Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Federal Office for the Environment FOEN

Sharing best practices for biodiversity conservation in European urban areas

The Federal Office for the Environment (FOEN) side-event on urban biodiversity during the Eleventh meeting of the Conference of the Parties to the Convention on Biological Diversity (CBD)

Hyderabad, India, 12 October 2012

1. Introduction 3
2. International biodiversity targets 3
2.1 CBD Targets 4
2.2 EU Biodiversity targets 4
2.3 Swiss Biodiversity Targets 4
3. Local and regional government action for biodiversity 5
3.1 The Economics of Ecosystems and Biodiversity (TEEB) for local authorities 5
3.2 European Learning Network for Regions and Biodiversity 5
3.3 Local Biodiversity Action Planning for Southeastern Europe 6
4. Research on urban biodiversity and ecosystem services 6
4.1 New Research Projects 7
4.2 Ongoing research projects 7
5. Benefits of biodiversity conservation and ecosystems for urban areas 8
5.1 Vitoria Gasteiz – Green capital of Europe 2012 9
5.2 Green roofs in the city of Basel, Switzerland 9
5.3 Hannover – German Capital of Biodiversity 2011 10
5.4 The benefits of protected areas for drinking water in cities 12
5.5 Climate change mitigation: reducing the urban heat island effect with trees 12
5.6 The urban natural environment can save health costs 13
6. Conclusion 13
7. Reference sources 14

Cover photo: Urban agriculture in Brussels: www.eco-innovation.net

1. Introduction

Urban green space offers a unique landscape that supports a diversity of flora and fauna and provides an ever-expanding human population with direct access to nature and all its benefits. Urban habitats and species are sometimes considered to be less important than their rural counterparts but cities host a surprisingly rich and diverse natural environment. As such, they can have an important role to play in halting biodiversity loss and improving human well-being.

Switzerland is an urbanised and densely populated country with approximately 75% of the population living in urban areas. Recognising that urban areas can form important habitats for plants and animals, urbanisation can due to its high ecological footprint represent a far-reaching human impact on the environment.

Swiss research has shown that high urban biodiversity improves the quality of life in the urban area. An example is the biodiversity potential of green roofs. In Basel, for example, as part of the city's biodiversity strategy, green roofs are mandatory on new buildings with flat roofs, and guidance is provided for the creation of different plant and animal habitats on the green roofs.

Urban green spaces can help to reduce air pollution, improve water retention and avoid the heat island effect. They provide areas for recreation and an environment that offers health benefits for urban citizens.

Biodiversity conservation in urban environments not only contributes to the objectives of the Swiss Biodiversity Action Plan, but local governmental actors also have a valuable role to play in relation to the Aichi Biodiversity Targets. At a European level, the ‘essential contribution to human wellbeing’ of biodiversity is recognised under the EU’s long term vision for protecting and restoring biodiversity by 2020.

In light of the CBD COP 11 side-event on sharing best practices for biodiversity conservation in European urban areas, hosted by the Swiss Federal Office for the Environment and the International Union for Conservation of Nature, this document will highlight the main international and Swiss biodiversity targets. It will also give an overview of some ongoing initiatives developing knowledge and best practices for valuing and managing biodiversity for sustainable growth at local level. The document will also describe a number of existing and new research projects on urban biodiversity and ecosystem services and examples from cities showcasing how their benefits can be integrated in urban planning and development.

2. International biodiversity targets

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 understanding of how ecosystems work, how they change, and what limits their performance, can add to the understanding of ecosystem change and governance in general in an ever more human dominated world.

The global scale of biodiversity loss demands concerted international action. The framework for such action is the United Nations Conventions on Biological Diversity (CBD), which the European Union (EU) ratified in 1993. Europe is a highly urbanised and densely populated part of the world where biodiversity is under tremendous pressure. The EU has therefore committed itself to the ambitious target of halting the loss of biodiversity in Europe by 2020.

