GREEN SURGE

June 2017

URBAN GREEN INFRASTRUCTURE PLANNING

A GUIDE FOR PRACTITIONERS

Excerpt for ENV-462 Urban Green & Blue Infrastructure and Global Warming (EPFL)

Practitioners' guide to urban green infrastructure planning, based on research in European cities as part of the EU FP7 project GREEN SURGE.

SEVENTH FRAMEWORK PROGRAMME

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HIGHLIGHTS

WHAT IS URBAN GREEN INFRASTRUCTURE PLANNING?

Urban Green Infrastructure (UGI) planning is a strategic planning approach that aims to develop networks of green and blue spaces in urban areas, designed and managed to deliver a wide range of ecosystem services and other benefits at all spatial scales.

WHY IS URBAN GREEN INFRASTRUCTURE SO IMPORTANT?

UGI is capable of addressing a broad range of urban challenges, such as conserving biodiversity, adapting to climate change, supporting the green economy and improving social cohesion. To capture this potential, local governments need to plan carefully and holistically.

CORE PRINCIPLES

A sound UGI planning approach is based on four principles:

- *Green-grey integration – combining green and grey infrastructures*
- *Connectivity – creating green space networks*
- *Multifunctionality – delivering and enhancing multiple functions and services*
- *Social inclusion – collaborative and participatory planning*

Barcelona has plans to invest considerably in urban green infrastructure. The city's 'Green Infrastructure and Biodiversity Plan' is an ambitious strategic tool to increase connectivity in the densely-built Mediterranean metropolis. Available in English www.barcelona.cat
Credit: Rieke Hansen

HIGHLIGHTS

KEY MESSAGES

For best results, UGI planners should:

- *Embrace the full diversity of urban green – and blue! All types of green and blue spaces, regardless of ownership or origin, can be considered part of a UGI network.*
- *Consider the full spectrum of benefits: ecological, social AND economic.*
- *Use a mix of assessment tools to raise awareness of the diverse values of UGI and its related benefits, and to gain support for these.*
- *Seek support to develop UGI planning strategies, for example, through mandates or advocates, or by identifying windows of opportunity.*
- *Coordinate plans, policies and instruments at multiple scales, ranging from metropolitan regions to individual sites.*
- *Cooperate with other departments and external experts.*
- *Collaborate with civil society groups, citizens and the private sector.*
- *Develop strong, but flexible, frameworks and mix 'hard' and 'soft' instruments for planning and implementation, adopting a long-term outlook.*
- *Start with pilot projects to test strategies and build support.*
- *Unlock additional resources by collaborating, pooling knowledge and accessing external funding.*
- *Identify less vocal groups and use appropriate tools and strategies to engage them, recognising skill and resource barriers for participants.*
- *Look for potential links, synergies and/or conflicts between planning objectives.*

Self-evaluation and tools:

- *Complete the checklists (Part D) to evaluate your organisation's current UGI planning efforts and see the Toolbox for ways to put UGI planning into practice.*

WANT TO KNOW MORE?

Reports from other work packages referred to in this guide are listed below and available on the **GREEN SURGE website**.

Deliverable 3.1
Cvejić, R., et al., 2015. A typology of urban green spaces, ecosystem services provisioning services and demands. Functional linkages. GREEN SURGE D3.1

Deliverable 4.1
Andersson, E., et al., 2015. Integrating Green Infrastructure Ecosystem Services into Real Economies. GREEN SURGE D4.1.

Deliverable 5.1
Davies, C., et al., 2015. Green Infrastructure Planning and Implementation. The status of European green space planning and implementation based on an analysis of selected European city-regions. GREEN SURGE D5.1.

Deliverable 5.2
Hansen, R., et al., 2016. Advanced Urban Green Infrastructure Planning and Implementation: Innovative Approaches and Strategies from European Cities. GREEN SURGE D5.2.

Deliverable 6.1
Buizer, M., et al., 2015. The governance of urban green spaces in selected EU-cities: Policies, Practices, Actors, Topics. GREEN SURGE D6.1

Deliverable 6.2
Buijs, A., et al., 2016. Innovative Governance of Urban Green Spaces: Learning from 18 innovative examples around Europe. GREEN SURGE D6.2

Milestone 32
Kronenberg, J., Andersson, E., 2016. Integrated Valuation: Integrating Value Dimensions and Valuation Methods. GREEN SURGE Milestone MS32.

A WHAT IS UGI PLANNING - AND WHY DO IT?

An overview
Green space typology
Urban challenges

Urban Green Infrastructure planning…

…can help to tackle key urban challenges that cities face

Here in Part A, we explore how UGI planning, taking into account the potential of a range of green space types (see Green Space Typology on page 6) can address four important urban challenges:

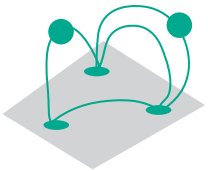
1. ***Adapting to climate change***
2. ***Protecting biodiversity***
3. ***Promoting a green economy***
4. ***Increasing social cohesion***

These are explored in more detail here in Part A.

…is based on four core principles

1) Green-grey integration – combining green and grey infrastructure

UGI planning seeks the integration and coordination of urban green spaces with other infrastructure, such as transport systems and utilities.



2) Connectivity – creating green space networks

UGI planning for connectivity involves creating and restoring connections to support and protect processes, functions and benefits that individual green spaces cannot provide alone.

3) Multifunctionality – delivering and enhancing multiple functions and services

UGI planning aims at combining different functions to enhance the capacity of urban green space to deliver multiple benefits – creating synergies, while reducing conflicts and trade-offs.

4) Social inclusion – collaborative and participatory planning

UGI planning aims for collaborative, socially inclusive processes. This means that planning processes are open to all and incorporate the knowledge and needs of diverse parties.

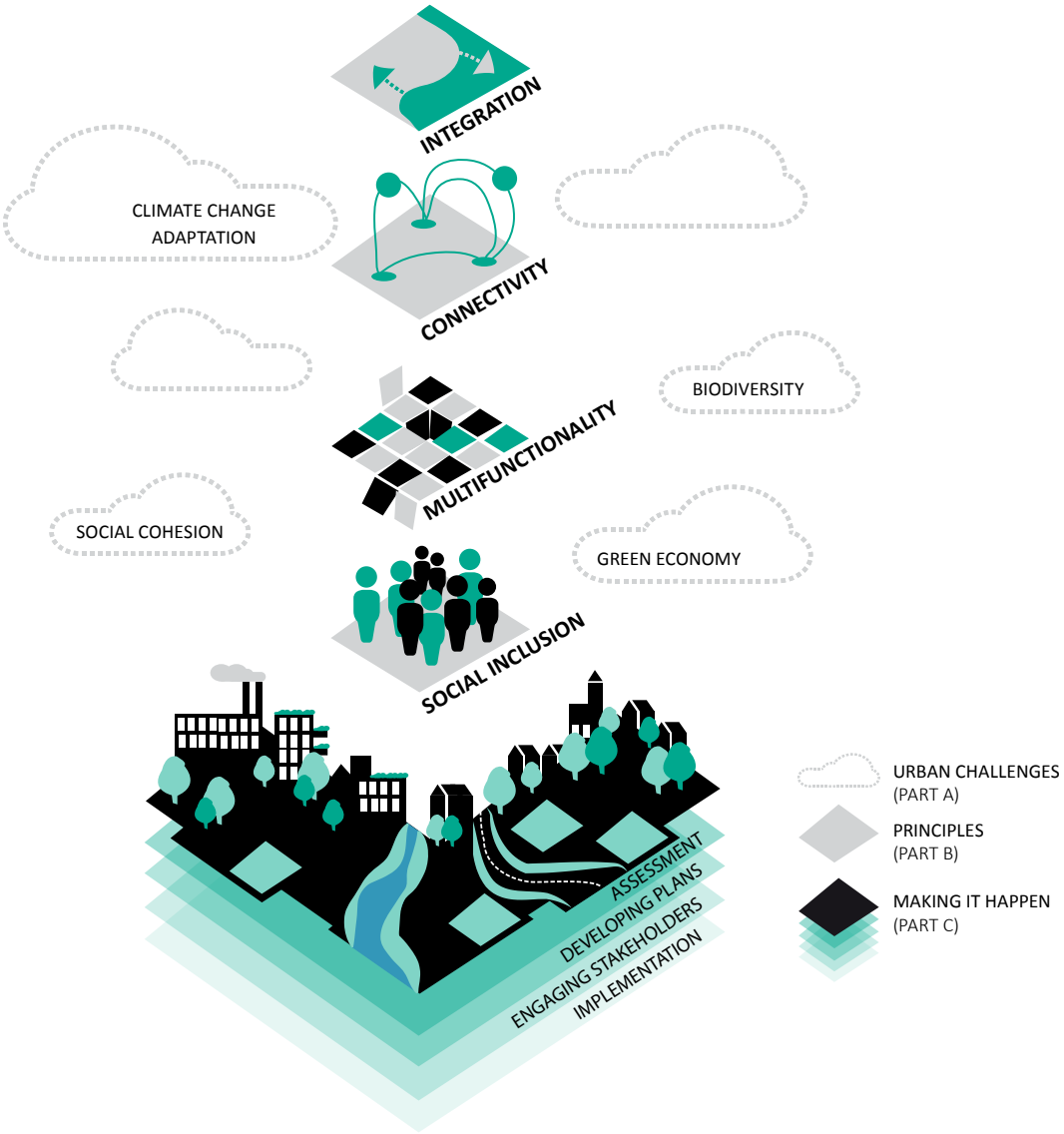
All four principles are explored in Part B.

…must be translated to practical actions on the ground

Such actions concern all phases of the planning process, involving engaging stakeholders, early assessment, developing plans, and implementation. They are explored in Part C.

Framework for UGI planning

UGI planning offers a conceptual framework to be adapted to your local context, as illustrated below. This framework is driven by the four core principles. Combined, the principles act in two directions: 1) to respond to the particular urban challenges your city faces and 2) to underpin practical actions on the ground.



SUPPORTING PRINCIPLES

While the four core principles provide a fundamental basis for UGI planning, certain supporting principles should be also taken into account:

- *Multi-scale: UGI planning aims to link different spatial levels, ranging from metropolitan regions to individual sites.*
- *Multi-object: All types of urban green and blue spaces, regardless of ownership and origin, can be considered as part of a green infrastructure network.*
- *Inter- and transdisciplinary: UGI planning aims at linking disciplines, as well as science, policy and practice. It integrates knowledge and demands from different fields, such as landscape ecology, urban and regional planning, and landscape architecture, and is ideally developed in partnership between local authorities and other stakeholders.*

GREEN SPACE TYPOLOGY

Urban green (and blue) spaces are incredibly diverse, ranging from urban forests to rooftop gardens. Some of these spaces are already typically considered in planning practice, but others (particularly private green spaces such as gardens, but also urban farmlands) have received less attention in research and practice. Often, their contribution to UGI networks is not so well understood.

