



GREEN SURGE

Report

GREEN SURGE FINAL PROJECT REPORT

January 2018

*Work package:
Partners involved:*

All
All

GREEN SURGE final project report



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1 LIST OF BENEFICIARIES

No.	Participant name (and short name)	Country	Organisation type
1	University of Copenhagen (UCPH)	Denmark	Research Organisation
2	University of Helsinki (UH)	Finland	Research Organisation
3	Humboldt University of Berlin (UBER)	Germany	Research Organisation
4	Technical University of Munich (TUM)	Germany	Research Organisation
5	University of Wageningen (WU)	Netherlands	Research Organisation
6	University of Stockholm SRC)	Sweden	Research Organisation
7	Forestry Commission Research Agency (FCRA)	United Kingdom	Public body
8	ICLEI European Secretariat (ICLEI)	Germany	SME
9	Metropolitan Research Institute Ltd. (MRI)	Hungary	SME
10	University of Bari Aldo Moro (UNIBA)	Italy	Research Organisation
11	Triple Me Holding BV (TE)	Netherlands	SME
12	University of Lodz (ULOD)	Poland	Research Organisation
13	Swedish University of Agricultural Sciences (SLU)	Sweden	Research Organisation
14	University of Lisbon (FFCUL)	Portugal	Not-for-profit Research Organisation
15	University of Ljubljana (UL)	Slovenia	Research Organisation
16	Technical University of Berlin (TUB)	Germany	Research Organisation
17	Institut za Trajnostni Razvoj (zavod ITR)	Slovenia	SME
18	Lavaco Podjetje za Gradbenistvo in Trgovino DOO (LAVACO)	Slovenia	SME
19	TISA DOO (TISA)	Slovenia	SME
20	Profin Service SRL (PROF)	Italy	SME
21	C-O-M-B-I-N-E Arkitekter AB (COMB)	Sweden	SME
22	Scandinavian Branding AS (SB)	Denmark	SME
23	Seebauer, Wefers und Partner GBR (SWUP)	Germany	SME
24	Eco-Metrica Limited (ECO)	United Kingdom	SME

EXECUTIVE SUMMARY (1 PAGE)

In a time of continuing urbanization, there is increasing focus on developing attractive and healthy urban environments. Green spaces, ranging from woodlands and parks to allotment gardens and green roofs, provide a range of ecosystem services that contribute to better cities.

The GREEN SURGE project set out in 2013 to identify, develop and test ways of linking green spaces, biodiversity, people and the green economy in order to meet the major urban challenges related to land use conflicts, climate change adaptation, demographic changes, and human health and wellbeing. It provided a sound evidence base for urban green infrastructure planning and implementation, exploring the potential for innovation in better linking environmental, social and economic ecosystem services with local communities.

Working from the local to the city-regional level, the project aimed to:

- 1) Develop urban green infrastructure as a planning concept for both integration and promotion of biodiversity and ecosystem services, and adapt it to local contexts.
- 2) Apply an innovative biocultural diversity perspective to develop successful governance arrangements facilitating socio-ecological integration and local engagement in planning of urban green spaces.
- 3) Explore how valuation and real market integration of biodiversity and ecosystem services could facilitate choices in favour of the development of multifunctional green spaces in urban areas.

Approaches and tools under these three interlinked objectives were developed and implemented through an integrative, iterative and transdisciplinary process. GREEN SURGE embraced a three-tiered approach of comparative European cases, synthesis of good practices, and establishment of five Urban Learning Labs, strategically selected to represent different urban situations in Europe. Urban Learning Labs were established in the cities of Bari (Italy), Berlin (Germany), Edinburgh (UK), Ljubljana (Slovenia), and Malmö (Sweden). GREEN SURGE worked within cooperative Learning Alliances, a specific type of multi-stakeholder involvement designed to enhance a process of shared learning and understanding in situations with a high degree of complexity and unpredictability. GREEN SURGE thus combined a project-wide, science-driven approach based on a common framework methodology with a bottom-up knowledge or experience-based approach at the local level.

2 SUMMARY OF PROJECT CONTEXT AND THE MAIN OBJECTIVES (MAX 4P)

2.1 Project context:

Worldwide, more than half of the population lives in cities, and this number is still rising. In Europe, more than 70% of the population is already living in urban areas. As Europe and the world continue to urbanize, challenges for sustainable development and human wellbeing will be more concentrated in cities.