2.1 CBD Targets

The Plan of Action on Subnational Governments, Cities and Other Local Authorities for Biodiversity under the Convention on Biological Diversity is intended to support Parties, their partners and local authorities in implementing the Strategic Plan for Biodiversity 2011-2020, the Aichi Biodiversity Targets and relevant decisions of the Conference of the Parties (http://www.cbd.int/sp/). Parties to the Convention on Biological Diversity should, as appropriate, seek to engage their Subnational Governments, cities and other local authorities to achieve the objectives of the Convention and the implementation of the Strategic Plan for Biodiversity 2011-2020 by developing policy tools, guidelines and programmes, providing technical assistance or guidance in line with their national biodiversity strategies and action plans and other relevant governance arrangements established by their national governments.

The Strategic Plan consists of 20 biodiversity targets for 2020, termed the 'Aichi Biodiversity Targets'. Some examples of these targets are:

- At least halve and where feasible, bring close to zero the rate of loss of natural habitats, including forests
- Establish a conservation target of 17% of terrestrial and inland water areas and 10% of marine and coastal areas
- Restore at least 15% of degraded areas through conservation and restoration activities

2.2 EU Biodiversity targets

The EU Biodiversity strategy to 2020 provides key directions for Europe to halt the loss of biodiversity and ecosystems services within the EU and beyond, as well as their restoration and awareness for the value of natural capital for human well-being and economic prosperity (http://ec.europa.eu/environment/nature/biodiversity/comm2006/pdf/2020/1_EN_ACT_part1_v7%5b1%5d.pdf).

Manuel Barosso, the President of the European Commission, confirms the vital role that cities will play in economic recovery and green growth. Barroso calls on 'all levels of government, including the regional and local authorities' to deliver on the goals of the strategy. By 2020 – a milestone year for the EU's current strategy for smart, sustainable and inclusive growth – it is estimated that 80% of our population will live in urban areas. The quality of life in European cities is much above the quality of life in the cities in other parts of the world and can therefore serve as a model for other cities in the world.

2.3 Swiss Biodiversity Targets

The new Swiss Biodiversity Strategy, adapted by the Federal Council on 25th April 2012, describes 10 strategic objectives to be achieved by 2020. Among these objectives we could highlight, the sustainable use of natural resources by all relevant sectors, the implementation of an ecological infrastructure comprised of protected areas and protected area networks, the development of activities related to biodiversity and cities and consideration of biodiversity as a measure of Swiss prosperity. This Strategy was prepared after taking into account the Aichi Biodiversity Targets and the EU's Biodiversity Strategy to 2020. Furthermore, the Department of Environment, Transportation, Energy and Communication (DETEC) intends to develop an accompanying action plan by 2014 with the participation of all actors.

http://www.cbd.int/nbsap/about/latest/

3. Local and regional government action for biodiversity

There are numerous examples of actions by local governments which aim to promote a comprehensive and integrated approach to biodiversity and ecosystem services for the sustainable development of rural municipalities and their local communities. The following section will show a selection of initiatives that seek to increase understanding of the social and cultural context of conservation and improve skills on policymakers and other stakeholders at all levels in Europe in strategic and interactive communication.

3.1 The Economics of Ecosystems and Biodiversity (TEEB) for local authorities

The report, entitled TEEB for Local and Regional Policy Makers (http://www.teebweb.org/ForLocalandRegionalPolicy/LocalandRegionalPolicyMakersReport/tabid/29433/Default.aspx) prepared by the TEEB initiative hosted by the United Nations Environment Programme, calls on local policy makers to understand the value of their natural capital and the services it provides and to apply a focus on nature's benefits in local policy areas such as urban management, spatial planning and protected areas management.

The report aims to provide an inspiring starting point for thinking about local policy in a new way. Highlighting practicality, the report calls for local authorities to take a stepwise approach to assessing options that factor nature's benefits into local policy actions. This approach includes: assessing ecosystem services and expected changes in their availability and distribution, identifying which ecosystem services are most relevant to particular policy issues, assessing impacts of policy options on different groups in the community. What we see already are significant investments in the transition to a green economy. Public policy and market action are important to strengthen the transition.

The recent TEEB 2012 conference in Leipzig on mainstreaming and implementing the economics of nature showed the progress so far in implementing the TEEB. TEEB is now being implemented around the world at regional, national and sub-national levels. Remaining challenges are the insufficient capacity to do ecosystem assessment in countries and communicating the value of nature, as not everyone is convinced of the significance.

