by an increase in water-hungry exotic species, further rapid urban development and destruction of vegetation.[39]
5. Future weather anomalies are expected to lead to an annual displacement of 11.8 million people in sub-Saharan Africa by the end of the twenty-first century.[40]
6. Decision-making that supports investment in natural capital can create jobs, underpin economic development, and secure untapped economic opportunities.[41]
7. The destruction of nature is now causing serious social and economic costs, at a pace that will accelerate if we continue with "business as usual."[41]
8. Eighty-six percent of the water depletion in the Rio Grande is caused by irrigation for agriculture, whereas three-quarters of the basin's total economic benefits accrue to urban users.[42]
9. Regulation and enforcement have decreased sulphur dioxide and black smoke emissions in London by more than 95 percent since 1962.[43]
10. Living close to and having visible access to gardens increases the prevalence of gardens—thus social contagion supports urban ecological resilience.[44]

## *Successful management of biodiversity and ecosystem services must be based on multi-scale, multi-sectoral, and multi-stakeholder involvement.*

1. Individual initiatives count! Voluntary approaches, for example to set standards and targets for decreasing emissions, are usually introduced before governments resort to regulations.[45]
2. Sustainable management of ecosystems requires empowerment of groups dependent on ecosystem services or affected by their degradation.[46]
3. Some processes are global, and local goods, services, matter, and energy are often transferred across regions.[47]
4. The input of cities is highly important in ensuring implementation of international agreements at local, national, and regional levels.[2]
5. The National Forest, an initiative in the UK to increase urban woodlands, involves about 20,000 adults and 40,000 school children each year.[48]
6. The need for locally based climate-change adaptation will increase in vulnerable localities such as Africa, for example by ecosystem-based adaptation (EBA).[49]
7. Various stakeholders can plant urban greens and maintain parks, while plans and coordination by authorities support the long-term management.[50]
8. Urban forestry can be effective only through a partnership of public, private, and local people.[50]
9. Regional sustainable management efforts, such as tree-planting schemes and green corridors, complement local efforts such as better use of domestic gardens and replacing impermeable surfaces with porous materials.[48]
10. In New Zealand, open spaces in environmentally sensitive areas such as ridges and riparian corridors were created following collaboration and learning among community members, municipalities, and developers.[51]

## *Cities offer unique opportunities for learning and education about a resilient and sustainable future.*

1. "Restoration" is as much about reconnecting people with nature as it is about restoring and managing biodiversity in urban landscapes.[52]
2. Hands-on activities, compared with textbook-based curricula, significantly increase children's knowledge about plants and eco-centric attitudes.[53]
3. Effective management of ecosystems is constrained by lack of knowledge about ecosystems and the failure to use existing information in decision-making.[54]
4. In the Millennium Ecosystem Assessment's future scenarios, locally focused, learning-based approaches lead to the largest improvements in social relations.[47]
5. Participatory learning and action include common planning tools to assist decision-making concerning ecosystems and their services.[47]
6. Creating space for learning that accommodates multiple perspectives is a key step in improving participatory processes in decision-making.[47]
7. Strategies to improve climate-change adaptation capacities can increase understanding of indigenous ecosystems and the roles they play for the most vulnerable human communities, as in Durban, South Africa.[49]
8. Case studies on the Chinese cities of Yangzhou and Dafeng show how cities can bring together managers, planners, designers, engineers, and local residents for coordinated urban and regional ecosystem development.[55]
9. Ninety percent of the respondents in a study in the USA thought that urban agriculture is something that is "done elsewhere," such as in Cuba.[56]
10. Community gardening, shellfish reintroductions, and tree planting reflect local cultures as well as the practical knowledge of city residents.[57]

## *Cities have a large potential to generate innovations and governance tools and therefore can—and must—take the lead in sustainable development.*

1. Green infrastructures such as tree plantings and solar installations can help improve cities marked by declining economies and social fallout.[58]
2. Urban greening tends to reduce costs related to urban sprawl and infrastructure provision, attract investment, raise property values, invigorate local economies, boost tourism, preserve farmland, and safeguard environmental quality.[59]
3. An increasing number of authorities require that new developments include green open spaces, innovative measures such as green roofs, and water-sensitive urban designs.[60]
4. Urbanization holds the potential to reduce material consumption and environmental impact through efficiency measures.[61]
5. Urban measures to increase energy efficiency can also benefit biodiversity. Green roofs, for example, help moderate the urban heat island effect, manage storm water, improve air quality, and attract birds and insects.[2]
6. Redevelopment of brownfields can curtail urban sprawl, reduce travel needs by creating compact developments, and meet shortfalls in new housing.[43]
7. Two of the greatest challenges that the world faces in the twenty-first century—food and energy production—can be addressed by features such as green roofs, gardens, wind turbines, and photocells.[62]
8. The informal sector can contribute to efficient management of resources; in Vietnam, junk buyers recycled 25.5 percent of containers and packaging waste.[63]
9. Harvesting resources in cities can significantly cover cities' needs: in The Netherlands, harvesting heat from roads can meet 55 percent of the heat demand, and rain water from roofs can reduce tap water use by 32 percent.[64]
10. The lifestyle choices that urban dwellers make, and their associated consumption patterns, will increasingly determine the sustainability of global development.[61]

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