Urban green space networks (including diverse kinds of green and blue spaces) are increasingly recognised as having an essential role to play in maintaining the human-nature interaction and in tackling various urban challenges. Green spaces can make substantial contributions to policy objectives for sustainable urban development, such as improving public health, protecting biodiversity, enhancing social cohesion, supporting the economy, providing opportunities for recreation, and helping cities adapt to a changing climate.

In May 2013, the European Commission published a strategy to acknowledge the key functions and services of green spaces and formulated aims to promote the use of UGI in order to mainstream it in EU policy areas. In March 2017, the European Environment Agency highlighted that urban green infrastructure is to play a key role in achieving EU policy objectives, stressing the need for improving the knowledge base supporting the implementation of the EU strategy on green infrastructure. In order to harness the full potential of urban green spaces, a carefully conceived and evidence-based approach to highlight the benefits offered by urban green and scrutinize the ways in which it is planned and governed is therefore required.

2.2 The main objectives

The overall project objectives were to **identify, develop and test ways of linking green spaces, biodiversity, people and the green economy in order to meet the major urban challenges related to land use conflicts, climate change adaptation, demographic changes, and human health and wellbeing.**

The project provided a sound evidence base for Urban Green Infrastructure (UGI) planning and implementation, exploring the potential for innovation in better linking environmental, social and economic ecosystem services with local communities.

Working from the local to the city-regional level, the project aimed to:

- 1) Develop urban green infrastructure as a planning concept for both integration and promotion of biodiversity and ecosystem services, and adapt it to local contexts.
- 2) Apply an innovative biocultural diversity perspective to develop successful governance arrangements facilitating socio-ecological integration and local engagement in planning of urban green spaces.
- 3) Explore how valuation and real market integration of biodiversity and ecosystem services could facilitate choices in favour of the development of multifunctional green spaces in urban areas.

2.3 The GREEN SURGE learning alliance and three-tier approach

Approaches and tools under these three interlinked objectives were developed and implemented through an integrative, iterative and transdisciplinary process. GREEN SURGE embraced a three-tiered approach of comparative European cases, synthesis of good practices, and establishment of five Urban Learning Labs (ULLs), strategically selected to represent different urban situations in Europe. GREEN SURGE worked within cooperative Learning Alliances (LAs), a specific type of multi-stakeholder involvement designed to enhance a process of shared learning and understanding in situations with a high degree of complexity and unpredictability. GREEN SURGE thus combined a project-wide, science-driven approach based on a common framework methodology with bottom-up knowledge or an experience-based approach at the local level.

The GREEN SURGE approach was based on linkages, for example between different disciplines, as well as science, policy and practice (inter- and transdisciplinary), as well as between green space, biodiversity, and local communities, and between the delivery of ecosystem services and integrated valuation, in order to enhance the planning and governance of green spaces and biocultural diversity. Linkages also concerned the interaction between different scales of governance and planning, with an emphasis on the local and city regional level. The GREEN SURGE approach was based on an effective and inclusive learning process that enhanced participant satisfaction and process credibility.

The collaborative project adopted a three-tier approach to: develop a pan-European evidence base on the linkages between urban biodiversity, green space, and its benefits for human well-being and social cohesion, green economies and climate change mitigation and adaptation (tier 1); identify good practice examples of urban green infrastructure (UGI) planning and urban biodiversity policies among 20 selected case studies (tier 2); and undertake in-depth work to develop, test and implement innovative UGI planning, governance and valuation approaches to enhance biodiversity, ecosystem services and economic opportunities within five Urban Learning Labs, ULLs (tier 3). The ULLs individually addressed different levels of UGI planning and governance – city regional, city, and project level.

Tier 1 – Comparative analysis of European cities / city regions

The tier 1 analyses included pan-European analysis of ecosystem services supply and demand of urban green spaces based on the European Urban Atlas and literature reviews. Comparative analysis was undertaken in 20 functional urban areas, carefully selected to represent different European macro-regions of planning systems and cultures. These 20 European cities were analysed by interviews with planners and by studying of planning documents in order to conduct an assessment of green space structure and elements, providing inputs to a database of: 1) biocultural diversity; 2) linkages between green space, biodiversity and ecosystem services. Furthermore, analysis of the relationships between urban population dynamics (growth, decline, ageing) and green space dynamics were conducted in order to develop a typology of opportunities and challenges for development of UGI in Europe's urban areas. Finally, analyses of UGI planning and governance approaches (state-of-the art) were undertaken. These analyses were linked to more quantitative features of urban green space, socio-demographic and economic variables.