3.2 3.2 European Learning Network for Regions and Biodiversity

In most European countries, biodiversity and its implementation at the regional and local levels are left to the regional and local authorities to develop with very little support or guidance, including on how to translate global and European biodiversity policies and targets into regional and local action. Nonetheless, many regions and local authorities have already taken up the challenge to integrate biodiversity into their policies and have started programmes and projects to implement these. So the efforts to develop a strategy, as well as the tools and capacity building to implement it, are duplicated many times across Europe.

The aim of the Learning Network for Regions & Biodiversity is to contribute to better conservation and sustainable use of biodiversity and ecosystem services both at local and regional levels for the benefit of sustainable development of the communities. It should empower regions and municipalities and allow stakeholders to exchange experience and knowledge in order to meet biodiversity targets and commitments while contributing to the maintenance of vital ecosystem services. Some of the main objectives of the Network are the following:

- The creation of a platform for providing and exchanging expertise and know-how to the regional and local levels, and for creating bridges between regions in Europe on issues relevant for biodiversity and ecosystem services
- Improvement of exchange of best practice and lessons learned through effective communication
- Translate international and EU decisions and expertise into a format and language accessible to local and regional levels, including to citizens.

The European Centre for Nature Conservation (ECNC) together with the United Nations Environment Program (UNEP) are the founders of the European Learning Network for Regions & Biodiversity Initiave. The network is constituted by a partnership of interested regions and municipalities that wish to cooperate on biodiversity issues and will act as a marketplace for ideas on biodiversity action at the local and regional levels.

http://www.ecnc.org/programmes/nature-and-society-projects

3.3 Local Biodiversity Action Planning for Southeastern Europe

The European Centre for Nature Conservation (ECNC) has engaged with several municipalities in South East Europe (Bosnia and Herzegovina, Croatia, Kosovo, Serbia, FYROM, and Albania) to integrate biodiversity and ecosystem services into local sustainable development policy and actions. The project has provided a participatory process for better communication of the direct benefits of biodiversity and ecosystem services, how they provide means to create local employment and to fight poverty in rural areas.

Consequently, by establishing Local Biodiversity Action Plans (LBAPs) the project aimed to local communities aware of their natural and cultural richness and of the many opportunities this offers through for example ecotourism, pro-biodiversity business, scientific and public interest in species protection or biodiversity rich community parks. This would eventually bring better living conditions for the target group through income and job creation in the region.

As part of the project, 10 local training programmes were held to introduce concepts related to biodiversity and ecosystem services, participatory decision making, inclusion of local communities in actions and understanding and realizing the benefits of biodiversity and ecosystem services. At the same time the participants learned by doing, applying the techniques for stakeholder participation and involvement. A handbook for developing and resourcing Local Biodiversity Action Plans was produced in six country languages. The handbook was used by the staff of municipalities, NGO's and community representatives to develop their own LBAPs through high communicate participation. Moreover, the project provided co-funding for all beneficiary municipalities to implement prioritized LBAP activities.

As a result of the project, each municipality now has a much higher recognition and awareness of the importance of the conservation of biodiversity and the sustainable use of the benefits of ecosystem services.
http://www.ecnc.org/file_handler/documents/original/view/465/2011--publication-local-biodiversity-action-planning-for-southeastern-europe--spotlight-on-the-activitiespdf.pdf

4. Research on urban biodiversity and ecosystem services

Most Europeans live in urban areas and their health and quality of life is influenced by the state of the urban environment. Cities are also economic drivers and urban dwellers are concerned about the future of green areas and their biological diversity in the face of growing demand on land for

construction. Finally the knowledge base to address the previous issues is currently poor and this could be only addressed by further research on urban environments.

4.1 New Research Projects

The European Commission has approved funding for 113 new environmental innovation projects in 18 countries under the LIFE+ Environment Policy & Governance programme 2011 (http://ec.europa.eu/environment/life/). These projects will demonstrate new methods and techniques for dealing with a wide diversity of Europe's environmental problems. Two examples of these new projects give an idea of the diversity and scope of biodiversity related projects and urban areas.

The 'SeineCityPark' - Development of an urban green infrastructure in the Chanteloup loop.