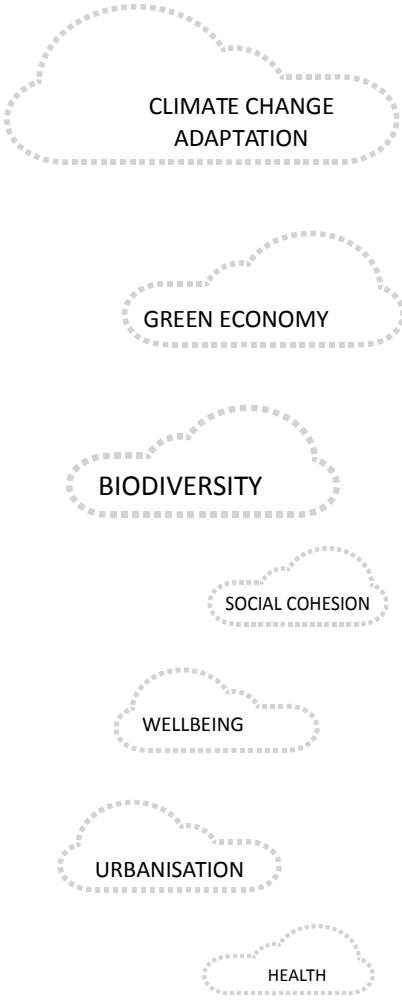
GREEN SURGE has contributed to this knowledge gap by developing a green space typology made up of 44 elements, in eight groups, and linking them to scientific evidence on their corresponding ecosystem services (see Deliverable 3.1). This provides an important basis for understanding the functional connections between green spaces and the surrounding built environment. An overview of the elements is provided below.

While all these elements can and should be considered in UGI planning, urban green infrastructure is more than simply a new name for existing green space elements. Using the principles of connectivity and multifunctionality, it is possible to determine which of these spaces form part of the city's UGI network (see Part B) and where it is necessary either to improve the quality of existing elements, or invest in new ones and strengthen linkages (see Part C).

Green space typology, made up of 44 green space types clustered in eight groups.
Image credits: Rieke Hansen

URBAN CHALLENGES

A



Green space planners are typically well aware of the potential of urban green spaces to contribute to challenges such as human health, species protection and adaptation to climate change. When understood as part of a UGI planning framework, these and other emerging challenges and trends are not just obstacles to be overcome, they can also form important drivers for investing in green space – especially when a challenge is high on the political agenda.

For instance, urban growth can present a threat to urban green spaces, but also a chance to recognise UGI's importance for human welbeing and develop corresponding planning strategies. Economic crises and environmental hazards, such as severe flood events, also open the door to testing new ways of planning and managing UGI (see Deliverable 5.2). In this way, adopting a UGI planning approach can assist practitioners to productively link urban challenges with the unrealised potential of green spaces, in the interest of gaining support for planned measures and achieving policy objectives.

In the following pages, we look at the potential contribution of UGI to two well-known challenges – biodiversity protection and climate change adaptation. In addition, we explore two that tend to be lesser-known in planning circles – increasing social cohesion and promoting a green economy (see Deliverable 5.2 for more details).

Parco Nord Milano is a regional park within Milan's metropolitan green belt. Protecting such green spaces on the city outskirts can be part of a strategy to counter urban sprawl.
Credit: Courtesy of ERSAF - Regional Agency for Agriculture and Forestry Services, Milan

KEY MESSAGES: UGI FOR ADAPTING TO CLIMATE CHANGE

Identify windows of opportunity

Where urban challenges are widely recognised, and the need to act upon them has gained legitimacy among decision-makers, they can be useful triggers for transforming the status quo. Identifying issues of a high political priority, reviewing corresponding plans and policies, and highlighting the range of benefits UGI is capable of delivering in this context can support a case for investing in UGI. For instance, the prominence that climate change has gained in many cities has helped some cities to secure support for related initiatives, such as green-grey integration (↖Box B4 Malmö, A1 Almada, and B3 Berlin).

Assess vulnerabilities to increase resilience

Effective strategies for climate change adaptation require continuous monitoring of the urban system in focus and an understanding of its specific vulnerabilities[6] (↖Assessing UGI networks). Therefore, UGI planning needs to draw on an integrated vulnerability assessment, targeting the reduction of risks and strengthening of resilience. Such an assessment should also take into account the synergies and potential conflicts between mitigation and adaptation strategies, as well as issues of distributional justice, given that socio-economically disadvantaged areas are often most vulnerable to climate change effects (↖Social Cohesion).

Coordinate efforts

While mitigation strategies often focus on specific sectors such as housing, transport or industries, adaptation strategies are cross-sectoral. This creates a particular imperative for collaborative strategy development and implementation processes that actively include relevant stakeholders[7] (↖Integration, ↖Social Inclusion). Universities and other research institutions can support assessment and monitoring processes (↖Box A1 Almada and B1 Szeged).

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BOX A2: A UGI NETWORK FOR FOREST BIODIVERSITY, HELSINKI

The proportion of original natural green spaces in Helsinki, Finland, is one of the highest among European capitals. However, they are under increasing pressure from population growth. This threat has given rise to a combination of grassroots and governmental efforts to protect and enhance the city's biodiversity.

Formal and informal efforts

Biodiversity support has evolved in Helsinki along two largely independent paths: a formal one led by the city council, and another led by local conservation NGOs. The formal process resulted in an update of the Nature Conservation Programme (2015-2024), proposing 47 new forest areas to be conserved – almost double the total area currently protected. The plan was integrated with the broader City Master Plan, however, it was not fully supported by local conservation NGOs, who outlined their own proposal for a forest conservation network[7]. They prepared field inventories identifying endangered species, documented each proposed site according to standardised criteria (consistent with METSO The Forest Biodiversity Programme for Southern Finland[8]), and gathered supporting material, including GIS data.

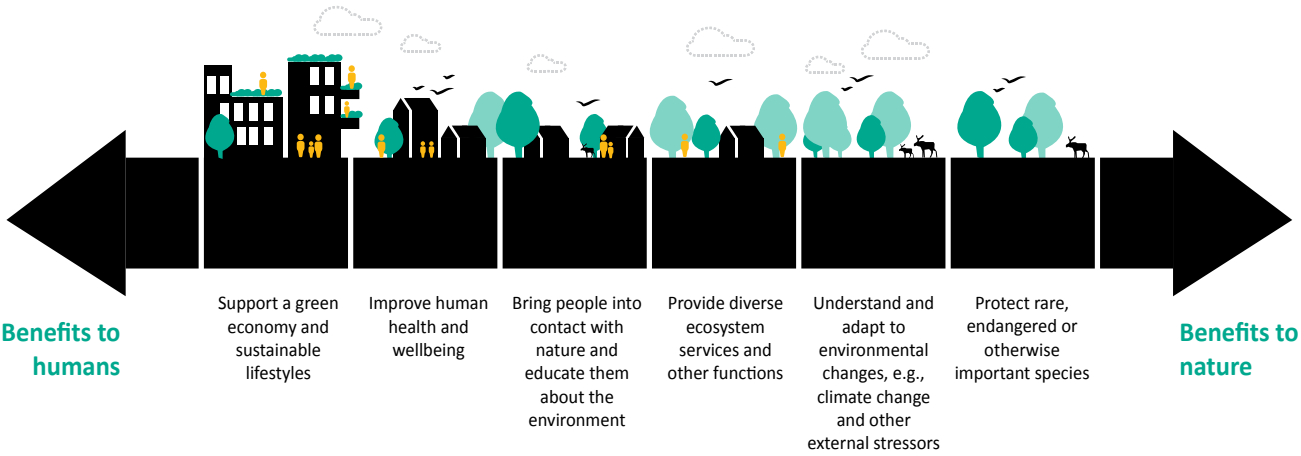
Lessons learnt

Both the formal and informal processes drew upon research provided by the University of Helsinki, and the NGOs' proposal influenced parts of the official Nature Conservation Programme. Overall, this is a successful example of the ability of bottom-up and top-down processes to interact. Yet it also indicates the limits of these interactions. Two-directional communication between the parallel processes was relatively low and the influence of local conservation groups remains fragile. The City Master Plan does not include quantitative green space targets or guidance on how to integrate biodiversity with grey infrastructure, and more work is needed to improve long-term management of natural habitats, as well as to raise awareness among residents of the importance of biodiversity.

Field inventories undertaken by local NGO experts produced valuable information on biodiversity and identified several endangered species to support a forest conservation network proposal.
Credit: Kati Vierikko

Find out more...

Sustainable green infrastructure of Helsinki – urban ecological research report and recommendations for the Helsinki master plan 2014. Vierikko et al., 2014 (in Finnish with English summary).



There are many motives for protecting urban biodiversity, with benefits for both nature and humans.
Credit: Design by Eleanor Chapman, adapted from Kati Vierikko, 2015, based on Dearborn and Kark, 2009[9].

KEY MESSAGES: UGI FOR PROMOTING A GREEN ECONOMY

Collaborate with non-governmental actors

Promoting a green economy usually requires engaging with a wide range of actors (↖Box A3 Edinburgh and E6 Berlin). The challenges introduced by a diverse range of interests may also be offset by costs saved through reduced municipal management expenditure and a healthier, more socially cohesive community.

Balance private and public interests

A green economy must consider the distribution of benefits, for example by implementing measures to prevent residents from being displaced through gentrification (↖Social Cohesion). When engaging the private sector as a partner, it is particularly important to ensure that incentives and regulations are carefully balanced between private profit, on the one hand, and public needs and benefits on the other[8].

Consider the full spectrum of benefits: ecological, social AND economic

Accounting for the social and ecological benefits of green spaces, alongside their potential to generate income and indirect economic benefits, demands an integrated approach to planning. While priorities will vary depending upon the context, a green economy seeks to maximise each of these three dimensions to the degree possible in the interest of long-term sustainability, rather than prioritising monetary gains.

↖Toolbox T2 for approaches to mapping and assessing economic benefits.

For a detailed study on the economic and health benefits of UGI, see **Integrating green infrastructure ecosystem services into real economies.** Deliverable 4.1.

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4 A detailed literature review on the economic benefits of UGI can be found in Andersson, E., et al. (eds.), 2015. Integrating green infrastructure ecosystem services into real economies. Report of the GREEN SURGE project (Deliverable 4.1), Copenhagen

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KEY MESSAGES: UGI FOR INCREASING SOCIAL COHESION

Access

Access to UGI includes both geographic proximity to green space (e.g., Natural England's Accessible Natural Greenspace Standard recommends a distance of no more than 300 metres from one's home, ⇱Toolbox T3) and access to it via public transport, especially for vulnerable residents (⇱Connectivity).