Tier 2 – Good practices (8-10 cases for in-depth study)

The tier 2 study was based on identification of good practices from across Europe, at the city region and local level. It included 'scanning' and in-depth analysis of innovative approaches on UGI planning, governance, valuation and market integration.

Tier 3 - Urban Learning Labs (ULL) in Bari, Berlin, Edinburgh, Ljubljana and Malmö

Finally, the tier 3 level analyses were based on application of good practices, methods and tools for assessing biocultural diversity, UGI and green economy planning, delivery and governance; valuing ecosystem services; integrating market-based mechanisms of ecosystem service valuation, marketing and governance based on the needs of local stakeholders using the learning alliance approach. The ULLs helped to ensure the 'social robustness' of the project in terms of its ability to appeal to stakeholders and span different policy and geographical areas. In all ULLs, local authorities committed themselves to the GREEN SURGE approach.

2.4 The GREEN SURGE work package structure

GREEN SURGE was structured into eight distinct but interlinked Work Packages, all comprising a set of objectives, tasks, milestones and deliverables. The WPs were led by a Coordinator and had one or more Deputy Coordinators.

WP1 'Project management' coordinated the project administratively and scientifically, including taking care of communicating with the EC and the consortium and handling contractual/financial issues.

WP2 'Assessment of biocultural diversity' had the role of first developing a conceptual framework including (urban) biological diversity and cultural diversity as well as their mutual interaction, evaluating methods and identifying good practices, and then using the framework for assessing BCD, with particular emphasis on the involvement of local communities in assessments.

WP3 – 'Functional linkages' analysed the linkages between green spaces and BCD on the one hand, and the ESS provided by them on the other. The WP developed a classification of green spaces based on their functionality and service delivery, including synergies and trade-offs. This classification was used in the Urban Learning Labs.

WP4 'Contributing to the Green Economy' identified and evaluated monetary and non-monetary methods for assessing the benefits of ecosystem services provided by urban green spaces and biodiversity. The WP also evaluated different ways of integrating ecosystem services provided by urban green spaces into real economies, for example within the Urban Learning Labs.

WP5 'Green infrastructure planning and implementation' assessed UGI planning and identified innovative UGI planning strategies for urban green spaces that effectively promote urban BD and ESS. The WP implemented this knowledge in the project's Urban Learning Labs.

WP6 'Innovative governance of green spaces and biocultural diversity' focused on governance that integrates participatory approaches (bottom-up) with planning approaches (top-down). It provided the evidence base for the facilitation of multi-stakeholder (including local communities and SMEs) participation in UGI planning and delivery, by identifying good practices and testing innovative governance approaches in the Urban Learning Labs.

WP7 'Urban Learning Labs' focused on two-loop learning (bringing together a science-based and a stakeholder-based approach) in Learning Alliances in the five ULLs. The WP activated the knowledge, evidence and good practices collated and created through the work of the other WPs.

WP8 'Knowledge brokerage and dissemination' included tasks on knowledge brokerage and dissemination, as well as the coordination of a European Learning Alliance.

3 THE MAIN S & T RESULTS/FOREGROUNDS (MAX 25P)

In the following the main scientific results are summarized across WPs according to the main objectives and each Tier study level (Tier 1, 2 and 3). Thereafter, the main findings within each WP are presented in more details according to submitted deliverables.

3.1 GREEN SURGE achievements according to the three main objectives

The first main objective was focused on developing urban green infrastructure as a planning and governance concept for both integration and promotion of biodiversity and ecosystem services, and adapts it to local contexts. GREEN SURGE advanced the state-of-the-art by identifying key elements of multifunctional UGI, such as the role of woodland, parks, residential green space, agricultural and community gardening plots, green roofs, and “blue” (water) elements. Moreover, the project provided evidence on the ecosystem services and benefits generated by urban green spaces, as well as the relationships and interactions between different green space types for providing ecosystem services and supporting human wellbeing. This was done by shedding light on the balances and imbalances between supply and demand of ecosystem services in different cities and urban areas across Europe. GREEN SURGE also carried out an assessment of the implementation of UGI planning in practice in order to find out what approaches existed, so that good practices could be identified and transferred. Finally, and based on an informative sample of good practice examples from across Europe, GREEN SURGE engaged in participatory development, pilot implementation, assessment and documentation of new strategic approaches to the development of UGI and well-functioning urban green spaces in a real-world setting in each of the selected Urban Learning Labs to make this new knowledge accessible and usable to policy makers and other target groups.

