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GreenInUrbs

GUIDELINE
FOR URBAN
FORESTRY AS CRITICAL
GREEN INFRASTRUCTURE
IN EUROPEAN URBAN AREAS

For Senior Policy Makers and Planners, Green Space Managers and Practitioners on maximising the value of the Urban Forest in Europe's Green Infrastructure.

INTRODUCTION

1. The United Nations (FAO 2016) states that urban and peri-urban forestry (UPF) is the practice of managing forests, groups of trees and individual trees in and around urban areas to maximize their economic, livelihood, social, cultural, environmental and biodiversity values. Urban and peri-urban forestry can serve a range of purposes and thus takes many forms, covering natural and planted forests and trees, forests maintained in watersheds or in drylands, forests and wooded areas, green spaces and street trees, as well as trees in urban/peri-urban gardens.

2. In Europe, the term urban and peri-urban forestry is generally shortened simply, to Urban Forestry (UF). Urban Forestry refers to the practice of planning and managing the 'Urban Forest' of each territory, at different scales.

3. Green Infrastructure (GI) has become a preeminent planning and delivery concept since the millennium. The European Union (EC 2012) describes it as a strategically planned network of natural and semi-natural areas with other environmental features designed and managed to deliver a wide range of ecosystem services such as water purification, air quality, space for recreation and climate mitigation and adaptation. This network of green (land) and blue (water) spaces can improve environmental conditions and therefore citizens' health and quality of life. It also supports a green economy, creates job opportunities and enhances biodiversity. The Natura 2000 network constitutes the backbone of Green Infrastructure.

4. Approaches to Green Infrastructure incorporate many predecessor concepts such as ecological networks and landscape planning. Delivery of Green Infrastructure is being linked to tackling major urban problems such as improving population health, climate change adaptation and sustainable urban growth. It is also being considered as the foundation on which Nature Based Solutions (NBS) can be delivered. Whilst approaches to Green Infrastructure vary across the European continent, in most urban areas, individual trees, groups of trees and forests represent the most critical part of a territories Urban Green Infrastructure (UGI).

Europe: our highly diverse and urbanised continent covering 11 biogeographic regions and a population of 740Mn.

Forestry: an economic activity in most European countries. Population growth and urbanisation has led to a fundamental reappraisal of the role of Forests over the last 30 years. Today the wider ecosystem benefits of forests are considered a priority.

Urban Forestry: all the trees, groups of trees and forests in and surrounding an urban area. A key component of Urban Green Infrastructure, with a distinctive contribution to make.

Green Infrastructure: A strategically planned network of natural and semi-natural areas with other environmental features designed and managed to deliver a wide range of ecosystem services.

Urban Green Infrastructure: Green infrastructure planned and delivered in predominantly urban areas. All of the elements of green infrastructure with a strong focus on its relationship to the built environment, social and economic factors including protecting urban soils and nutrient cycling.

PURPOSE

5. The purpose of this guideline is to aid Senior Policy Makers and Planners, Green Space Managers and Practitioners in maximising the value of the Urban Forest in their territories as part of the urban areas' overall Green Infrastructure.
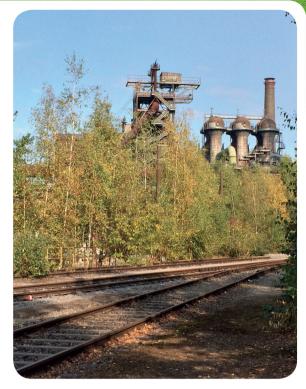

Caption: Ljubljana, Slovenia was European Green Capital 2016. The urban forest frames the city as seen in this panorama from its medieval castle. The urban forest is a major recreational draw and important to biodiversity. PHOTO CREDIT: Clive Davies

THE DISTINCTIVE CONTRIBUTION OF URBAN FORESTS TO GREEN INFRASTRUCTURE

6. Urban Forests make a distinctive and sometimes unique contribution to Green Infrastructure at the territorial level. Understanding that distinctive contribution and making provision for it is essential if the services each Urban Forest can provide to overall Green Infrastructure are to be fully achieved.