Welcoming places

Visitors must feel safe and welcome, and find green spaces attractive and of interest for use. Careless planning and management may neglect the many gender-based, ethnic, and disability-related barriers to use. For instance, ethnic minorities and women may feel more threatened or unsafe in secluded spaces[10]. Planners need to take into account the needs, motivations and preferred uses of a range of groups (⇱Multifunctionality). To ensure these interests are represented, different user groups need to be engaged in UGI planning (⇱Social Inclusion). Communication with and outreach to local communities can be decisive factors for attracting people from a range of socio-economic backgrounds (⇱Box A4 Edinburgh and C6 Milan).

Space for social encounters

Urban green spaces can provide a platform for social contact and interaction, which helps to prevent loneliness and to extend social networks[11], and may reduce social tensions[12]. To really be successful, however, UGI must provide adequate amenities in connection to existing economic and social networks, instead of being limited to design. Local attachments to existing spaces should also be considered, instead of trying to solve perceived 'anti-social' behaviour by displacing it elsewhere[13].

Fostering engagement and self-regulation

Bringing people together for a common purpose, whether through cultural events, volunteer activities, or even by providing some basic amenities, can catalyse social interactions. Active engagement in the design and/or management of UGI can help to build local skills and lead to cleaner, safer, active spaces[14]. Local governments can act as facilitators and support bottom-up initiatives by promoting self-management and defining framing conditions (⇱Box C3 Utrecht). UGI designs should be flexible, leaving room for self-organisation and initiative (⇱Box E6 Berlin). Urban gardening is a good example (⇱Box A4 Edinburgh and B5 Ljubljana).

See Toolbox T3 for exemplary methods and tools to increase social cohesion

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FURTHER READING

PRACTICAL GUIDANCE

CLIMATE CHANGE

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SOCIAL COHESION

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B CORE PRINCIPLES OF UGI PLANNING

Green-grey integration
Connectivity
Multifunctionality
Social inclusion

PRINCIPLE **GREEN-GREY INTEGRATION** B

Combining green and grey infrastructure

"Integration concerns the interaction and links between urban green infrastructure and other urban structures. [...] the new approach means that these are increasingly viewed as integrated partners."[1]

KEY OBJECTIVES

Green-grey integration...

...aims at physical and functional synergies between urban green space and other kinds of infrastructure.

...not only targets primary infrastructural needs, but also seeks to provide wider environmental, social and economic benefits.

...is based on sound knowledge from different disciplines and sectors, and on cooperation between them.

UGI planning seeks to integrate and coordinate urban green spaces with other infrastructure, such as transport systems and utilities.

In contemporary cities, many urban issues, including mobility and the management of storm- and wastewater are addressed through engineered or 'grey' infrastructure, such as canals, pipes or asphalted streets. UGI planning for integration considers urban green spaces as another kind of infrastructure, with the potential to complement or even replace this grey infrastructure.

Integrating infrastructure can lead to multifunctional solutions which provide various benefits simultaneously (↖Multifunctionality). For example, vegetated road buffers can improve aesthetics and reduce noise and air pollution, while dispersed planting strips or rain gardens in high flood-risk neighbourhoods can enhance the stormwater management capacity of conventional grey systems and buffer climate change effects (↖Climate Change Adaptation).

Green-grey integration in UGI planning is most prominently related to stormwater systems. However, it can also apply to other kinds of infrastructure, e.g., bike paths along rights-of-way below powerlines, gardens along railways, and street trees that reduce the heat island effect. While there are other possible applications of integration, this guide focuses on two major areas: stormwater management and sustainable mobility.

The Water Square Benthemplein in Rotterdam looks much like a conventional plaza for playing sports and hanging out, but doubles as a water collection system during rain.
Credit: Rieke Hansen

KEY MESSAGES FOR GREEN-GREY INTEGRATION

Good cooperation

Cooperation among urban planners, green space planners and grey infrastructure planners is an important factor of success for green-grey solutions. Since government administration is often fragmented across many departments, overcoming uncooperative or even adversarial departmental relationships is an important starting point. Political leadership, early departmental involvement, use of a common terminology, and an emphasis on synergies and shared goals can help.

Learn from local pilot projects

Pilot projects can promote awareness of green-grey measures and their potential, as well as cooperation between departments, enabling continuous learning and paving the way to implement similar solutions in other parts of the city (↖Box E1 Malmö).

Combine 'hard' and 'soft' instruments for implementation

Legislation can provide a powerful mandate and fiscal support to green-grey integration. Examples are provisions in building and planning legislation (↖Box Malmö) or using environmental impact charges to landowners to fund green-grey measures. In the absence of sufficient legislation, and where municipal budgets are constrained, 'soft' instruments like incentives or voluntary rating schemes can provide a way forward.

Multifunctional UGI designs

If UGI designs are to capture the full potential of integration, multiple functions and the specific context of designs should be taken into account (↖Multifunctionality). A substantial evidence base of benefits (including often overlooked social benefits), and UGI performance is still in development, but some guidance is available[8].

↖Toolbox T4 for methods and tools to help integrate green and grey infrastructure.

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7 See more at www.usgbc.org/leed

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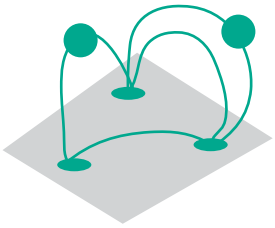
PRINCIPLE **CONNECTIVITY**

Creating green space networks

B



"The strategic connection of ecosystem components – parks, preserves, riparian areas, wetlands, and other green spaces – is critical to maintaining the values and services of natural systems."[1]

KEY OBJECTIVES

Connectivity…

…involves both structural and functional connections between green spaces, in order to create added value from an interlinked system.

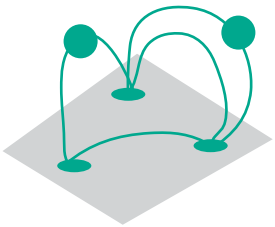
…targets clearly defined functions and benefits for humans and wildlife, recognising the different kinds of connectivity (ecological, social and abiotic) and the potential for synergies between them.

…matches aims and strategies to different spatial scales – regional, city and local – and ideally is integrated across them.

UGI planning aims to create a well-connected green space network that serves humans and other species. This involves creating and restoring connections to support and protect processes, functions and benefits that individual green spaces cannot provide alone[2].

Landscape connectivity can be broadly defined as the extent to which movement and flow is enabled or inhibited by the landscape[3]. It has played a central role in the field of landscape conservation for some time, for instance in countering the negative impacts of wildlife habitat fragmentation[4]. Yet connectivity is also of relevance to more direct human benefits, such as improved movement between homes and recreational spaces, e.g., via safe and attractive bicycle paths, and other modes of sustainable mobility. UGI networks are not just important for enabling the movement of people and wildlife, they can also support abiotic flows, such as of energy, water and air[5]. Ventilation corridors improve the supply of fresh air and reduce pollution, while the cooling effect of urban parks is enhanced when these form part of a network. In this way, interconnected green spaces can minimise environmental risks and the impacts of climate change (⇖Climate Change Adaptation).

The Isar river in Munich serves as a central urban recreation space and an important regional ecological corridor. The riverbanks also act as a green corridor for walking and biking.
Credit: Rieke Hansen



KEY MESSAGES FOR CONNECTIVITY

Clearly define the kind of connectivity, functions and aims

Increasing connectivity requires planning on large spatial scales and consideration of different kinds of connectivity, such as for humans, for biodiversity, or for urban climate. Practitioners should clearly define these functions and relevant actors in developing a plan for connectivity.

Think long-term and integrate objectives at multiple levels

Connectivity objectives are best achieved when a long-term outlook is adopted, combined with regular monitoring and updates to incorporate new scientific knowledge and implementation strategies. Planning guidance at a particular spatial scale should additionally be 'nested' with related policies and instruments (including incentives and regulations) at multiple scales and across sectors (⇱Box E2 Milan and B3 Berlin).

⇱Toolbox T5 for tools to evaluate social and ecological connectivity.

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PRINCIPLE **MULTIFUNCTIONALITY**

Delivering and enhancing multiple functions and services

B

"Multifunctionality can apply to individual sites and routes, but it is when the sites and links are taken together that we achieve a fully multifunctional green infrastructure network."[1]

KEY OBJECTIVES

Multifunctionality...

...aims to secure and increase the multiple ecological, socio-cultural and economic benefits of UGI.

...considers interrelations between different functions and services and the capacity of different urban green spaces to provide them, while avoiding trade-offs.

...targets the social questions of demand for and access to UGI and its benefits.

UGI planning aims at intertwining or combining different functions to enhance the capacity of urban green space to deliver multiple benefits. Planning for multifunctionality seeks to create synergies between functions, while reducing conflicts and trade-offs.

Multifunctionality concerns the ability of UGI to provide several ecological, socio-cultural, and economic benefits concurrently. A UGI planning process expressly considers how to deliver these benefits instead of leaving it to chance. This is not simply a case of 'the more functions the better'. Potential trade-offs and conflicts between functions need to be assessed, as well as the capacity of different UGI elements[2]. For instance, using land for intensive recreation may conflict with the protection of species sensitive to disturbance. These kinds of conflicts can sometimes be avoided by physically separating incompatible uses (e.g., through zoning, visitor management or agreements with land users), or by planning them so as not to happen at the same time (e.g., when breeding or flooding is expected). This means it is not only the functions themselves and the associations between them that are important, but also their spatial and temporal dimensions.

Further, the benefits of multifunctionality should be considered in relation to who needs them and who has access to them. Otherwise, UGI planning could deliver benefits only relevant or accessible to certain groups in society[3] (↖Social Cohesion). To avoid this trap, a strong element of public participation is critical (↖Social Inclusion).

Park Transwijk, Utrecht is a redesigned public park that supports structural diversity and many recreational uses, including learning facilities such as an urban farm and educational garden.
Credit: Sabrina Erlwein

KEY MESSAGES FOR MULTIFUNCTIONALITY

Support multifunctionality at different planning levels
Increasing multifunctionality should be included as an objective in strategic green space plans, supported by the assessment of different functions and services, including demand for them and their spatial distribution. Clever design and visitor management can help to maximise synergies at the site-level.

Use tools to identify functions and benefits
Tools such as multifunctionality inventories or ecosystem services assessments are useful to identify multiple green space functions and benefits (⇱Toolbox T6). However, they should be supported by a sound understanding of the kind of interrelations, synergies and trade-offs that exist between these.

Support participation to raise awareness of demands and needs
Actively involving a diverse group of local residents in UGI planning makes it more likely that outcomes will increase UGI benefits and their accessibility for a wide range of people (⇱Social Inclusion).

Foster inter- and transdisciplinary collaboration
Multifunctional thinking and planning requires cross-sectoral and cross-departmental cooperation to integrate expertise from different professions. Thus, silo-thinking must be overcome to successfully plan for multifunctionality, e.g., by sharing tools and outputs between departments and communicating the benefits of working together (⇱Engaging Stakeholders).