The 'SeineCityPark' project aims to demonstrate how the socio-economic development of an urbanised territory of 1,700 ha can be combined with the improvement of local environmental conditions through the creation of green urban infrastructure. It hopes to be the first step of an ambitious programme of sustainable economic development in the Chanteloup loop.

The project will develop ecological infrastructure to link the Park to the Seine in the south and the rest of the green network in the north - the Hautil Massif. This will allow the free movement of land animals, birds, insects, amphibians and dragonflies across the urbanised territory. It will use natural clean-up techniques to tackle water and soil pollution and remove invasive aquatic and terrestrial plant species.

The works also aim to deliver a consistent ecological infrastructure which will play a key role in adapting to climate change, including flood control, in the Chanteloup loop. Finally, the project will seek to raise local public awareness of environmental issues in order to maximize the integration and success of the urban green infrastructure.
http://www.yvelines.fr/cadre-de-vie/environnement/nature/les-espaces-naturels-departementaux/le-parc-paysager-recreatif-de-carrieres-sous-poissy/

Urban Oases - Shaping a sustainable future through environmentally functional landscape features

The 'Urban Oases' project aims to study how alternative constructions in urban watersheds can improve functioning of natural systems and ecosystem services, thereby helping to reduce run-off polluting substances to receiving waters.

It hopes to contribute to reducing contamination, algal blooms and eutrophication in receiving rivers and lakes, and ultimately to improve the water quality of the Baltic Sea.

The expected results will be to improve know-how on developing urban water ecosystems services through functional landscapes, information about the cost of developing ecosystem services, improve biological diversity and recreational value of water bodies and specific quality improvements in the management of water runoff in urban areas and the impact on ecosystems and receiving waters.
http://ec.europa.eu/environment/life/publications/lifepublications/compilations/documents/envcompilation11.pdf (p. 17)

4.2 Ongoing research projects

URBES Project

The URBES project – Urban Biodiversity and Ecosystem Services, aims at bridging the knowledge gap on urbanisation processes and the ecosystem services sustaining them. The project will address significant scientific knowledge gaps on the role of urban biodiversity and ecosystem services for

human well-being and for building capacity of European cities to adapt to climate change and reduce their ecological footprints.

In addition, URBES will pioneer the development of the TEEB- approach in an urban context and be innovative in integrating monetary and non-monetary valuation techniques, explore their governance implications and develop guidelines for implementation in urban landscapes. URBES will develop a tool box intended to promote sustainable management of urban biodiversity and ecosystem service generation and in doing this involving and communicate the results to important stakeholders. The project consists of eleven top research institutes in Europe and New York, being well placed to take on the challenging interdisciplinary tasks on URBES. The case study cities selected for this project are: Stockholm, Rotterdam, Berlin and Stockholm.
www.urbesproject.org

Positive health effects of the natural outdoor environment
The project PHENOTYPE is focused on the integration of human health needs and the translation of the research outcomes into recommendations for policy makers and guidelines for professional practitioners. It will include both positive effects and preconditions for the natural environment to have a positive effect on health. The project will investigate the intercommunication between exposure to natural outdoor environments, rural and urban, and better human health and wellbeing. Furthermore it will examine the effects of different characteristics of the natural outdoor environment and address the implications for land-use planning and green space management.

The PHENOTYPE project will use a multidisciplinary and integrated approach using the best and most efficient methods to understand the relation between exposure to the natural environment and health. It will specifically address in-depth the potential mechanisms associated, and translate these findings into potential policies and management practices, taking into account potential regional, social and/or cultural differences. Stakeholders will play an active role throughout the work.
http://www.phenotype.eu/

BiodiverCity
The project BiodiverCity – Ecological and social value of urban nature: tools to identify, maintain and improve biodiversity and its acceptance in urban areas, is developed to enhance the understanding of the relationship between urban biodiversity, the built environment and the acceptance of residents, and to find measures to link ecological with social values of urban nature. The project addresses the following main research modules: A) Biodiversity potential in the built environment; B) Assessment of the ecological value of urban green habitats; C) Attitudes of residents towards urban nature and biodiversity; D) Guidelines for practical implementation to enhance urban biodiversity and acceptance of the residents.
http://www.biodivercity.ch/

5. Benefits of biodiversity conservation and ecosystems for urban areas

Urban areas host rich biodiversity. Natural urban ecosystems contribute to public health and increase the quality of life of urban citizens. Most of the problems present in urban areas are locally generated such as those due to traffic. Often the most effective and in some cases the only way to deal with these local problems is through the understanding of the benefits that can be derived from the ecosystem services that urban areas provide. In this respect, urban ecosystems are vital.