The second main objective was focused on applying an innovative biocultural diversity perspective to develop successful governance arrangements facilitating socio-ecological integration and local engagement in planning of urban green spaces. GREEN SURGE adapted and advanced the biocultural diversity approach to an urban green infrastructure context. First, a conceptual framework of biocultural diversity was developed, followed by an application of the framework to the examination of interactions between humans and urban biodiversity in European cities. Of particular interest was how residents with different cultural backgrounds and socio-economic situations value, use and help maintain and improve the provision and quality of urban green spaces.

The third and final main objective was focused on the exploration of how valuation and real market integration of biodiversity and ecosystem services could facilitate choices in favour of the development of multifunctional green spaces in urban areas. GREEN SURGE

manage to identify mechanisms for unlocking cash flows from urban green spaces by evaluating relevant and existing cases, providing an overview of already existing instruments. Particular focus was given to integrating different approaches (including monetary and non-monetary methods) to the value of urban ecosystem services. This was done by applying new and innovative methods for data collection on property prices in relation to urban green spaces, including models of hedonic pricing which was developed and mapped to enable analysis of the relationships and distances to different qualitative aspects of green spaces based on a green space quality index. GREEN SURGE also developed an innovative multi criteria evaluation framework in terms of a do-it-yourself guideline on integrated valuation for the assessment and integration of monetary and non-monetary values (integrated valuation) of ecosystem services and biodiversity in a policy-relevant format. Furthermore, a learning module was developed and testing in the form of a card-board game for policy- and decision makers.

3.1.1 Tier 1 study of 20 European case cities

The identification and documentation of green infrastructure planning, governance and typologies was carried out by city-regional case studies and desk-top studies. This work included the Tier 1 study which was conducted in close collaboration between WP2, WP5 and WP6. About 40 GREEN SURGE researchers applied identical analytical frameworks comprising of interviews with city officials and planning document analyses in 20 cities. This work revealed the state of green infrastructure planning, governance practices, and linkages between biodiversity and culture (i.e. expressions of biocultural diversity) in a cross sample of city regions within the five main European planning families. The output of this comprehensive work was a stand-alone report including all 20 city portraits, as well as individual city portraits (see <http://greensurge.eu/products/case-studies/>). Deliverables 2.1, 5.1 and 6.1 are based on this work. In addition, green infrastructure typologies were identified, described and quantified in ULL cities and across European cities by focus on urban green spaces and ecosystem services provisioning and demand (D3.1). This work was carried out in collaboration between WP3 and WP2 and mainly based on literature reviews and GIS-based spatial analyses and content analyses of Urban Atlas data.

3.1.2 Tier 2 study: good practices and in-depth case studies

The Tier 2 study level included a selective number of comparative European cases from the 20 cities studied at Tier 1. The linkages between biodiversity and cultural diversity were investigated in-depth by a global literature review, and by spatial analyses of multiple European cities, and also by an empirical questionnaire study in 10 different languages targeting local people in the five ULL cities (n=3,800) (task 2.2, D2.2). Functional linkages between urban green space, human health and social cohesion were further explored by spatial analyses for European cities and in-depth case studies from Berlin (task 3.2, 3.3,

D3.2). Linkages in terms of both synergies and trade-offs between urban green infrastructure and ecosystem services were studied based on a systematic literature review resulting in a novel classification of UGI based on these linkages (task 3.5, D3.3). The linkages to the green economy were studied with a focus on a review of experiences with integrating green space ecosystem services in real economies, and also empirical case studies exploring cash flows generated by urban green spaces in six different cities (task 4.1, 4.2, D4.1, D4.2), and finally, by a case study on how to integrate different approaches to valuation of urban ecosystem services (task 4.3, D4.3). The work in the period also included in-depth case studies of good practices, advanced approaches, and success and failure of urban green infrastructure planning and governance (task 5.2, 6.2, D5.2, D6.2).

3.1.3 Tier 3 study: Urban Learning Labs and learning together

The Tier 3 study included work undertaken in relation to the five Urban Learning Labs and focal learning alliances established in Bari, Berlin, Edinburgh, Malmö and Ljubljana. Research oriented WPs produced numerous guidelines and recommendations (D2.3, D4.4, D4.5, D5.3, D6.3) which were tested in ULL settings. Furthermore, evaluations of the ULL and learning alliances processes were revealed in numerous reports across WPs (D3.4, D7.2, and D8.7). Finally, synthesis of the project was achieved by a synthesis report (D8.5) and a printed handbook (a collection of shorter and longer communications, the D1.3).