⇱Toolbox T6 for exemplary methods and tools to identify and assess multiple green space functions and benefits.

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PRINCIPLE **SOCIAL INCLUSION**

Collaborative and Participatory Planning

"In many countries the main tendency in recent years has been to shift the balance between government and society away from the public sector towards doing things together instead of doing them alone."[1]

KEY OBJECTIVES

Social inclusion…

…aims at including all social groups in the planning process of UGI, while putting a special emphasis on the most vulnerable ones.

…seeks not only to ascertain the interests of different stakeholders but also to balance them.

…intends to facilitate more equitable access to green space services.

UGI planning aims for collaborative, socially inclusive processes. This means that planning processes are open to all and incorporate the knowledge and interests of diverse parties.

Social inclusion in general refers to the involvement of a wide range of social groups (including vulnerable ones that are often excluded) in all spheres of life. Making UGI planning socially inclusive demands attention to the needs of these different groups. Of particular concern are those with the most difficulties accessing information and articulating their interests, such as immigrants or ethnic minorities; or people who are homeless, unemployed or poor. If not carefully managed, initiatives to involve citizens in planning produce results that favour some and not others, by further empowering those in advantaged positions, or encouraging resistance from narrow interest groups to policies designed for the public interest[2]. In order to avoid these pitfalls, it is essential that governing institutions are capable of not only listening to a range of interests, but also channelling and balancing them.

Social inclusion is related to social cohesion, yet these are not the same. The latter concerns the *outcome* of UGI planning with regard to its social effects (↖Social Cohesion), while socially inclusive UGI planning is instead a *process* of including all social and cultural groups people in decision-making – one end goal of which is UGI that is equally accessible to them and meets their various needs (↖Multifunctionality).

Working group at the XII. Kunbábonyi Summer University, Hungary, exploring spatial development from the community perspective.
Credit: Hajnal Fekete

KEY MESSAGES FOR INCREASING SOCIAL INCLUSION

Match the level of participation to the scale, context and intended outcome

A voluntary, bottom-up initiative can empower local people and, in some cases, result in local residents taking responsibility to manage an urban green space (↖Box B5 Ljubljana). However, this approach may not be suitable at a much larger-scale, where participatory methods need to complement, rather than supplant, conventional planning approaches.

Identify under-represented groups and appropriate tools and strategies to engage them

Participatory approaches can easily lead to an unbalanced level of involvement, excluding less powerful groups. These groups need to be identified and a bundle of dedicated tools and strategies employed to involve them, such as special participatory offers for young people, women, or ethnic minorities (↖Box E3 Aarhus). One of the easiest ways is to increase citizen involvement is to decrease the burdens of participation, i.e., to make it as simple as possible for people to get involved. ↖Toolbox T7 provides a range of tools that can help.

Address skill and resources barriers

To move from formal consultation to strategic involvement, barriers to efficient public participation need to be dealt with. These might be lack of financial and human resources, time constraints, insufficient representation of interest groups, lack of social facilitation skills among city officials and/or non-governmental actors, or the limitations of policy frameworks. To this end, possible strategies are engaging a dedicated facilitator, or advocating to higher political levels and other departments for more policy mechanisms and resources to support participatory planning.

Social inclusion goes beyond the planning process

After plans are developed and implemented with an inclusive approach, ongoing investment is needed to ensure that green spaces continue to be available for the use of all groups. This may include physical maintenance programmes, but also social work (↖Social Cohesion).

↖Toolbox T7 for methods and tools to help foster social inclusion.

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C MAKING IT HAPPEN!

Embedding UGI in the planning process
Assessing UGI networks
Developing plans
Engaging stakeholders
Implementation

EMBEDDING UGI IN THE PLANNING PROCESS

C

This section is about the practicalities of embedding the UGI approach in the planning process, in other words, making it happen on the ground!

Although the social, environmental and regulatory context varies from city to city, GREEN SURGE findings offer some clues about where and how it might be possible to influence planning processes, regardless of where they take place, in order to support urban green infrastructure.

So far, we have looked at UGI planning in relation to urban challenges and four core principles. Importantly, these are fundamentally inter-linked with one another. Each of the UGI planning principles can, to varying degrees, contribute to addressing the urban challenges investigated for GREEN SURGE (see matrix below). Green-grey integration, whether for stormwater management or urban cooling, is directly connected to climate change adaptation; while enhancing ecological connectivity relates closely to protecting biodiversity. Finally, a socially inclusive planning process might not guarantee a socially cohesive community – but it is an important step towards one.

The next pages offer further insights across a range of practical planning aspects – assessing a UGI network, developing plans, engaging stakeholders and implementation.

INTEGRATION

CONNECTIVITY

MULTIFUNCTIONALITY

SOCIAL INCLUSION

LINKING UGI PRINCIPLES WITH URBAN CHALLENGES			
CLIMATE CHANGE	Green-grey measures for flood retention or urban cooling.	Connected green structures that enhance natural ventilation and cooling.	Regulating services that contribute to climate change adaptation as an integral part of planning for multifunctionality.	Inclusion of groups vulnerable to climate change impacts in UGI planning.
BIODIVERSITY	Habitat provision, supporting native plants as one of the co-benefits of green-grey solutions.	Networks for ecological connectivity.	Protecting ecological functions and habitat as an integral part of planning for multifunctionality.	Fostering awareness among all groups of the value of biodiversity.
GREEN ECONOMY	Reduced management costs through integrated green-grey systems; avoided costs through risk mitigation.	Promotion of sustainable transport systems, e.g., walking and biking to lessen environmental impacts.	Cost effective UGI solutions through providing multiple benefits in the same space.	Promotion of a green economy, through co-creation, co-management and co-governance of urban green spaces.
SOCIAL COHESION	Consideration of the usability and amenity values of integrated UGI measures to promote social cohesion.	Provision of equitable access to urban green spaces.	Provision of UGI to meet identified demands and needs of all groups.	Consideration of vulnerable and less-vocal groups' needs and their empowerment through collaborative planning.

The four core principles of UGI planning can each help to address a range of challenges, including those examined in GREEN SURGE.

ASSESSING UGI NETWORKS

Uncover value and opportunities

Systematic assessment of existing UGI is an essential precursor to the development of any sound UGI plan, but assessments are also tools to raise awareness of UGI's multiple benefits. Quantifying these benefits can be an effective strategy to promote investment in UGI, if communicated well to the public and decision-makers.

KEY MESSAGES

Assessing UGI, including quantity, quality, supply and demand, is critical for defining action areas.

Use assessment to raise awareness for the value of UGI and related benefits, as well as to create investment opportunities.

A multitude of assessment tools exist for different aspects of UGI planning – it is best to use a mix of them.

Quantity AND quality

Identifying and quantifying a broad range of UGI elements (↖Green Space Typology, Part A) is a first step in understanding the shortcomings and potential of a UGI network, but it is also important to assess the quality of these elements and their connections to each other (↖Connectivity). Quality in its simplest form can be assessed by gathering data on the benefits provided by different UGI elements. Any qualitative assessment as a basis for UGI planning should first consider a broad spectrum of functions and services before identifying priorities (↖Multifunctionality). An ecosystem services approach is one means of doing so. The TEEB (The Economics of Ecosystems and Biodiversity) initiative suggests a stepwise procedure to identify and assess benefits and stakeholder needs in a given urban area (↖ TEEB Box on page 48).

Supply and demand

Alongside information about existing green and blue spaces, both demand for and access to them need to be considered. Top-down assessments can also help determine priority actions, such as a green space audit, which assesses and maps city green spaces along with their shortcomings, potential and accessibility for residents in different parts of the city (↖Box E4 Edinburgh).

To develop a city's green infrastructure, planners need to identify not only the valuable green spaces but also those areas that hold hidden potential for improvement. The city of Lisbon, for example, is turning wastelands into green corridors.
Credit: Rieke Hansen

DEVELOPING PLANS

Coordinate planning strategies

A large variety of plans and policies can be used to support UGI, such as comprehensive urban development strategies, green space plans or thematic strategies on biodiversity, urban water or climate. A strategic perspective at the city-wide or city-regional level is important to ensure that the whole network is taken into account.

KEY MESSAGES

Get support through mandates and advocates.

Develop strong but flexible frameworks and mix instruments for implementation.

Coordinate plans, policies and instruments for achieving goals, also at different spatial scales.

Coordinate planning instruments and other mechanisms

Strategic UGI plans should be long-term instruments, modified and updated regularly in order to provide an accurate and useful framework for action (↖Box B3 Berlin and E2 Milan). Often multiple instruments are needed, including at different spatial scales, and these need to be coordinated with one another. Therefore, it is important that UGI plans are embedded in the city's planning system and linked to other planning instruments (↖Box C4 Malmö). Berlin's Urban Landscape Strategy is a good example of a strategic plan coordinated with other planning mechanisms, as well as instruments such as pilot projects and dialogue forums, within a framework to involve non-government actors to develop the city's UGI (↖Box E6 Berlin).

Planning for an uncertain future

In the face of the uncertainties that current urban challenges create, especially climate change, the key requirement for planning is to adopt 'no-regret' or 'low-regret' strategies over 'hard' adaptation (e.g., early warning systems, insurance, dykes). No/low-regret strategies are designed to increase robustness at low costs, or compensate costs with other benefits (↖Multifunctionality, ↖Integration, also Box E1 Malmö).

Legislating and advocating

Legal requirements and political mandates are often a powerful driver for a UGI strategy, since they constitute a commitment on a higher legal or political level. However, even without an official mandate, decision-makers such as local politicians can sometimes secure enough political support to trigger concrete actions (↖Box B1 Szeged), while NGOs can use evidence-based proposals to influence policy (↖Box A2 Helsinki).

Edinburgh's Open Space Strategy involved consultation with many departments (↖Box E4).
Credit: City of Edinburgh Council

BOX C3: NEIGHBOURHOOD GREEN PLANS, UTRECHT

Citizens are important stakeholders who can be mobilised to take part in shaping plans. Often it is easier to engage people at a neighbourhood level, when the area they live in is directly concerned, rather than the whole city. In Utrecht, The Netherlands, Neighbourhood Green Plans have proved to be a successful instrument to engage citizens in contributing ideas for green space projects across the city. For each of the city's ten neighbourhoods, a budget of €500,000 has been made available to realise 'green' ideas brought forward by locals. These ideas were assessed by the municipality, and those considered feasible bundled together to form a Green Plan. After implementation, the municipality plans to further involve citizens in self-management of the spaces concerned.

ENGAGING STAKEHOLDERS

Cross-sectoral and inclusive UGI planning

UGI planning requires the involvement of a variety of actors, not only public authorities but also businesses, civil society and citizens. Active engagement can promote a sense of shared responsibility for local green spaces, towards co-creation, co-management and co-governance arrangements (↖ Social Inclusion).