Throughout Europe, technical staff from government, research institutions, NGO's but also citizens can make a significant contribution to preserve biodiversity within and around their settlements. There is a growing number of case studies that show how cities have successfully developed projects that promote invest in the benefits of biodiversity and ecosystems.

5.1 Vitoria Gasteiz – Green capital of Europe 2012

Victoria Gasteiz is the Green Capital of Europe in 2012. It is a regional capital of northern Spain and has made great progress in greening a traditional urban environment. The 'Green Belt', a semi-natural green area partially reclaimed from degraded areas, surrounds the centre, ensuring its entire population of almost a quarter of a million people, lives within 300 metres of an open green space. There are numerous measures in place to assist and increase biodiversity and ecosystem services. Flora and fauna are being monitored and habitat fragmentation is reduced wherever possible

Vitoria-Gasteiz recognised the value of its natural environment and considered that the maintenance and improvement of its biodiversity was a key issue for the city. By 2003, the city's General Urban Development Plan had already identified the most significant areas of nature conservation in the municipality.

Many of the actions taken to improve the biodiversity of the city are grouped together in the Green Belt project, which has been underway for several years now. The Green Belt is a set of peri-urban parks of high ecological and landscape value, strategically linked through a number of eco-recreational corridors. It is also the result of an ambitious and challenging project initiated in the early 90's with the main aim of restoring and recovering the outlying areas of Vitoria Gasteiz, both from the environmental and social point of view, in order to create a large green area for recreational activities around the city. It offers a variety of natural ecosystems such as rivers, wetlands, meadows, field and hedgerows that coexist in the outlying areas of the city. Some of these have won international recognition for their high environmental value: the case of the restored wetlands of Salburua and the River Zadorra ecosystem.

The mayor of the city is convinced that their green initiatives will help the city become an international leader in sustainable development and that this would attract more investment.

Vitoria Gasteiz-European Green Capital Award 2012
http://ec.europa.eu/environment/europeangreencapital/docs/cities/2012-2013/European%20Green%20Capital%20Award%202012-13%20nuevo%20estandar.pdf
http://www.vitoria-gasteiz.org/we001/was/we001Action.do?idioma=en&uid=u_6cbfe3b3_13381a23c52__7fdb&nuevaPag=&aplicacion=wb021&tabla=contenido&id

5.2 Green roofs in the city of Basel, Switzerland

In 1996-1997 the city of Basel invested CHF 1 million in a green roof incentive programme, funded by the Energy Saving Fund (generated from 5% on the consumers' energy bills). The city has established a Green Roof Building Regulation in 2002 to promote the number of green roofs for energy saving and protection of endangered invertebrate species and birds. The regulation stipulates

that all new and renovated flat roofs must be greened and includes design guidelines that maximize biodiversity by using native plants and soils. The average costs of installation of green roofs decrease in the 1990's from CHF 100/m^2 to CHF 20/m^2. The cost-benefit ratio of this initiative is positive. In 2007, approximately 23% of Basel's flat roof areas was greened which has a beneficial impact on the city climate and reduces the urban heat island effect. An investigation into the bio-ecological potential of the new habitats on the roofs revealed that numerous endangered Red List species, such as insects, spiders and birds were found. The incentive programme was calculated to deliver 4 giga watt-hours saving per year across Basel.