- The Urban Forest provides strong visual and landscape amenity to residential and business neighbourhoods. These amenities enhance property values and reduce vacancy times, support the visitor economy, break up 'hard built landscapes' and can be used as a regeneration tool.

- The Urban Forest helps regulate the urban climate by providing shade, acting as wind breaks, intercepting or slowing rainfall run-off, and cooling public areas through the process of evapo-transpiration. These services reduce energy costs in terms of heating and cooling buildings and protect vulnerable people such as the very old and young children during unexpected and unfavourable weather events.

- The Urban Forest has a mitigating effect on climate change by storing and sequestering carbon in the tissues of urban trees and shrubs, by the recycling of removed trees back into the landscape using wood chip mulch and by reducing fossil fuel emissions through decreased annual energy consumption.

- The Urban Forest regulates urban air quality through normal biotic processes and has a special value in the filtration of particulate matter arising from transport and burning of fossil fuels. Trees close to major transport infrastructure attenuate noise pollution, control urban glare and reflection, contributing to human health and relaxation, and reduce stress and anxiety levels.

- The Urban Forest intercepts rainfall and slows water run-off, which allows particulate matter to precipitate out and thus not pollute the local environment.

- The Urban Forest is a key element in nutrient cycling: tree root systems help improve urban soil quality and hydrology, increasing the potential for water infiltration, storage and the recharging of groundwater, and in this way the Urban Forest contributes to overall urban ecosystem health.

- The Urban Forest provides a source of food and renewable produce including wood-fuel biomass, timber, craft and artisan materials as well as through foraging. The Urban Forest is also important in emergencies such as drought.

- The Urban Forest increases urban biodiversity by providing critical habitat for urban flora and fauna as well as forage for the urban pollinator population. Moreover, a diverse Urban Forest increases the ability of the urban ecosystem to withstand change.

- The Urban Forest is a key setting for tourism, recreation, sports training, children's play and part of an active, healthy lifestyle. The Urban Forest is well used by all age and social categories regardless of income.

- The Urban Forest provides extensive health benefits from reduced cardiovascular disease mortality, lower respiratory tract illness and heat-related health issues to decreased levels of stress, improved health recovery as well as a profound positive impact on mental health and psychological well-being.

The industrial forests of the Ruhr region of Germany demonstrates how natural forest regeneration can be used to create attractive heritage destinations such as the Landschaftspark Duisburg-Nord. Such sites are now major tourist draws in areas previously thought beyond the visitor economy. PHOTO CREDIT: Clive Davies

- The Urban Forest provides connectivity and links important green areas together. Well-planned, new tree planting expands available habitat by allowing movement between patches, provides additional habitat and enables recolonisation.

- The Urban Forest is a multi-functional ecosystem simultaneously offering benefits to people and the environment and provides nature-based solutions to complex sociological, social and economic problems.

Pine trees are characteristic of Mediterranean cities and create a 'sense of place'. The shade benefits to pedestrian route ways is also notable. Pisa, Toscana, Italy. PHOTO CREDIT: Clive Davies

A GREEN THREAD THROUGH PLANNING

7. Recognising the diverse structure and unique attributes and benefits of Urban Forest planning is important not only for municipalities but also other public bodies, planners and indeed residents. Municipalities and other public bodies should recognise the diverse structure and unique attributes of the Urban Forest within their jurisdiction and give it prominence in their strategic green space (Green Infrastructure) plans, territorial spatial plans and urban development plans. These plans should have proposals in place for the care and sustainable management of trees, woodlands and forests in their territory. Trees in private ownership should also be regulated in keeping with local ordinances such as the "Tree Preservation Order (TPO)" regulations in the United Kingdom, or the "Regolamento del Verde Pubblico e Privato" (Public and private greenery municipal regulations) in Italy.

8. With respect to development plans, existing trees and Urban Forests should be protected through the planning and delivery stages of new urban development and a "Building WITH Trees" strategy should be explored and adopted, wherever possible. If losses cannot be avoided, then this should be offset by sustainable gains in other areas. Compensatory offsets should recognise the significant loss of tree maturity and resulting ecosystem benefits to the territories overall Green Infrastructure. This will mean that the reciprocal gains in both new tree planting and the overall planted area should take account of losses through an independent valuation methodology. The cost and compensatory measures of this should be met by developers, even when the developer is the municipality itself. Municipalities should set local standards based on Best Management Practices for all developers (public and private) to meet.