KEY MESSAGES

Cooperate with other departments and external experts.

Collaborate with non-governmental stakeholders and support co-governance arrangements.

Partner-up with a variety of stakeholders and find meaningful ways for them to become engaged.

Cooperation with other departments and external experts

Interdisciplinary cooperation between urban planners, green space planners, infrastructure planners and others is a critical aspect of UGI planning and an especially important success factor for green-grey integration approaches, where the complexity involved cannot be effectively addressed by a single discipline alone (↖Integration). In Berlin, an informal planning strategy illustrating a vision through visually-engaging graphics and collages has promoted cooperation with other departments, because the plan content was presented in an unusual and easily accessible way (↖Box E6 Berlin). Elsewhere, there is evidence that collaboration between planners social workers may be a productive avenue (↖Box C6 Berlin, ↖Social cohesion).

Networking, forming partnerships between different departments and sectors and integrating (external) experts early-on can also be especially helpful for developing UGI strategies at the city level. Effective local responses require knowledge of the context and potential paths forward as well as motivated actors to implement actions. Universities and other scientific institutions can also play a role in providing the relevant knowledge and measures (↖Box A1 Almada, A2 Helsinki, and B1 Szeged).

Staff from various departments in the City of Malmö discuss UGI strategies for Malmö's peri-urban farmland with a GREEN SURGE researcher and other external experts.
Credit: Anders Mårsén

IMPLEMENTATION

Take action and monitor impacts

Making the leap from paper to practice is a challenge for any policy or plan. A range of tools are available to help implement UGI planning (e.g., ⇱Toolbox T7 to increase participation), but a key question is usually how to get the resources.

KEY MESSAGES

Create a framework for regular monitoring of UGI resources.

Start with pilot projects in order to adapt strategies and build public and political support.

Unlock additional resources by collaborating, pooling knowledge and accessing external funding.

Collaboration and sharing knowledge can be an effective way to better deal with resource constraints. This includes, in particular, collaboration at the expert level and pooling knowledge from various partners (⇱Engaging stakeholders). In addition, the involvement of citizens can help planning to better correspond to local needs and to target investments more efficiently (⇱Assessing UGI networks).

Learning by doing

Pilot projects have been shown to be an effective means of testing new approaches. They can encourage similar initiatives and convince decision-makers that an idea is worth pursuing. A pilot project focusing on a key issue or objective of broad relevance can help to gain interest and support across different departments (⇱Box E1 Malmö). Learning from these examples can also help to adjust and refine a planning strategy before it is expanded to other areas.

Unlock alternative resources

GREEN SURGE research found external funding to be a major factor for supporting UGI (see Deliverable 5.1). Access to European and national funding programmes is very important for implementing innovative strategies on larger scales and testing new approaches that require time and (human) resources. However, funds from developers or other private actors can also support implementation (⇱Box B3 Berlin, C7 Lodz), provided there is a framework to ensure that private profit is not prioritised over the public interest, and benefits distributed equally (⇱Green Economy). Importantly, resources are not only monetary! Volunteerism and citizens' knowledge count among the resources that local governments can harness to get things done (⇱Box C8 Ljubljana).

BOX C7: A PPP FOR GREEN SPACE RENEWAL

Lisciasta Park Residence is a housing complex in the north of Lodz, Poland, and bordered by green spaces to the south and east – including a park, the Sokolowka stream and several reservoirs. In 2006, the City Office rehabilitated the stream and created the Teresa Reservoir, but there were no funds to improve the surrounding green spaces.

When the Residence was constructed soon after (2010-2013), a Public-Private-Partnership was arranged between the developer and the municipality. The developer cleaned and rehabilitated the adjacent land; partly as mandatory compensation for their removal of local trees, and partly to maximise the positive influence of the green surroundings on prospective sales. The rehabilitated green space remains in public ownership and management, and the City Office hopes to enable similar private investment in improving green space.

Liciasta Park Residence and its regenerated green spaces, Lodz.
Credit: Budomal

CONCLUSION

D

This guide has outlined the fundamentals for planning and developing urban green infrastructure – whether it be to kickstart a new UGI planning strategy in your city, or to improve an existing approach. Ultimately, it provides a framework for getting started, with insights from case studies throughout Europe. More specific practical tools and guidance are available in the ⇱Toolbox section.

Priorities for local UGI planning

Before developing a UGI planning strategy, local priorities need to be defined. Such priorities are often driven by widely-recognised urban challenges. Hence, these challenges may present windows of opportunity for UGI planning to play a greater role in urban development and decision-making overall. In this guide, four key urban challenges have been examined for their relevance to UGI planning: climate change adaptation, biodiversity protection, promoting a green economy and increasing social cohesion. While these are growing in importance, they are not the only ones that cities face. You may identify others that are more pressing for your local community – a declining manufacturing sector, for instance, or rising public healthcare costs.

Bringing things together – a holistic approach to UGI planning

The underlying principles and practical guidance offered here need to be understood as part of a holistic approach – one that will need to be adapted to suit your local context: the planning system, social, economic and environmental conditions, as well as the available actors. In addition, successfully planning UGI requires a strategic approach. Once clear priorities and objectives are established, the linkages, synergies and potential conflicts between these should be taken into account.

Importantly, the four UGI principles are fundamentally inter-linked. For instance, improving connectivity within a green network can increase the provision of ecosystem services, which in turn enhances multifunctionality. Solutions for green-grey integration likewise provide multiple benefits beyond the mono-functionality of conventional solutions for transport routes and stormwater disposal. In parallel to these three principles, it is essential to involve different groups in UGI planning in order to ensure equitable recognition of their needs and distribution of benefits – in other words, to incorporate the principle of social inclusion.

The city of Essen in the Ruhr district was the European Green Capital in 2017. It has built up a network of green and blue corridors and high quality parks, such as Krupp Park.
Credit: Johannes Kassenberg

REFLECTING ON UGI PLANNING IN YOUR CITY

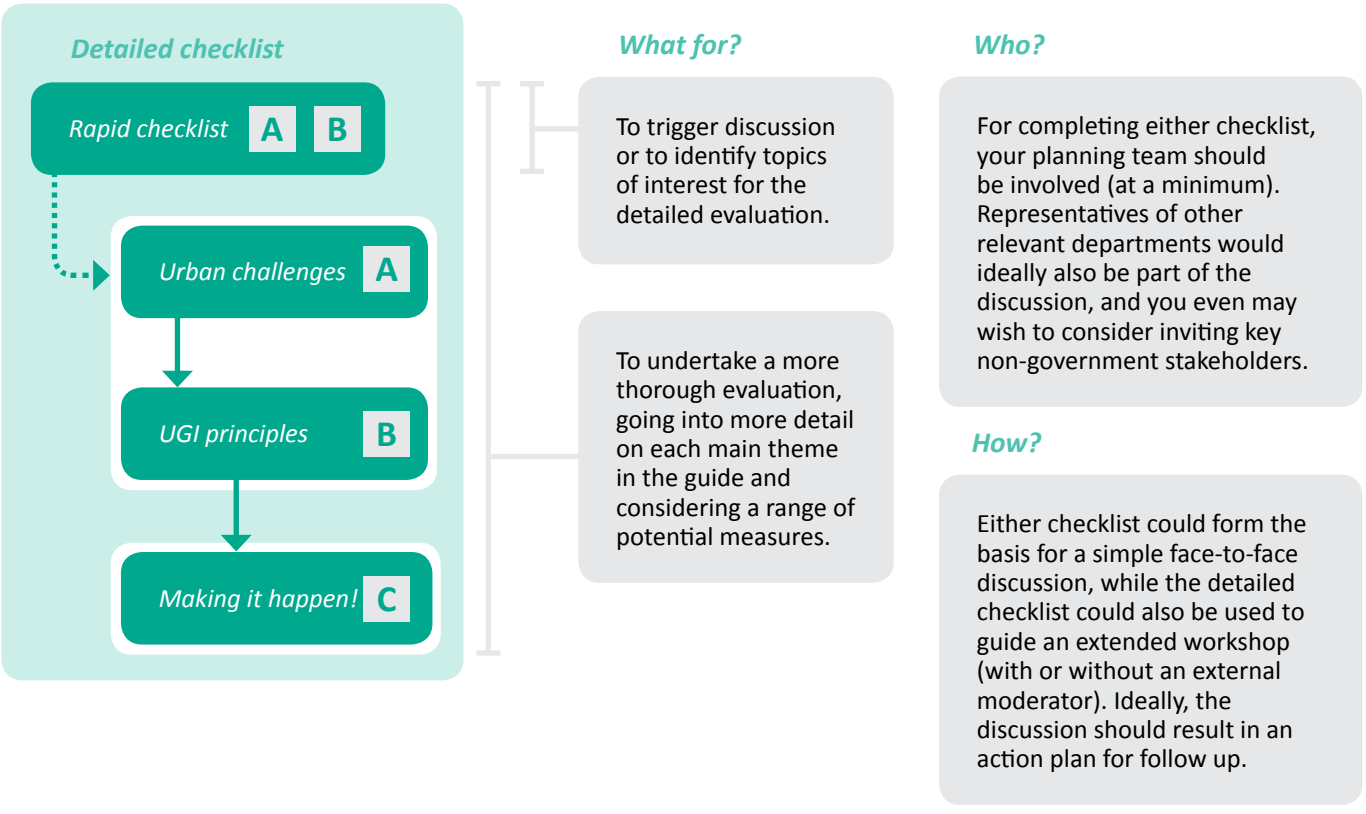
To help you evaluate your current planning approaches and to identify priorities and action steps for implementing UGI planning, we have prepared two evaluation checklists – one rapid, and one detailed (see illustration below for how they work).

Both checklists are tailored to strategic planning at the city-level (such as green space plans or open space plans), but they might also provide insights for regional planning or local, site-specific projects. The aim is to identify the potential to advance or update existing practices, plans and policies by adopting the UGI planning approach (e.g., Are there gaps to be filled? Are action steps required? Do additional stakeholders need to be involved?).

The suggested measures listed in the detailed checklist are the result of research conducted throughout GREEN SURGE, including a literature review of identified urban challenges and core UGI planning principles, as well as experiences from cities across Europe that have been studied in-depth (see Deliverable 5.2). The listed measures include planning objectives and actions that could be included in a strategic plan; as well as ideas for initiatives, regulatory and financial instruments, and participatory engagement policies that require broader action. This is neither an exhaustive list, nor one that will necessarily suit every situation. For each measure, consider its relevance and adequacy for the given context in your city. Either evaluation can be undertaken for:

1. ***Existing plans, strategies and policies relevant to urban green space planning, in order to identify gaps and potential for improvement;***
2. ***Plans, strategies and policies that are in an early stage of development, in order to identify specific needs and priorities for action.***

Both evaluations begin with the one-page rapid checklist.