In the following the results from each scientific WP are summarized based on selected Deliverables.

3.2 Work package 1 – Project Management

3.2.1 Urban green infrastructure: connecting people and nature for sustainable cities.

A summary for policy makers (Deliverable D.8.5)

This report summarised and integrated the main findings which were presented in the GREEN SURGE deliverables and scientific papers. With this, our work contributes to important debates around UGI. This includes debates around which benefits are provided by UGI and how these benefits can be articulated in ecological, social and economic terms. We also discuss how strategic planning can promote these benefits and how innovative forms of governance can contribute towards the creation and management of high quality green spaces. Furthermore, we scrutinize the relationship between green spaces and social cohesion and discuss links between biological and cultural diversity. The six empirical chapters of this report highlight the many different types of research conducted in GREEN SURGE. This includes reviews of relevant literature, GIS analyses, field surveys, case studies in 20 European cities, conceptual analyses, studies of policy documents, interviews with public officials, creation and analysis of databases, and an iterative and interactive

learning alliance approach which secured discussion of and reflection on findings in five urban learning labs (which includes the cities of Bari, Berlin, Edinburgh, Ljubljana and Malmö). In these empirical chapters, we present the most important findings that we have collected via this wide range of methods. We provide important recommendations for policy makers and UGI-planners, but also for citizens, NGOs and business actors who engage in the planning, governance and management of UGI.

3.2.2 D1.3 Handbook (manual) for UGI planning (Deliverable D1.3)

The GREEN SURGE Handbook is a selection of findings and examples, compiled into policy briefs, factsheets, guidelines, recommendations, and main messages which are all tailor-made for decision-makers such as planners, policy-makers, and other practitioners. The selection is all focused on how Urban Green Infrastructure can contribute to a sustainable future for cities by addressing major urban challenges. The challenges are related to land use conflicts, biodiversity conservation, climate change, demographic changes, a greener economy, and human health and wellbeing. The handbook was printed and is also available in an online version from the project website (www.greensurge.eu).

3.3 Work package 2 – Assessment of biocultural diversity

The GREEN SURGE project has identified Biocultural Diversity (BCD) as a key concept for (1) understanding the integration between biological variety in the Urban Green Infrastructure (UGI) and the cultural specificities of the users of UGI, and (2) developing innovative approaches to planning and governance of UGI. Work Package 2 (WP2) aimed to apply BCD in the context of Western urban societies, which is an innovative and novel approach to the use of the concept requiring further operationalization in respect of its relevance for UGI planning and governance. To realise these aims, WP2 was divided into three different tasks:

1. Development of a conceptual framework for addressing how residents value and interact with biodiversity (BD) and each other in urban regions
2. Use of a conceptual framework to assess components of UGI and how residents with different cultural backgrounds and socio-economic situations value and use UGI across European cities
3. Development of a database and typology of BCD of UGI components as grounding knowledge for other parts of the project (WP4-7).

In total three Deliverables were produced in WP2.

3.3.1 Biocultural Diversity (BCD) – Concept and Assessment in the Urban Context (Deliverable 2.1)

This report presented a conceptual framework of BCD for urban context and analyses of BCD interpretations, manifestations and practices in governance and planning policy of green areas in 20 European cities. The report was directed to a broad audience ranging from researchers to practitioners and decision-makers who are involved in urban studies, management or planning of urban green areas, respectively. It was highlighted how the concept of BCD offers a new way of thinking about biodiversity conservation by looking at culturally significant and valued biodiversity. A research framework was developed with three BCD research pillars. *The first research pillar* takes as a starting point studies on how people use, perceive and value the biodiversity that is associated with different types of urban green spaces, as well as how biodiversity is influenced and shaped by institutions, communities or citizens. *The second pillar* assesses the nature of cultural mechanisms and practices that are used in maintaining this diversity. Mechanisms may consist of shared language, norms and symbols that guide the conservation and management of biodiversity as an ecological or cultural heritage object. These mechanisms and practices can vary greatly between cultural groups, institutions, cities and nations. *The third research pillar* strives towards transdisciplinary research where science is not only for information gathering, but also for interactive analysis, making sure multiple knowledge are drawn upon, and critical debate about the kind of observations made in the research pillars one and two. The third pillar of research will focus specifically on biocultural creatives. This research framework was used to analyse the planning and governance systems in place for 20 case cities in Europe. It was identified how more than ten different policy objectives was in place to support BCD in the 20 European cities either at local or city levels. From the interviews it also became clear that spatial scale mattered for interpreting BCD policy and management.