9. It is good practice to assess the existing urban tree stock and hold GIS-based datasets of all trees in the urban area covering both the public and private domains. Urban tree inventories should include tree condition and risk assessment, spatial resource evaluation, maintenance and available tree-planting sites. Where trees are grouped together into woodland or forests, strategic management plans should be produced featuring short, medium and long-term targets. The recommendations in management plans and the data collected through tree inventories should be monitored and evaluated. Ground-based urban tree inventories and Urban Forest management plans are the evidence base for well-informed strategic and operational plan and policy making. Tree inventories and Urban Forest management plans should be reviewed and updated on the same timeframe as municipal spatial plan or strategic green space (Green Infrastructure) plan updates. The advantage of GPS / GIS-based computerised urban tree inventories affords in-the-field access and update to the dataset during new tree / replacement planting, crises management, scheduled routine maintenance and risk assessment documentation.

10. A municipality should also have a designated Urban Forest advocate, who may also be an employed Urban Forester, whose role is to work and develop communication and cooperation protocols between departments and between organisations to ensure that the role of the Urban Forest in Green Infrastructure is not overlooked. The Urban Forest advocate should ensure that Strategic Green space (Green Infrastructure) plans, municipal spatial plans and development plans and policies provide protection, preservation and recognition to the Urban Forest resource.

ESTABLISHING AN INTERDISCIPLINARY APPROACH

11. Managing the Urban Forest as part of Green Infrastructure requires the input of many disciplines. There are key roles for arborists, tree officers, foresters and green space planners. These professions understand the technical and sustainable management of the Urban Forest. Where foresters are managing the broader wooded ecosystem, arborists deal with the care of individual trees (cultivation, tree surgery, tree diseases) in practice (as consultant, or as a civil servant). A tree officer is a civil servant who is responsible for tree management at the local authority; he/she is responsible for granting permits for planting and removing trees or parts of trees. A green space planner is looking for opportunities to develop the Green Infrastructure further.

12. However, in the context of Green Infrastructure, the professional canvass is much wider than the forest and tree management; urban planners, landscape architects, engineers, community workers, sustainable development and climate change specialists as well as staff and volunteers in NGOs and the community have important contributions to make to urban forestry discussions. For example, in the planning process roundtable discussion can draw on the many disciplines to help draw up policies and find creative ways of funding Urban Forest management.

13. As the contributions of the Urban Forest are multiple and situated within a variety of domains, a close collaboration between different disciplines is needed: urban planners should involve green space planners when designing new developments, and arborists and foresters should be involved to check the technical feasibility of the planned establishment and management of the new green space. Climate change experts, arborists and planners should look for nature based solutions in an interdisciplinary way. The role of the Urban Forest advocates is crucial in coordinating the cooperation between different disciplines.

GOVERNANCE

14. Citizens interact with the Urban Forest daily and in many ways, and consequently governance considerations are important. In respect of Green Infrastructure channelling citizen interest into urban forestry is a practical vehicle for direct engagement and is generally more easily achieved than with other Green Infrastructure elements (such as green roofs or green walls). Citizens should be involved in all stages of the Urban Forest planning process including the drafting, approval and delivery of Urban Forest management plans or Strategic Green Infrastructure plans and be offered training support. Citizens can also be involved directly in growing the Urban Forest through, for example, citizen science projects, common nurseries, tree planting schemes, monitoring tree health or planning new facilities such as forest trails. Co-designing and co-managing the Urban Forest should be a common thread in Green Infrastructure governance.

The tree lined boulevard is the classic urban landscape in many European cities. Cours Mirabeau, Aix-en-Provence, France. PHOTO CREDIT: Naomi Zurcher.

15. At the political and legal levels municipalities and other governmental bodies, should have in place ordinances that can protect the Urban Forest from the individual tree through to whole forests.