RAPID UGI PLANNING CHECKLIST

☑ Tick this box if an item has already been considered in your plan

☒ Cross this box if action is needed

↗ Cross-link to related evaluation areas (if an area is identified as a priority)

HINT: For those items with crosses in the right-hand box, you might be interested in going to the corresponding section in the detailed checklist to review this area in more depth.

A URBAN CHALLENGES

UGI planning can help to tackle important urban challenges, such as climate change adaptation, biodiversity protection, a green economy, social cohesion, and others.

	Does your plan (existing or in development) include activities and measures to...	☑ ☒
CLIMATE CHANGE	... adapt to the adverse effects of **climate change**, for instance by assessing vulnerabilities, taking appropriate action to prevent or minimise damage, and seizing opportunities that may arise (e.g. low-/no-regret solutions)?	☐ ☐ *Go to A.1*
BIODIVERSITY	... protect local **biodiversity**, offer nature experience opportunities for citizens, and raise awareness for the benefits of species-rich environments?	☐ ☐ *Go to A.2*
GREEN ECONOMY	... contribute to a **green economy** that aims to improve human well-being and social equity while reducing environmental risks and depletion of natural resources? This involves considering the direct and indirect economic benefits of urban green spaces.	☐ ☐ *Go to A.3*
SOCIAL COHESION	...provide equal opportunities for people from different backgrounds to access and benefit from urban green spaces and to promote social interactions among them, in the interest of greater **social cohesion**?	☐ ☐ *Go to A.4*
???	In your local context, are there additional pressing challenges? Please make a note of them and discuss ways they might be tackled through UGI planning.	☐ ☐

B UGI PLANNING PRINCIPLES

UGI planning is an approach based on the core principles of green-grey integration, connectivity, multifunctionality and social inclusion.

	Does your plan (existing or in development) include activities and measures to...	☑ ☒
INTEGRATION	...**integrate** urban green spaces with 'grey' infrastructure (e.g. roads, canals, drainage systems) and to promote combined green-grey infrastructure in ways that provide more benefits than traditional engineering approaches?	☐ ☐ *Go to B.1*
CONNECTIVITY	...**connect** different green spaces in order to enhance recreation, mobility by bike and on foot, biodiversity and natural ventilation, ideally by combining different goals for humans, other species and abiotic flows?	☐ ☐ *Go to B.2*
MULTIFUNCTIONALITY	...support the capacity of urban green spaces to provide **multiple** ecological, socio-cultural and economic benefits, combining functions and services in ways that create synergies and reduce conflicts and trade-offs between them?	☐ ☐ *Go to B.3*
SOCIAL INCLUSION	...facilitate collaborative, **socially inclusive** planning processes that are open to all and incorporate the knowledge and needs of diverse parties, with emphasis on vulnerable social groups?	☐ ☐ *Go to B.4*

DETAILED UGI PLANNING CHECKLIST

☑ Tick this box if an item has already been considered in your plan

☒ Cross this box if action is needed

↗ Cross-link to related evaluation areas (if an area is identified as a priority)

HINT: Use the space next to each section to note down priorities, other ideas, or specific steps for action. When thinking about what's appropriate for your local context, make sure you consider the full spectrum of types of green (and blue) spaces that make up UGI (e.g., urban farmland, schoolgrounds, railroad embankments, green walls, green roofs and abandoned areas – see Guide Part A: Green Space Typology).

A URBAN CHALLENGES

		☑	☒ Notes (priorities/ideas/actions)
A1	**Climate change adaptation: Specific activities and measures may include:**		
A1.1	Assessing the potential impacts of different climate change effects, including identification of vulnerable areas or groups (e.g., people living in flood-prone, densely built or socio-economically disadvantaged areas).	☐	☐
A1.2	Reducing the urban heat island effect in dense areas (e.g., requiring or incentivising street trees, green walls and green roofs, requiring minimum green space amounts in developments).	☐	☐
A1.3	Providing climate refuges for vulnerable resident populations in high density areas (e.g. shaded areas and/or areas with water features)	☐	☐
A1.4	Measures to prevent and minimise damage such as protecting and restoring floodplains, wetlands and coastal landforms	☐	☐
A1.5	Decreasing the amount of impervious surface (e.g. minimum requirements, incentivising pervious or semi-pervious surfaces).	☐	☐
A1.6	Developing a planting strategy composed of diverse species (with preference for heat-tolerant varieties, especially for street trees).	☐	☐
↗	*B1 Integration, C1 Assessing UGI networks, C3 Engaging stakeholders*		
A2	**Biodiversity: Specific activities and measures may include:**		
A2.1	Protecting and enhancing native species and biotopes, especially those that are ecologically significant and threatened. This may include restoring damaged valuable habitats and controlling invasive species.	☐	☐
A2.2	Establishing a well-connected, citywide and diverse biotope/habitat network.	☐	☐
A2.3	Creating areas of low intensity management where nature can 'run wild' and species can establish themselves spontaneously, or protecting existing sites (e.g., brownfields with high quality habitats).	☐	☐
A2.4	Promoting biodiversity in ornamental and constructed green spaces, e.g., parks, green roofs, and street green (e.g., by increasing structural diversity, planting native species, allowing for succession, and planting pollination-friendly plants).	☐	☐
A2.5	Providing guidance and/or incentives to business- and homeowners to support biodiversity on their properties (for measures see prior point).	☐	☐
A2.6	Educating the public on the importance of biodiversity and ways to protect it, as well as opportunities available to them to experience nature.	☐	☐
↗	*B2 Connectivity, B3 Multifunctionality, C2 Developing plans*		

A	URBAN CHALLENGES	☑	☒	Notes (priorities/ideas/actions)
A3	**Promoting a green economy: Specific activities and measures may include:**			
A3.1	Assessing the value of the **benefits** and **avoided costs** green spaces can provide (e.g., reduced asthma and respiratory disease rates, avoided damage from flooding and other natural events).	☐	☐	
A3.2	Engaging the **private sector** in financing UGI (e.g. public-private partnerships, regulatory instruments, taxes, user-pays and compensation schemes, business improvement districts).	☐	☐	
A3.3	Collaborating with **volunteers** for green space **development** and **maintenance** (e.g., through time banks, reward schemes, non-profit partnering).	☐	☐	
A3.4	Promoting green space as an asset in city marketing and economic development initiatives.	☐	☐	
↗	*B4 Social inclusion, C3 Engaging stakeholders, C4 Implementation*			
A4	**Increasing social cohesion: Specific activities and measures may include:**			
A4.1	Assessing or creating standards for **equitable** green space **accessibility** (e.g., providing parks within a 15 minute walk of all residents analysing public transit links to popular parks).	☐	☐	
A4.2	Ensuring the **quality and safety** of new and existing green spaces (e.g., adequate lighting, maintenance, design), as well as designing new spaces in ways that leave room for creative play and neighbourhood identity.	☐	☐	
A4.3	Promoting **community** or intercultural **gardens** as spaces where people from different backgrounds may interact.	☐	☐	
A4.4	Supporting **local NGOs and citizens' initiatives** to create and maintain green spaces.	☐	☐	
↗	*B4 Social inclusion, C3 Engaging stakeholders, C4 Implementation*			
A5	**Other challenges:**			

B	UGI PRINCIPLES	☑	☒	Notes (priorities/ideas/actions)
B1	**Integration: Specific activities and measures may include:**			
B1.1	Linking green spaces with **stormwater infrastructure** to improve water quality and reduce pressure on stormwater systems (e.g., incentives or standards for decentralised water retention and drainage through rain gardens, swales, green roofs, constructed wetlands and permeable pavement; centralised solutions like bioretention basins; regional cooperation for vegetated river buffers and wetland protection).	☐	☐	
B1.2	Linking green spaces with **transport infrastructure** to improve air quality, mitigate noise and provide safe opportunities for walking and biking and/or species movement (e.g., vegetation to house species and trap pollutants and noise along transport corridors; installing bike paths in green corridors).	☐	☐	
B1.3	Linking green infrastructure with **energy and communications infrastructure** to maximise design and construction efficiencies and encourage walking, biking, species movement, aesthetic appearance and educational opportunities (e.g., bike paths along powerline corridors, promoting native vegetation, installing nature interpretation signage).	☐	☐	
B1.4	Linking green infrastructure with **buildings** to maximise recreation opportunities in residential, institutional and commercial areas (e.g., through minimum requirements or incentives for green courtyards or accessible green roofs).	☐	☐	
↗	*B3 Multifunctionality, C3 Engaging stakeholders, C4 Implementation*			
B2	**Connectivity: Specific activities and measures may include:**			
B2.1	Developing and preserving a **city-wide** and **regionally-linked** green network that promotes synergies between recreation, mobility, cultural heritage, wildlife, local climate and the built environment.	☐	☐	
B2.2	Developing and maintaining a **well-connected, safe** bike and pedestrian network (e.g., working to fill in missing segments of key corridors, producing a bike map) and ensuring **public accessibility** to both local parks and key recreational areas (e.g., instituting minimum requirements for park access, ensuring adequate access points at key parks).	☐	☐	
B2.3	Developing and conserving a **habitat network** to support the **movement of species** (including identifying critical habitats and corridors as well as barriers or bottlenecks) and ensuring that quality habitats for flora and fauna are **well-distributed** throughout the city, based on sound ecological knowledge (e.g., key species, habitat preferences, seed dispersal, adaptation capabilities and movement patterns).	☐	☐	
B2.4	Developing green corridors and 'perforated' green space (e.g. areas of dispersed vegetation) capable of improving **natural ventilation** as well as **flood control** in vulnerable areas.	☐	☐	
↗	*A2 Biodiversity, B1 Integration, C1 Developing plans*			

B	UGI PRINCIPLES	☑	☒	Notes (priorities/ideas/actions)
B3	**Multifunctionality: Specific activities and measures may include:**			
B3.1	**Assessing** the various **ecological, social** and **economic** benefits of urban green spaces and **communicating** these to policy-makers and the public.	☐	☐	
B3.2	Assessing the **demand** for green spaces across the city and their **capacity** to provide services, now and in the long term.	☐	☐	
B3.3	Developing strategic plans that highlight UGI's diversity of functions and services city-wide, including **socio-cultural** (e.g., nature contemplation, social interaction, sports and play), **biodiversity** (e.g., habitats for rare species, wilderness), **regulating** (e.g., temperature regulation, flood control) or **provisioning** (e.g., agricultural products, fresh water, wood).	☐	☐	
B3.4	At the site level, developing green spaces in ways that **create synergies** between different functions and services and **reduce conflicts** (e.g., through visitor management and guidance or spatial separation of conflicting uses).	☐	☐	
↗	*C3 Engaging stakeholders, C2 Assessing UGI networks*			
B4	**Social inclusion: Specific activities and measures may include:**			
B4.1	Actively including citizens in plan **development** and **implementation** (e.g., through visioning forums, questionnaires, charrettes and citizens' juries).	☐	☐	
B4.2	**Mobilising** and including the views of populations not usually active in planning (e.g., people with disabilities and the elderly, children and adolescents, immigrants, low-income and homeless people) by applying **participation methods** oriented towards these groups (e.g., Photo-voice).	☐	☐	
B4.3	**Delegating responsibility** to citizens (e.g., by supporting participatory budgeting, citizens' urban gardening initiatives, volunteer maintenance schemes or other forms of civic engagement for UGI).	☐	☐	
↗	*C3 Engaging stakeholders, A4 Social cohesion*			

C EMBEDDING UGI IN PLANNING

To successfully embed UGI in the planning process, a number of factors have been shown to be important. These include systematic assessment, strategic planning and coordinating different plans, cooperating with a range of stakeholders, and finding the means for implementation and maintenance.

