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Session title: Green infrastructure and ecosystem services for resilient cities of the future

Presentation title: Urban green infrastructure: making visible what is valuable

Abstract:

Many European cities host a surprisingly rich and diverse wildlife. As such, they have an important role to play in halting biodiversity loss in Europe.

Investing in nature can help cities to enhance quality of life, save money, strengthen the local economy and reduce the impacts of climate change. This presentation will highlight how the IUCN network of members and experts can offer valuable knowledge and best practices to develop green infrastructure and make urban areas more resilient by embracing nature based solutions as part of urban planning and development. To achieve this, it is essential to strengthen the knowledge on the interaction between urbanized areas and the surrounding rural areas for their biodiversity and ecosystems services values.

Keywords:

biodiversity conservation, connectivity between urban and rural areas, ecosystems services values for urban areas, green infrastructure, nature based solutions

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Urban green infrastructure: Making visible what is valuable

1 Introduction

In Europe around 75% of the population lives in urban areas, and in some countries this number is expected to grow to 80% by 2020 (European Environment Agency, 2010). With increasing population densities and mounting development pressures, large tracks of land in the immediate surroundings of urban areas are undergoing a process of urbanisation.

Cities host a surprisingly rich and diverse natural environment:

- Brussels, for example, contains more than 50 percent of the floral species found in Belgium
- The Île-de-France, which surrounds Paris and is the most populated region in France, is home to 10,000 species of animals and 1,500 species of plants. 80% of the region is covered in forest, farmlands and unspoilt countryside
- In Hong Kong, one the world's most densely populated cities, 40% of land is in protected areas. Hong Kong's terrestrial and marine parks harbour 3,100 species of vascular plants, 57 mammals, 452 birds, 78 reptiles, 23 amphibians, 2,300 insects, 84 stony corals and 96 fish. New records of birds and insects are constantly added to the list

Residents of urban communities depend heavily on biodiversity, notably for the provision of food, clean air, drinking water, climate regulation and recreation, but also for many other non-material services such as education and inspiration and thus have a vested interest in the protection of the natural environment both within and well beyond urban boundaries. However, the dependence on and interactions of urbanized areas with the surrounding rural landscape and its biodiversity and ecosystems present a knowledge gap that needs to be bridged. IUCN, the International Union for Conservation of Nature, considers awareness of urban interactions with nature highly important for establishing urban resilience.

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There are strong incentives for cities and local governments to develop innovative ways to integrate natural capital in policies and planning and to maintain vital ecosystem services for the enhancement of the well-being of their citizens. Investing in ecosystem management and natural infrastructure can play an important role in making our economies and societies more resilient.

The connection between people and nature in the urban environment will affect their views and actions contributing to sustainable change in society. Even more, the concentration of people, businesses and services in cities offer huge opportunities for finding nature based solutions leading to a reduced ecological footprint and improvement in the quality of urban life.

IUCN helps the world find pragmatic solutions to our most pressing environment and development challenges.

IUCN works on biodiversity, climate change, energy, human livelihoods and greening the world economy by supporting scientific research, managing field projects all over the world, and bringing governments, NGOs, the UN and companies together to develop policy, laws and best practice.

IUCN is the world's oldest and largest global environmental organization, with more than 1,200 government and NGO members and almost 11,000 volunteer experts in some 160 countries. IUCN's work is supported by over 1,000 staff in 45 offices and hundreds of partners in public, NGO and private sectors around the world (www.iucn.org).

IUCN demonstrates how biodiversity is fundamental to addressing some of the world's greatest challenges: tackling climate change, achieving sustainable energy, improving human well-being and building a green economy.

There is an enormous unseen potential in nature and the network of IUCN members, experts and partners in Europe is ready to take on a more prominent role in promoting nature based solutions and to develop partnerships for action to make our cities more resilient.

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During the past years, IUCN Europe has worked on biodiversity conservation and management with local and regional authorities through the joint ICLEI-IUCN Local Action for Biodiversity initiative and the Countdown 2010 network. Currently, the European Secretariat is together with ICLEI involved in the research project [URBES](#) (Urban Biodiversity and Ecosystem Services), which bridges the knowledge gap on the role of urban biodiversity and ecosystem services for human well-being. It further aims to inform urban management and decision-makers on how to best integrate the natural environment and land use planning.

2 The importance of biodiversity and ecosystems services for the future of urban areas

Significant biodiversity is present in all cities and its value is often underestimated. Urban green space offers a unique landscape that supports a diversity of flora and fauna and provides urban citizens with direct access to nature and all its benefits. Natural ecosystems can have an important role to play in halting biodiversity loss and are essential to our survival, as they provide for instance with clean air, drinking water, regulate the climate and are places of wonder and inspiration. Maintaining our connection with nature is a fundamental need and has significant benefits for the quality of life of urban citizens. Increasing our understanding of these benefits can help to develop sustainable urban development.