There are many documented benefits from the implementation of green roofs:

- Reduction of storm water runoff and hence potential saving to developers, as the number of drainage outlets required on a building can be reduced
- Reduction of urban heat island effect by reducing building heat loss and increasing evapotranspiration
- Creation of natural green spaces and recreation sites in urban areas
- Reduction of energy consumption and fuel costs, since green roofs provide cooling in summer and thermal insulation in winter
- Benefits for biodiversity and nature conservations
- Reductions of air pollution which results in less health problems for people living in urban areas
- Reduction of roof life, since the green roof protects the roof's waterproofing membrane, almost doubling its life expectancy
- Climate change mitigation

Newly constructed green roof on the Klinikum 2 of the Cantonal Hospital of Basel, built in accordance with the city's new guidelines on green roofs and urban biodiversity – (Photo Brenneisen)
http://www.ieep.eu/assets/903/GI_Case_Analysis_5_-_Urban_Green_Infrastructure.pdf)

5.3 Hannover – German Capital of Biodiversity 2011

In the city of Hannover, a 'green' and diverse living and working environment is considered a vital requirement for a lasting high quality of life. The authorities have taken the necessary steps and made biodiversity a basic goal in the current urban development process. The result is an extraordinary number of action plans: rivers are reconstructed and maintained in a natural way and the natural momentum is consistently integrated into the river management. The municipal forest is FSC certified and an additional programme is successfully enhances and supports the amount of dead wood in the forest. Natural 'wild' areas appear in the parks where they increasingly replace intensively managed lawns. A 'courtyard and residential environment programme' supports and encourages citizens to make their communities greener. Several action plans deal specifically with biodiversity in the open

landscape around the city aiming at creating ponds, planting trees and small woods, protecting wild farmland herbs, intensifying grassland management and increasing organic farming. The municipal tree nursery cultivates local varieties of native plants to contribute to the protection of the diversity of plants. The 'Plant Species Aid Programme' goes one step further: former habitats of rare plant species are successfully reactivated on 118 specifically chosen sites. Regular monitoring impressively demonstrates the successful dispersion of rare vascular plants.

In addition to all these measures directly aiming at improving biodiversity, the biodiversity strategy of Hannover declares another specific goal: the people are to be made more enthusiastic about nature. A remarkable number of high quality institutions and activities have been set up to achieve this goal. In the 'Forest Experience Tower' or 'Forest Skyscraper', for example the well-established concept of a nature trail has gone vertical: a wooden tower of 32m, raising above the top of the surrounding trees, allows experiencing a tree as a habitat for numerous species. Fascinating and interactive displays on several levels of the tower – much like a multistory building in a city – explain the morphology of trees and the diversity of life between roots and canopy. Since the Forest Experience Tower first opened in 2009, it has become a magnet for adults and children alike.

Other extraordinary educational institutions with well thought out educational concepts are scattered across the city, such as a children's forest, an urban farm and the school biology centre. Together they make sure that the meaning of biodiversity and the necessity to protect it are conveyed to people of all ages.

The City Hall of Hannover is surrounded by diverse nature (Photo by City of Hannover)

Capitals of Biodiversity – European municipalities lead the way in local biodiversity protection report - http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=home.showFile&rep=file&fil=COB_European_ENG.pdf)

5.4 The benefits of protected areas for drinking water in cities

Around a third of the world's largest cities obtain a significant proportion of their drinking water directly from protected areas. Until recently, the main focus of efforts to improve urban water sanitation and supply have focused on the creation of better distribution systems, treatment plants and methods of sewage disposal. However, increasing interest is being shown in the opportunities for purifying urban water through the management of natural resources.

Forests are essential to our survival and well-being. Forests clean the air, water, soil and they regulate climate, amongst many other things. Trees and forests are not always associated with urban landscapes. However, there too they provide invaluable, often invisible, ecosystem services. Well managed natural forests almost always provide higher quality water, with less sediment and fewer pollutants, than water from other catchments. Therefore, cities can save costs of water provision, by protecting natural ecosystems.

The water supply company of Melbourne, Australia has deliberately protected forests to maintain high quality water for residents: 90 per cent of Melbourne's water comes from forested catchments and almost half of these catchments are protected and much of the rest managed for water collection.
http://www.cbd.int/doc/publications/cbd-ts-36-en.pdf

5.5 Climate change mitigation: reducing the urban heat island effect with trees

Average annual temperatures in the UK may increase by between 1 and 5℃ by the 2080s, with summer temperatures expected to increase more than winter temperatures. And by the 2080s winters may be up to 30% wetter and summers up to 50% drier, depending on the region and carbon emission scenarios.