		☑	☒	Notes (priorities/ideas/actions)
C1	**Assessing UGI networks: Specific activities and measures to expand knowledge base and support for UGI and inform decision-making may include:**			
C1.1	Conducting a **comprehensive assessment** of existing green spaces of all types (i.e., also private and underutilised sites like brownfields and railways) in order to better understand the **deficits and potential** of your UGI network (e.g., quantity, quality, distribution, access, supply of benefits and citizen demand).	☐	☐	
C1.2	Identifying existing areas that need to be **conserved or improved** and the need for **new** UGI elements and corridors between them.	☐	☐	
C1.3	Using **integrated methods** to assess not just UGI'S monetary value, but its social and ecological value too, where appropriate.	☐	☐	
C1.4	Framing assessments in terms of **challenges** to be tackled (e.g., vulnerability to the impacts of climate change, habitats that are threatened) and demonstrating potential **cost-savings** (e.g., by conducting a cost-benefit analysis).	☐	☐	
C1.5	Illustrating UGI benefits in a format that is attractive and easy to understand for non-experts (local politicians, decision-makers, and the general public) in order to raise **awareness** and gain **support**.	☐	☐	
C2	**Developing plans: Specific activities and measures to strategically support UGI with available planning instruments may include:**			
C2.1	Developing a strategic plan with a l**ong-term vision** for UGI development and conservation, including **regular updates** to monitor progress and respond to changing conditions.	☐	☐	
C2.2	Considering measures which are **'no-regret'** or **'low-regret'** (i.e., designed to increase robustness at low costs or to compensate for extra costs through added benefits).	☐	☐	
C2.3	Getting plan support: through **mandates** (e.g., global or national policies that support the plan and its objectives), by linking it to locally important **challenges** (such as climate change) and/or collaborating with strong **advocates** (e.g., politicians, environmental NGOs).	☐	☐	
C2.4	Developing a **coordinated** UGI strategy by considering the full spectrum of available planning **instruments** (e.g., formal and informal), and their strengths and weaknesses, as well as a range of **implementation mechanisms** (e.g., funding programmes, regulations, pilot projects to demonstrate new approaches, initiatives to support non-state actor involvement).	☐	☐	
C2.5	**Linking** the UGI plan with those of other departments/sectors and those at other levels (e.g., at the city and regional levels), aiming at **synergies** (e.g., with the aid of cross-sectoral working groups or coordinated, simultaneous development of different plans).	☐	☐	

C	EMBEDDING UGI IN PLANNING	☑	☒	Notes (priorities/ideas/actions)
C3	**Engaging stakeholders: Specific activities and measures to involve a variety of actors in inclusive UGI development may include:**			
C3.1	Identifying relevant **actors** (e.g., staff in other departments, external experts, universities, businesses and civil society) that are not yet engaged in UGI development, and finding **meaningful ways to engage them** (e.g., by networking, by directly reaching out to them, or by developing incentives for their involvement).	☐	☐	
C3.2	**Cooperating** with other departments and external experts and maintaining **interdisciplinary networks** (e.g., identification of shared topics or objectives related to UGI across departments, sharing and exchanging knowledge from different fields of expertise and aiming at shared UGI solutions).	☐	☐	
C3.3	Collaborating with non-governmental stakeholders, e.g. by supporting **co-governance** arrangements in the management of bottom-up initiatives (e.g., community gardens), and **fostering** the required **skills and frameworks** for coordinating such arrangements within or outside the administration (e.g., taking on a supervising, moderating or facilitating role, as well as establishing contract agreements and access rights).	☐	☐	
C4	**Implementation: Specific activities and measures to aid the implementation of UGI plans and projects may include:**			
C4.1	Using **pilot projects** to test novel approaches in cooperation with relevant partners (e.g., engineering, building design, water management, parks and recreation). Results should be evaluated to enable such strategies to be refined before application on a larger scale.	☐	☐	
C4.2	Exploring additional **resources**, including European or national funding programmes, funds from private actors (e.g., Public-Private-Partnerships, compensation schemes and other regulatory instruments), joint projects with other departments or non-financial support through voluntary work and local knowledge.	☐	☐	
C4.3	**Monitoring** to document improvements in the city's UGI and progress towards planning and performance targets, with provision to adjust strategies if progress is not adequate.	☐	☐	

WHAT NOW?

We hope this checklist has helped you to reflect on your plan and how to incorporate elements of UGI planning into it, as well as to identify some potential measures for action. If you have too many areas where action is needed, think about reducing them to the five most urgent or most promising ones. To help build a coherent UGI strategy, we invite you to visit (or revisit) these areas of our Practitioners' Guide:

- ***Core planning instruments, their potential, and interrelations between them (see Guide Part C);***
- ***Green space types within your city and their (potential) contribution to a multifunctional and connected UGI network (see Guide Part A: Green Space Typology);***
- ***Tools to assess the current state of your city's UGI (see Guide Part C: Assessing UGI networks and related Toolboxes);***
- ***Potentially helpful partners and supporters in and outside your organisation (see Guide Part C: Engaging stakeholders);***
- ***Implementation mechanisms, including resources you need and ways to obtain them (see Guide Part C: Implementation and Toolbox T8), as well as;***
- ***Barriers that you need to overcome (see case studies throughout Guide, and at Part E).***

TOOLBOX

T1: Tools for Protecting Biodiversity
T2: Tools for Promoting a Green Economy
T3: Tools for Increasing Social Cohesion
T4: Tools for Green-Grey Integration
T5: Tools for Connectivity
T6: Tools for Multifunctionality
T7: Tools for Social Inclusion
T8: Funding Tools and Mechanisms

T1: TOOLS FOR PROTECTING BIODIVERSITY

METHOD/ TOOL	WHAT FOR?	SCORING SYSTEM	FIND OUT MORE
City Biodiversity Index (CBI)	Also known as the Singapore Index on Cities' Biodiversity, the CBI is a tool designed for cities to monitor and evaluate their progress and performance on conserving and enhancing biodiversity and ecosystem services. Suitable for: city-wide scale	CBI includes 23 indicators divided into 1) native biodiversity, 2) ecosystem services, and 3) governance and management of biodiversity. For each indicator, the CBI manual proposes a score of 0-4 points, where 0 corresponds to poor performance and 4 to excellent.	**CBI website**
Wildlife Friendly Development Certification programme	Programme designed for use prior to a new development project, to initiate an early dialogue between developers and biologists and to identify important natural resources. Projects are evaluated using criteria which allocate points during the design, construction and post-construction phases. Suitable for: neighbourhood/site scale	The scoring criteria are divided between two sections: 1) Development Conservation Design, and 2) Development Construction and Post-Construction, which the applicant uses to assess progress towards certification and make any adjustments to the project necessary. If an applicant earns less than 50% of the applicable points from each section, the certification process cannot continue.	**Wildlife Friendly Development Certification website**
Biotope Area Factor, Berlin (BAF)	The BAF provides minimum ecological standards for new development and alterations or additions on a site. It considers protection of ecosystems, biotopes and species as well as landscape appearance and recreational use. Suitable for: site scale in built-up areas	The BAF is the area of a site that hosts species or performs other ecosystem functions, expressed as a ratio in relation to the total site area. BAF values can be used to define a minimum standard to be achieved when a site is redeveloped.	**BAF description, on the Berlin Senate Department for Environment, Transportation and Climate Protection website**

T2: TOOLS FOR PROMOTING A GREEN ECONOMY

METHOD/ TOOL	WHAT FOR?	FIND OUT MORE
Business mapping in and around urban green spaces	Method to map and analyse the kind of businesses located in and around green spaces. Data on businesses and their addresses is relatively easily accessible, e.g. from OpenStreetMap (OSM). The user needs to select a buffer zone – indicating a certain range of proximity to a green space within which a relationship is expected.	**Cash flows generated by urban green spaces: methods for identifying indirect values of UGI.** GREEN SURGE Deliverable 4.2. Andersson, E., Kronenberg, J. et al., 2015. pp18-19 and pp26-27.
Identification of R&D offices and other creative companies	Method to examine where companies in the creative industries, and/or those engaged in research and development (R&D), are located relative to urban green spaces.	**Cash flows generated by urban green spaces: methods for identifying indirect values of UGI.** pp22-21.
Hedonic pricing	Method to assign value to non-market components of real estate sales or rental prices. A model is used to calculate the impacts of different variables on property sales or rental prices, usually including structural, geographic and environmental attributes of these properties and their surroundings. The latter ones are most often associated with distances to different types of urban green spaces.	**Cash flows generated by urban green spaces: methods for identifying indirect values of UGI.** pp29-30.
InVEST	Open source software to map and assess the monetary value of ecosystem services. Results can also be non-monetary (e.g., tonnes of carbon sequestered).	**InVEST website**
i-Tree	Software package from the USDA Forest Service that provides urban forestry analysis and benefits assessment tools.	**i-Tree website**

T3: TOOLS FOR INCREASING SOCIAL COHESION

METHOD/ TOOL	WHAT FOR?	FIND OUT MORE
Accessible Natural Greenspace Standard (ANGSt)	Sets benchmarks for the accessibility of green space (e.g., maximum distance to parks and area of parks or woodlands per capita).	**Nature Nearby. Accessible Natural Greenspace Guidance.** Natural England, 2010.
URGE criteria and indicators for social assessments of urban green spaces	Completed EU project to develop green spaces in the interest of improving the quality of life in cities and urban regions. Among its outputs is a catalogue containing criteria, indicators and suggested methodologies for use in assessing the social aspects of urban green spaces.	**Social Criteria for the Evaluation and Development of Urban Green Spaces.** Coles, R., Caserio, M., 2001.
Public Benefits Recording System (PBRS)	Tool for strategic planning and investment that aims to identify synergies between social, economic and environmental needs and opportunities, using GIS software.	**PBRS Website** Example Report: **Lancashire Green Infrastructure Strategy. Public Benefit Assessment. Project Report.** PBRS, 2008.
Social Cohesion Radar	Measures a country's social cohesion based on three domains (social relations, connectedness, and focus on the common good) and nine dimensions.	**Project summary** **Social Cohesion Radar. Measuring Common Ground. An International Comparison of Social Cohesion.** Bertelsmann Stiftung (Ed.), 2013.
Social Cohesion Policy News	Review system to measure the state of social cohesion in a country (based on indicators in three dimensions: social inclusion, social mobility, social capital) and to identify policies that can strengthen or improve social cohesion.	**OECD social cohesion policy reviews. Concept Note.** OECD, 2014.