3.3.2 Interaction of Biological and Cultural Diversity of Urban Green Spaces (Deliverable 2.2)

In this report BCD and its relationship with different types of green spaces and components of green infrastructure were analysed on three subsequent research levels. *Research level 1:* Assessment of BCD at a European level (55 cities of which 24 are also represented at level 2) through a review of peer-reviewed papers on the perception and valuation of biodiversity in urban green spaces. *Research level 2:* Assessment of BCD via spatial analyses of pan-European GIS data and a comparison of spatial data between the ULL (Urban Learning Lab) cities including Bari, Berlin, Edinburgh, Ljubljana, and Łódź as an extra case representing an eastern European city. *Research level 3:* Assessment of BCD via a field survey that was conducted in the five ULL cities on how people with different social and cultural backgrounds perceive, value and use biodiversity in urban green spaces.

Research level 1, the literature review, revealed that important areas of research are understudied in European cities. Up to now, most studies on the perception and valuation of urban nature focus on the ecosystem level. Especially at the species level, outcomes of perception and valuation studies vary widely, and the gene level is not studied at all. Also, a range of important socio-demographic and cultural characteristics of the population sample are not systematically included in most studies. First results thus clearly indicate unexploited opportunities in linking biological and cultural diversity in urban assessments. *From research level 2*, the spatial analyses, we conclude that urban green areas and forest areas are distributed differently in European cities. Whereas some European urban regions have rather few green spaces in the inner parts of their cities, other urban areas show a greater or more even distribution of the green spaces over the whole city area. The analyses also demonstrate that data on such a broad spatial scale are vastly inconsistent, making overarching spatial analyses still difficult. Socio-demographic data are comparatively up-to-date, while land cover data stem from 2006. Recent data would certainly provide a more realistic picture of the urban green areas actually present in European cities. For some cities provision with urban green may have increased since 2006, whereas for others urban green may have decreased. Therefore, once updated Urban Atlas data are available, maps will be redeveloped to reflect these new data.

Research level 3, the field survey, specifically picked up on the outcomes of research level 1 and started to close knowledge gaps on the perception, valuation and use of biodiversity and UGI types at a more detailed level. The field survey was successfully performed in five ULL cities and allows us to analyse links between patterns of perception, valuation and use on the one hand and the socio-demographic and cultural backgrounds of the respondents on the other. In contrast to most other studies in this field, we were able (i) to include a wide range of socio-demographic variables (e.g. possible migration history of the respondents) in comparative analyses as well as a combination of these variables in multivariate analyses; (ii) to explicitly analyse the survey responses regarding different degrees of biological richness at the species level and (iii) compare general patterns and differences between UGI types, including formal (forests, parks) as well as informal green spaces (wastelands, streetscapes). Our results highlight that a wide range of urban dwellers explicitly stated that they value high BD levels, and also that medium (forest) and high (parks, wastelands, roadsides) BD levels are recognised to contribute to good living conditions in cities. We also determined with this representative sample across European cities that a wide range of activities are conducted within the four UGI types studied, and some of these can be attributed to the biodiversity (e.g. plants, animals that are observed) found in the specific sites (e.g. forest and wasteland). Reflecting these outcomes especially with the ULL partners and within the ULL cities by Green Surge will disseminate the knowledge gained at a very practical level. The insights of this study can thus be integrated in the

double helix approach of GREEN SURGE and lead to a more sustainable, biodiversity-oriented and user-friendly design of urban green spaces.

3.3.3 Identifying, quantifying and qualifying biocultural diversity - assessment of biocultural diversity (Deliverable 2.3)

GREEN SURGE's deliverable 2.3 was aimed at managers, planners and researchers of urban green infrastructure (UGI) and other experts who are interested in the BCD concept. The aim of the deliverable was to give an overview of the main results based on BCD research conducted in GREEN SURGE through case study narratives from different aspects of the BCD concept: tangible, lived and stewardship. The report ends up to short conclusions. Each research narrative is an independent story of the BCD research following the same structure. Main contributors of the research are presented followed by an information box which gives a reader an idea in which BCD research phases the narrative can be anchored, what kind of data has been collected and used in analyses and about linkages with BCD indicators. Main outcomes of the research and what the study tells us about human-nature relationships were highlighted with bullet points, and the methodological design was presented in a separate box, including researchers' notes about strengths and challenges of the case study.