The impact of climate change will be most significant in the places where people are concentrated such as towns and cities. Urbanisation has already marked some negative effects on the environment. It affects surface temperature (with risks associated with urban heat island effects), hydrology (with risks of flooding), carbon storage and sequestration and biodiversity (loss of biodiversity and habitats). These effects of urbanisation are likely to increase significantly under future climate change unless climate ameliorating measures are taken. The value of green open spaces in cities for offsetting or even reversing climate change and urbanisation effects is widely appreciated.

Simulation studies from Greater Manchester report that an increase of 10% in urban green cover in high-density residential areas, like green roofs in the city of Basel, would decrease the expected maximum surface temperature in the 2080s by around 2.5℃. Similarly, some green structures have the potential to be sustainable urban drainage systems, such as green roofs or walls and permeable paving, which can mitigate risks associated with flooding. Benefits deriving from such structures are:

- Lower risk of flooding because run-off is reduced
- Reduced likelihood of flash flooding following heavy rainfall by slowing the rate of release
- Cheaper and easier maintenance than other traditional systems
- Improved water quality

The Green Streets Project, part of Red Rose Forest, is planting street trees in areas of socio-economic deprivation in Greater Manchester. Local communities are involved in the process from the outset and are encouraged and supported to take on after care of planted trees. Over the last decade more than 3,000 street trees have been planted.
http://www.forestry.gov.uk/fr/URGC-7EVE82
http://www.ukcip.org.uk/wordpress/wp-content/LA_casestudies/LA_CS_Manchester_greenspace.pdf

5.6 The urban natural environment can save health costs

An emerging body of research is now uncovering a hugely important range of ecosystem services: benefits for human health as result of biodiversity conservation. Incorporating green spaces into urban planning combines opportunities for conserving biodiversity with health benefits to the population. If every household in England was provided with good access to quality green spaces it could save an estimated value of €2.5 billion per year in health care costs. This is a statement made by Natural England based on various studies. While the connection between better health and access to green spaces has been established, the nature of the relationship is not entirely understood. A study completed in 2008 by the University of Glasgow has shown that, for England as a whole, people living closer to recreation sites had lower death rates and less heart disease.

Natural England believes that the provision of new and improved parks, woodlands and other green spaces is essential to improve the health of people today but also for future generations. They will work with local authorities, planners, industry and the National Health Service (NHS) to achieve this goal.

Availability of green spaces within cities in linked to mental wellbeing and physical fitness of the population although the health benefits are difficult to be estimated. Improving scientific, political and public awareness of the connections between biodiversity and health is the key to ensure that the consequences of biodiversity loss and any other resulting impacts on human health are minimized.
http://www.naturalengland.org.uk/Images/nhsmanifesto_tcm6-12022.pdf
http://ec.europa.eu/environment/integration/research/newsalert/pdf/FB2.pdf

6. Conclusion

This paper helps key stakeholders understand the importance of biodiversity conservation and ecosystem services in European urban areas. Sharing knowledge and best practices with a focus on the following key areas can contribute to sustainable urban growth in urban areas and improved quality of life for urban citizens:

- Support the nature based solutions approach to urban development by investing in green infrastructure in order to achieve urban resilience.
- Increase the understanding of the interaction between cities and biodiversity and facilitate the sharing of scientific findings that prove the economic value of ecosystem services in urban areas.
- Recognise and communicate the multiple functions and services that naturally functioning ecosystems offer to urban life and support their integration in urban landscape strategies and implementation.
- Promote connectivity between green spaces in urban, peri-urban and rural areas in order to reduce habitat and species loss and increase the benefits derived from nature areas for urban citizens.
- Promote cooperation between private, public and NGO stakeholders to mobilise financial resources and innovative ideas for sustainable urban development implementation.
- Keeping nature at the centre of policy, planning and management decisions support municipalities and local governments to deliver economic return and improved quality of life for urban citizens.
- Cities are key actors in achieving the CBD Aichi Biodiversity Targets and there is a strong need to create new and adapt existing conservation strategies as well as city planning and management instruments to improve biodiversity.
- In order to develop an ecosystem based approach to urban development, provisions are needed in the urban budget to conserve, restore and maintain ecosystem services.