T4: TOOLS FOR GREEN-GREY-INTEGRATION

METHOD/ TOOL	WHAT FOR?	FIND OUT MORE
Minnesota Stormwater Manual	This online source provides a comprensive overview of popular stormwater modelling software to assist with selecting the right one for your purposes. A selection of possible tools is outlined below.	**Minnesota Stormwater Manual website**
SUSTAIN - Systems for Urban Stormwater Treatment and Analysis Integration	Decision support tool evaluating optimal location, type and cost of the stormwater management practices needed to meet water quantity and quality goals. Note that EPA support for newer versions of SUSTAIN for later version of Windows or ArcGIS has ended.	**SUSTAIN website**
RECARGA	Design tool developed by the Wisconsin Department of Natural Resources for performance evaluation of bio retention facilities, rain gardens and infiltration basins.	**RECARGA website**
P8 - Program for Predicting Polluting Particle Passage through Pits, Puddles & Ponds	Models the generation and transportation of pollutants through urban runoff and the effectiveness of green infrastructure for improving water quality.	**P8 website**
SWMM - EPA Stormwater Management Model	Supports planning, analysis and design concerning stormwater runoff, combined sewer overflows and drainage systems.	**SWMM website**
MUSIC - Model for Urban Stormwater Improvement Conceptualisation	Models stormwater system performance to assist in selecting an appropriate strategy.	**MUSIC website**
WinSLAMM - Source Loading and Management Model for Windows	Evaluates stormwater pollution and runoff volume at the area where runoff is generated and the effectiveness of a range of control measures, including infiltration/ biofiltration basins, street cleaning, wet detention ponds, grass swales, filter strips, porous pavement, catchbasins, water reuse, and various proprietary devices.	**WinSLAMM website**
i-Tree Hydro	Simulates the effect of trees and green cover on water quality. Designed to be simple enough for non-experts to use.	**i-Tree Hydro website**

T5: TOOLS FOR CONNECTIVITY

METHOD/ TOOL	WHAT FOR?	FIND OUT MORE
Corridor Design	A platform offering access to CorridorDesigner (a basic ArcGIS toolbox for creating corridor models) and links to a range of other GIS tools to model, map and assess ecological connectivity, corridors, or habitats.	**Corridor Design website**
SCALETOOL	Part of the SCALES project (Securing the Conservation of biodiversity across Administrative Levels and spatial, temporal, and Ecological Scales), this is a platform offering methods and tools to assess ecological connectivity at various scales, as well as a connectivity learning module, background reading material and links to other resources online. Also useful for assessing and monitoring biodiversity.	**SCALETOOL website**
Corridor Toolbox	The Connectivity Conservation Specialist Group offers a toolbox including links to software, technical papers and web resources useful for ecological connectivity.	**Corridor Toolbox, on the Connectivity Conservation Specialist Group website**
Green Walkable City Plan	Stockholm's Green Walkable City Plan (Den gröna promenadstaden) has a particular focus on connecting residents to green (and blue) areas, with identified focus areas and defined strategies, as part of the comprehensive city plan 'The Walkable City: Stockholm City Plan'. An English summary of the comprehensive plan and an article describing the Green Walkable City Plan are available online.	**Stockholm City Plan website** (English summary) **The Walkable City: Stockholm City Plan, 2010.** (in English) **Green Walkable City Plan, 2013** (in Swedish) **Planning the Green Walkable City: Conceptualizing Values and Conflicts for Urban Green Space Strategies in Stockholm.** Littke, H., 2015.
Accessible Natural Greenspace Standard (ANGSt)	Sets benchmarks for the social accessibility and connectivity of green space (e.g., maximum distance to parks and area of parks or woodlands per capita). Also useful as part of evaluating a community's social cohesion.	**'Nature Nearby' Accessible Natural Greenspace Guidance.** Natural England, 2010.

T6: TOOLS FOR MULTIFUNCTIONALITY

METHOD/ TOOL	WHAT FOR?	FIND OUT MORE
GreenKeys@YourCity – A Guide for Urban Green Quality	Manual, toolbox and e-learning module published by the IOER Leibniz Institute of Ecological and Regional Development, Dresden. See in particular monitoring and project evaluation tools.	**GreenKeys website.** Green Keys Team, 2008.
Green Flag Award	Benchmark standard for parks and green spaces in the UK. It is based on 27 criteria across eight categories, including, among others, benefits for humans, sustainability, and conservation of biodiversity and heritage. The diversity of the criteria promotes a multifunctional approach to assessing the capacity of green spaces. Applicants are required to demonstrate their understanding of the site's users, the site itself and its special characteristics (whether historical, social or physical), and their long-term management strategies.	**Green Flag Award website**
The Mersey Forest Multifunctionality GIS mapping	A GIS mapping approach developed by a UK-based network of woodlands and green spaces. The methodology includes assessing data needs and acquiring data, ahead of mapping green infrastructure, its various functions and benefits, and associated needs. It is designed to be adaptable to a range of different projects and scales.	**The Value of Mapping Green Infrastructure.** The Mersey Forest, 2011.

T7: TOOLS FOR SOCIAL INCLUSION

METHOD/ TOOL	WHAT FOR?	FIND OUT MORE
TOOLS FOR ASSESSMENT AND VALUATION		
Stakeholder Analysis	Method to ensure that relevant stakeholders are contacted in an action-planning project.	**The URBACT II Local Support Group Toolkit**, p64-65.
Importance/ Influence Matrix	Method to prioritise stakeholders, as well as to think about the right approach to take with each of them. Often used in combination with a stakeholder analysis.	**The URBACT II Local Support Group Toolkit**, p66-67.
TOOLS FOR PARTICIPATING IN PLANNING		
Forestry Commission public engagement toolbox	Resources and guidance for fostering public participation in planning, prepared by the UK-based Forestry Commission. The toolbox is aimed at managers of forests and woodlands, but also useful for other practitioners involved in green space planning and management.	**Public engagement toolbox on the Forestry Commission website**
Community planning methods	The community planning website provides an A to Z of possible methods to employ for greater social inclusion in the planning process. Selected options are outlined below.	**Community Planning website**
Charette or 'inquiry by design' workshop	A workshop where stakeholders come together to identify issues, deliberate about preferred outcomes and create plans for the future.	**Engaging Communities Toolkit.** West Lothian Community Planning Partnership, 2015, p15.
Citizens' juries	A group of citizens is selected, based on special criteria, as a representative cross-section of a wider community. Much like a jury in a legal context, they are required to meet as a group, receive information, deliberate together and ultimately make recommendations about an issue of public importance.	**Active Democracy website**
Photovoice	Cameras are provided to community members to identify and record their community's situation and experiences through photography. The emphasis on visual objects makes it easier for populations without strong command of the local language to participate.	**Community Toolbox website: Implementing Photovoice in Your Community**
Participatory Budgeting	City residents are given the chance to decide how to spend part of a municipal budget. Besides increasing transparency and educating citizens about the costs of public management, this can increase engagement and empowerment.	**Participatory Budgeting Project website**
Neighbourhood Green Plans	Communities work together on developing projects and/ or plans for more livable neighbourhoods. Examples range from more traditional, top-down approaches with strong community involvement to completely community-led initiatives which then go for city council approval.	**How to resource your neighbourhood plan.** Planning Aid. **A Guide for Developing Neighbourhood Plans (Neighbourhoods Alive!).** Manitoba Government, 2002.
PPGIS	**For flexible mapping:** options include Wikimapping (free), ArcGIS Story Map Crowdsource℠ app (license-based) and Maptionnaire (paid subscription). **For citizens' requests and complaints:** options include Fix My Street and Improve My City (both free).	**Wikimapping** **ArcGIS Story Map Crowdsource℠** **Maptionnaire** **Fix My Street** **Improve My City**

T8: FUNDING TOOLS AND MECHANISMS

METHOD/ TOOL	WHAT FOR?	FIND OUT MORE
Business use of public spaces	Businesses pay a fee for the right to use public green space for commercial profit, such as for running a park café (e.g., in the form of a lease or licence).	Example: **Business Use of Public Spaces.** Randwick City Council, Australia.
Business improvement districts (BIDs)	Business-led partnerships that manage privately-owned areas. They are based on a majority of businesses (either land owners or tenants) agreeing to pay a member contribution. Related greening initiatives can serve the public good but are primarily motivated by increased value return to owners and investors, and should be deployed with caution, as they may grant exclusionary rights to these parties.	Example: **Green benefits in Victoria business improvement district.** Rogers et al., 2012.
Compensation schemes	Such schemes include requiring private land owners to compensate for any impact on public goods caused by their activities (such as Biodiversity Offsets), or offering alternative plots of land or financial compensation in exchange for their land if they do not intend to manage it in line with local authorities' requirements.	Example: **Biodiversity Offsets.** UNDP 2016.
Rain tax	Paid by a land owner based on the volume of surface runoff from their property.	**Wastewater taxes.** ECOTEC 2001.
Payments for ecosystem services (PES)	Financial incentive where ecosystem services (ESS) are purchased from ESS providers to ensure ecosystems are managed in a way that maximises the delivery of a particular service.	**Payments for ecosystem services.** UNEP 2008.
Public-private-partnerships (PPP)	Local authorities have the option of providing incentives to enhance collaboration with the private sector and enable more flexible conditions for investment. A win-win-situation for both partners is key to a successful PPP.	Example: ↖Box C7 Lodz.
Competitions, award schemes	Local, regional, national, and international governments or organisations may organise these to encourage investment in UGI.	Examples: **European Green Capital Award** **Green Flag Award**
Charity events and activities (e.g. funruns)	Undertaken by non-profit organisations such as 'friends of parks' groups.	Example: **Glasgow City Council. Friends of Glasgow Parks.**
Sponsorship	Companies, communities or individuals may 'adopt' trees or green spaces.	Example: **Million Trees NYC.**
Green bonds	Fixed-income investors provide funds to support bank loans for eligible projects, e.g., those seeking to mitigate climate change or to help affected communities adapt to it. For instance, the Green Infrastructure Investment Coalition (GIIC) brings together investors, governments, green infrastructure developers and development banks to help increase the flow of capital to green infrastructure around the world.	Example: **Green Infrastructure Investment Coalition**