The report managed to illustrate how the BCD concept can enforce researchers, practitioners and planners to widen their epistemological thinking from a culture-nature dichotomy and to be sensitive towards diversity of relationships between culture and nature. By cases and studies targeting tangible, lived and stewardship biocultural diversity of urban green infrastructure, it was showed how BCD being a reflexive concept and taking contextual situations into account, can be a useful tool when planning, designing and managing for socially inclusive and ecologically sound UGI.

3.4 Work package 3 – Functional linkages

WP3 deals with the 'typification' and analysis of the urban and peri-urban green infrastructure using and applying the ecosystem services and the human wellbeing/health concepts as functional linkages. WP3 works at all three scales (Tier 1, 2 and 3) and produced a number of interesting results concerning e.g. 1) the functional relationships between different types of GI, the urban water balance, soil functions and biodiversity, 2) the effects of green space availability and the health of firstgraders, 3) the productivity of allotment gardens in European cities and thus the realization of the 'edible city' including the aspect of urban foraging as well as 4) the linkages between green and blue infrastructure in urban areas.

Four Deliverables were produced in WP4.

3.4.1 A typology of urban green spaces, ecosystem provisioning services and demands (Deliverable 3.1)

The main part of this deliverable, consequently, included the inventory of green space elements, a list and a discussion of the potential ESS provisioning by different green space elements and an analysis of the demand/accessibility of green spaces in European cities. In addition, for the pan-European dataset of the Urban Atlas it was showed which urban green space elements can be identified and quantified using data provided by the European Environment Agency (EEA). The WP3 developed typology of green spaces based on their functionality and service delivery, including synergies and trade-offs, was used in other WP work as well as in the ULLs.

3.4.2 Functional Linkages between Urban Green Infrastructure, Biodiversity and Human Well-Being (Deliverable 3.2)

The functional linkages between urban green spaces, urban green space diversity, climate change adaptation and human health are extremely multifaceted and only a subset could be addressed in this deliverable. Four different analyses were included dealing with pan-European analyses as well as more detailed analyses in the ULL city of Berlin:

- (1) the diversity of different green infrastructure components across Europe using landscape metrics as indicators;
- (2) functional linkages between UGS and climate change mitigation and adaptation based on the pan-European datasets of the Urban Atlas and the European Environment Agency (EEA) for Tier 1a and Tier 1b cities;
- (3) urban foraging as functional linkage between people and urban ecosystems; and
- (4) health of urban dwellers linked to availability of green and blue spaces in their neighbourhood/daily environment.

Overall conclusions across the four analyses state that the findings at European scale definitely support each other and that cities in Northern Europe benefit from large green spaces (mainly forests and waters) and are at the same time less impacted by urban heat and high temperature. At the same time, Southern European cities mainly suffer from traditionally less green in their cities (this refers to both parks and forests) but at simultaneously are affected by considerable high summer temperatures and heat islands. A mean position takes Central Europe and Eastern Europe being on the one hand well-equipped with different types of UGI but at the same time also under pressure of increasing temperatures and clear heat islands. Whether or not the species diversity of the green and blue spaces in- or decreases the climate adaptation function was not able to investigate using the European Urban Atlas dataset where no information on site diversity is given. What could be assumed is that cities where green spaces and especially forests form large patches can support a wider range of forest dwelling species than very fragmented

‘patchy’ forest green spaces. What is more, probably ecological resilience, e.g. resistance towards alien species, is lower in small green spaces compared to large ones. But this needs definitely more empirical evidence to get proved.

At the local level, urban foraging and environmental justice and public health were studied also showing linkages in terms of where do we find which kind of patterns and which parts of the population benefit from green more than others: Areas with higher activities (densities) of urban foraging belong to those districts that exhibit better public health under firstgraders (young children starting primary school) in terms of a) access to UGI (parks, waters) and b) detectable health state (obesity, tooth state, language deficits). Thus, social segregation falls together with imbalances in green space distribution and accessibility (see here also Kabisch et al., 2016). Here, intervention could start in terms of bringing in green, that is for instance planting trees or construct new green spaces including pocket parks or make use of interim use sites, into deprived neighbourhoods on the one hand. On the other, better education on what is urban foraging and what it means in terms of personal happiness and well-being could also bring kids from inner Berlin districts to the areas where foraging takes place/happens. Thus, urban foraging could develop into a really creative tool for urban green and social intervention.