7. Reference sources

BiodiverCity 2010 http://www.biodivercity.ch/

CAG consultants, (2009), Adapting to Climate Change: Local areas' action. http://www.cagconsultants.co.uk/resources/climate-change-case-study/Adapting_to_Climate_Change_Local_Areas_Action_June09.pdf

Cil, A., Ognjanovic, D., Atmis, E., and Jones- Walters, L. (2011) Local Biodiversity Action Planning for Southeastern Europe: Spotlight on the activities, ECNC, Tilburg, Netherlands. http://www.ecnc.org/file_handler/documents/original/view/465/2011--publication-local-biodiversity-action-planning-for-southeastern-europe--spotlight-on-the-activitiespdf.pdf

European Capitals of Biodiversity, 2011. Capitals of Biodiversity: European municipalities lead the way in local biodiversity protection. http://www.capital-biodiversity.eu/uploads/media/European_Capitals_ENG.pdf

European Centre for Nature Conservation (ECNC) (2011), Nature and Society projects. http://www.ecnc.org/programmes/nature-and-society-projects

European Commission (2011) Communication from the Commission to the European Parliament, the Council, the Economic and Social Committee and the Committee of the Regions. Our life insurance, our natural capital: and EU biodiversity strategy to 2020. Brussels: European Commission. http://ec.europa.eu/environment/nature/biodiversity/comm2006/pdf/2020/1_EN_ACT_part1_v7%5b1%5d.pdf

European Commission Directorate-General Environment (2011) Science for Environment Policy, DG Environment News Alert Service, the Science Communication Unit, the University of the West of England (UWE) Bristol. http://ec.europa.eu/environment/integration/research/newsalert/pdf/FB2.pdf

European Commission, 2011. Environment, Policy & Governance, LIFE PROJECTS 2011, European Commission. Urban Oases: Shaping a Sustainable Future through Environmentally Functional Landscape Features p. 17.

Forest Research, Urban Regeneration and Greenspace Partnership, Greenspace in practice, Benefits of Greenspace. http://www.forestry.gov.uk/fr/URGC-7EVE82

General Council of Yvelines, 2010. Landscaped park and recreational Carrieres – sous –Poissy http://www.yvelines.fr/cadre-de-vie/environnement/nature/les-espaces-naturels-departementaux/le-parc-paysager-recreatif-de-carrieres-sous-poissy/

Latest National Biodiversity Strategies and Actions Plans (2010), NBSAPs, the Swiss Biodiversity Strategy. http://www.cbd.int/nbsap/about/latest/

LIFE+ 2011 http://ec.europa.eu/environment/life/

Losarcos L., Romero L., (2010) Green infrastructure in-depth case analysis, theme 5: urban green infrastructure, IEEP, Ecologic, GHK, Syzygy, TAU, University of Antwerp, Vito. http://www.ieep.eu/assets/903/GI_Case_Analysis_5_-_Urban_Green_Infrastructure.pdf

Natural England, 2009. Our Natural Health Service: The role of the natural environment in maintaining healthy lives.

PHENOTYPE, (2012) health from outside in. Positive health effects on the natural outdoor environment in typical populations of different regions in Europe. http://www.phenotype.eu/

Secretariat of the Convention on Biological Diversity (2008), Protected Areas in Today's World: Their Values and Benefits for the Welfare of the Planet. Montreal, Technical Series no. 36, i-vii + 96 pages. http://www.cbd.int/doc/publications/cbd-ts-36-en.pdf

Strategic Plan for Biodiversity 2011-2020, including Aichi Biodiversity Targets. http://www.cbd.int/sp/

The Economics of Ecosystems and Biodiversity (TEEB) (2010) A Quick Guide to the Economics of Ecosystems and Biodiversity for Local and Regional Policy Makers. http://www.teebweb.org/ForLocalandRegionalPolicy/LocalandRegionalPolicyMakersReport/tabid/29433/Default.aspx

The Plan of Action on Subnational Governments, Cities and Other Local Authorities for Biodiversity under the Convention on Biological Diversity. http://www.cbd.int/authorities/planofaction.shtml

URBES (2012), Urban Biodiversity and Ecosystem Services www.urbesproject.org

Victoria Gasteiz (2012): where' the green' is capital. http://www.vitoria gasteiz.org/we001/was/we001Action.do?idioma=en&accionWe001=ficha&accion=greenCapital