In line with the EU Strategy for Biodiversity to 2020, the European agenda for smart, sustainable and inclusive urban growth and the roadmap for a resource efficient Europe, investing in natural capital offers a valuable return for urban citizens:

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Table 2.4 Benefits provided by green infrastructure identified in some of the literature

Topic area	Benefits	Reference					
		Environment DG (2010)	US EPA (2009)	Landscape Institute (2009)	Natural England (2010)	Ahern (2007)	Benedict & McMahon (2006)
Biodiversity/ species protection	Habitats for species			●	●	●	
	Permeability for migrating species	●		●		●	●
	Connecting habitats	●				●	●
Climate change adaptation	Mitigating urban heat island effect with evapotranspiration, shading and keeping free corridors for cold air movement			●	●	●	
	Strengthening ecosystems' resilience to climate change	●		●			
	Storing flood water and ameliorating surface water run-off to reduce the risk of flooding	●	●	●	●	●	●
Climate change mitigation	Carbon sequestration	●		●		●	
	Encouraging sustainable travel			●			
	Reducing energy use for heating and cooling buildings			●			
	Providing space for renewable energy like ground source heating, hydroelectric power, biomass and wind power			●		●	
Water management	Sustainable drainage systems – attenuating surface water run-off		●	●		●	●
	Groundwater infiltration		●			●	●
	Removal of pollutants from water (e.g. reed beds)		●	●			●
Food production and security	Direct food and fibre production on agricultural land, gardens and allotments			●			
	Keeping potential for agricultural land – food security (safeguarding of soil)						
	Soil development and nutrient cycle					●	●
	Preventing soil erosion	●		●			
Recreation, well-being and health	Recreation			●	●	●	●
	Sense of space and nature				●	●	●
	Cleaner air						●
Land values	Positive impact on land and property			●		●	●
Culture and communities	Local distinctiveness			●			
	Opportunities for education, training and social interactions			●	●	●	
	Tourism opportunities			●			

EEA Technical report No 18/2011, Green infrastructure and territorial cohesion - The concept of green infrastructure and its integration into policies using monitoring systems

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Natural England (2009), estimates that if every household in England had good access to quality green space it could save around €2.5 billion every year in health costs. A study in New York City (G. Lovasi et.al, 2008), found that more trees in urban neighborhoods correlate with a lower incidence of asthma. Literature review by the Deakin University in Australia (Deakin University, 2008) shows that natural areas, such as parks, can reduce crime, foster psychological wellbeing, reduce stress, boost immunity, enhance productivity, and promote healing. In fact, the positive effects on human health, particularly in urban environments, cannot be over-stated. As a result, urban planning should ensure that the communities have adequate access to nature.

About a third of the world's largest cities obtain a significant proportion of their drinking water directly from forest protected areas (Dudley & Stolton,.....). Well-managed natural forests almost always provide higher quality water, with less sediment and fewer pollutants, than water from other catchments. Sofia, for example, relies for much of its water supply on sources originating from two mountain protected areas: the Rila and Vitosha National Park. These Parks comprise of coniferous and deciduous forests characterized by a rich botanical diversity.

Forests represent 35% of the land area in the EU and provide crucial ecosystems services, maintaining key resources like water, soil and biodiversity, which are vital for sustaining life and enhancing resilience and adaptability to climate change. Forests remove 10% of all EU CO2 emissions annually (European Forest Institute, 2012).

Many cities have difficulties with heavy rain, as the sewage system cannot take the amount of water, as for example was seen in Copenhagen last year. Green roofs, green areas and water squares which can function as temporary ponds solve this problem as they improve water retention and prevent expensive repair works.

New York City and the state Department of Environmental Conservation have signed off on a \$3.8 billion deal to control storm water over eighteen years that depends heavily on green infrastructure like porous pavement, green roofs, and tree pits. The agreement marks an even greater shift from 'gray' infrastructure to green than a similar 2005 deal and also includes fines if the city fails to meet its targets.

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It can be up to 6 degrees warmer in a city in comparison to surrounding areas, the so called urban heat island effect. A green city reduces the heat effect in Summer and can save lives. One example illustrating this comes from the United Kingdom, where the city of Manchester has increased green spaces in order to reduce average surface temperatures.

The [Green Capital of Europe](#), Vitoria-Gasteiz, shows with the development of a 'green belt' around the city centre, that giving priority to the establishment of new and maintenance of existing natural areas provides important benefits to its citizens, ranging from education and recreation to conservation of biodiversity, water supply and income from tourism.

These examples, and there are many more, demonstrate that there are strong incentives for cities, local governmental authorities, business and other interested parties to invest in natural solutions and to maintain vital ecosystems services, ranging from cost-effective water provision to greater tourism revenues, lower healthcare costs, increased energy efficiency and reduced greenhouse gas emissions.

3 The way forward

The unique added value of IUCN is its global network of expertise on biodiversity, ecosystems and sustainable use of natural resources, providing guidance and tools to value, protect and manage natural resources and ecosystems services sustainably.

We consider the following aspects of crucial importance to strengthen knowledge development, facilitate sharing of lessons-learnt, transmit best practices, promote the mainstreaming of biodiversity, and enhance the benefits for local governments and cities for investing in natural capital:

- A holistic approach to urban planning taking into account benefits and trade-offs across sectors

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- Integrate green infrastructure in both rural and urban environment spatial planning
- Foster connectivity between green spaces in urban, peri-urban and rural areas
- Promote cooperation between private, public and NGO stakeholders
- Strong collaboration between national, regional and local administration level in developing green infrastructure
- Raise awareness for the economic benefits of investing in green infrastructure
- Establish platforms for exchange of knowledge and best practices between cities



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Bio:

Chantal van Ham is responsible for the IUCN Biodiversity Conservation and Urban Areas Programme in Europe. She develops and coordinates projects for biodiversity and ecosystems services conservation, restoration and valuation that help urban areas in Europe find nature based solutions for sustainable growth, by mobilizing IUCN knowledge and best practices.

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