16. It is normally local authorities in partnership with their agencies that have responsibility for the territorial Urban Forest. This responsibility extends beyond land ownership, as frequently a large proportion of the Urban Forest will be in private ownership. Through legal instruments and development planning the municipality and its partners can exert significant influence on the privately-owned elements. The private sector has a key role. There are benefits to companies and property owners in the Urban Forest since it can help reduce energy costs, add to property values, general amenity and improve the appearance of business to visitors and the public. Co-establishing the Urban Forest is a profitable investment for both the public and the private sector; not necessarily monetary, but the overall economic and societal return on investment is enormous.

The urban forest sets the scene for important recreational areas such as the General Guisan Quai, Zurich, Switzerland. PHOTO CREDIT: Naomi Zurcher.

17. The role of NGOs in urban forestry is significant in some countries. NGOs are skilled at attracting external resources not available to public bodies. NGOs are efficient in engaging citizens in Urban Forest planning, establishment, management and monitoring.

18. An Urban Forest forum in a territory may be appropriate in some situations to bring together stakeholders into an urban forestry stakeholder collaboration.

RESOURCES

19. Resources needed for the Urban Forest and Green Infrastructure include staff, plans and budgets. The costs of these resources may be clear in a municipal budget, but the (monetary) benefits generated by the Urban Forest are less well documented. There are well known valuation methods in place to establish a monetary value on a territories Urban Forest. The evidence generated by this can be used to justify the resources needed to manage the Urban Forest.

20. Continuing professional development is needed for those engaged in urban forestry and exchange of knowledge and techniques across the continent sought. Staff should be encouraged to become part of national and international urban forestry networks such as the European Forum on Urban Forestry (EFUF) and to avail themselves of a vast, existing body of knowledge, extensive array of online Urban Forest strategic and management plan examples as well as informative webinars.

21. Strong consideration should be given to the creation and subsequent sustenance of the post of Urban Forester. It is almost unthinkable that other areas of urban infrastructure would be without a key oversight person. An Urban Forester (or a team of people in large territories) can work in planning and delivery, engage with citizens, oversee good management of the Urban Forest resource and ensure it is aligned and highly preforming in respect of Urban Green Infrastructure in the territory.

SUSTAINABLE MANAGEMENT OBJECTIVES

22. Sustainability planning and having long-range territorial objectives is essential. There are two crucial questions that need to be answered by green space managers. Firstly, what do we want to know, and secondly how will that information be in used in respect of the entire Urban Forest resource. The answers should then inform local standards and protocols and determine Best Management Practices. Central to the information needs is a ground-based Urban Forest inventory followed by the implementation of a valuation methodology to determine the economic value of the ecosystem service benefits the Urban Forest is providing, and could provide into the future. This can most readily be incorporated in the planning and decision-making process in order to prioritise different project proposals and justify the relative allocation of funds for urban greening.

23. Territorial guidelines are strongly advocated, directed towards the needs of practitioners and contractors and linked to Strategic Green Space (Green Infrastructure) Plans. The content can be tailored to the local and biogeographic situation. Suggested content includes planting soil specifications, tree selection protocols including genetic diversity, provenance requirements, site preparation procedures and planting protocols, establishment period criteria, e.g. watering and the development of a contract growing standard to facilitate diversity of species and quality of stock for public infrastructure projects.

INFORMATION ABOUT GREENINURBS

24. COST Action FP1204, entitled Green Infrastructure approach: linking environmental with social aspects in studying and managing Urban Forests (GreenInUrbs) started in February 2013 funded by the European Commission through the European Cooperation in Science and Technology (COST) which is one of the longest-running European frameworks which encourages and supports cooperation among different communities across Europe. Led by Dr. Carlo Calfapietra of the Institute of Agro-Environmental and Forest Biology (IBAF) of the National Research Council (CNR), Italy, GreenInUrbs is a collaborative effort between scientists, practitioners and policy makers engaged with the environmental, socio-cultural, governance and economic aspects of Urban Forests within a broader Green Infrastructure perspective.

FURTHER INFORMATION

25. Web links to further reading on Green Infrastructure and Urban Forestry can be found at the European Forum on Urban Forestry website www.efuf.org

AUTHOR CREDITS

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