In so far, we detected a close functional linkage between geographical situation and wealth on the one hand and green space diversity (in size, edge and shape) and availability as well as adaptation potential against summer heat at pan-European level and a same strong linkage between social deprivation, poor health and missing access to green space at local level (exemplified at the city/ULL of Berlin).

3.4.3 Classification of UGI based on their Functionality, Services, Synergies, Trade-Offs and Spatial Conflicts (Deliverable 3.3)

The main objective of D3.3 was to provide detailed information on the state of the art about functional linkages between UGI and ecosystem services as well as human health and wellbeing. This was achieved by a discussion and classification of the UGI types based on functionality, ecosystem services, synergies and tradeoffs and spatial patterns/conflicts. The study acknowledged a bunch of literature already published highlighting the benefits of UGI for the provisioning of ecosystem services (ES) and human wellbeing including physical and mental health (i.e. a review on urban ecosystem services (UES) by Haase et al., 2014 and another review on urban nature, human-environment interactions in urban green spaces by Kabisch et al., 2016; Andersson et al., 2007; Chiesura, 2004). Potentials, challenges, spatial synergies, and tradeoffs were discussed for different urban dynamics and contexts such as urban growth and land take but

also shrinkage and land abandonment. D3.3 expands the existing reviews and knowledge base (see here again the references given by the two cited review papers not to repeat a lot of literature compilation already done) on UES and urban human nature interactions by the ecosystem services and health benefits provided by various types of UGI here (based on Deliverable 3.1).

The following six main conclusions were made in the report:

- (1) There is an extensive body of knowledge about functional linkages between single types of GI; parks, forests, green roofs, street trees, brownfields (to a certain extent) and urban ecosystem services and human wellbeing.
- (2) There is a broad range of urban GI types, identified and described in D3.1, which is comparatively under-researched in terms of their functional linkages to provide ecosystem services and to support human health and wellbeing: urban wetlands, cemeteries, house green, green walls, lawns, brownfields (to a certain extent).
- (3) Many studies come from the developed world including Europe, the US and from China. Almost no knowledge has been found from South America, Africa, Russia or Asia except China. Thus, the knowledge spread and the knowledge about the variability of GI functionality is spatially limited. Particularly studies from the cold climates (Tundra, boreal forests) are almost completely missing. As there cold temperatures, long-term snow cover and minus degrees dominate long periods of the year, GI might serve as heat accumulator instead as cooler as mostly discussed in the prevailing literature (including that what we reviewed).
- (4) GI has many positive impacts on human health and wellbeing such as a heat defense and air cooling system, as regulator of heavy rainfall events and storage of moisture in the soil/air or as emitter of essentials that are strengthening the respiratory and the lung system of the human body. Moreover, positive effects of GI, namely parks, trees, gardens and forests, have been reported to counteract mental problems, stress and depressions.
- (5) GI in cities is spread across the whole city area and along a rural-urban gradient whereas parks and green roofs are ubiquitous and occur across the whole city, forests often form the spatial linkage to the nature of the hinterland and serve as stepping stones for species as well as important nodes of biological networks as for the pollination ES. Brownfields more often occur in the outer parts of the cities and along the urban edge compared to inner-urban areas.
- (6) There are also ecosystem disservices which are reported in studies reviewed in the database such as pollen count or fallen parts of trees resulting in allergies or injuries of urban residents. However, the positive linkages between GI, ES and human wellbeing dominate in the international literature.

3.4.4 Databases for the ULLs on Urban Green Spaces and Their Functional Linkages as input to the ULL Portal (Deliverable 3.4)

This deliverable served to provide some insight into the functionality and features of the online OE-platform providing information on UGI and its functionality in the five ULL cities. The GREEN SURGE “Our Ecosystem (OE)” platform is a web-based tool for storing, sharing and analysing spatial data to help answer environmental, social and economic questions. The tool is intended for a) access and b) the communication of spatial data; it does not allow for sophisticated individual analysis or data modelling. The easy to understand user interface makes OE a tool that enables users without specialist GIS (Geographical Information Systems) knowledge to extract spatial information from maps. In addition, users are provided with the opportunity to provide feedback on spatial data using “Geo-Wiki’s” (i.e., spatially tagged narratives). Hence, the tool may appeal to spatial planners interested in furthering (stakeholder input into) the planning of urban green infrastructure (UGI).

The report shows and describes how applications for each of the ULL-cities are currently hosted on the platform, allowing users to interact with the data from the Urban Atlas 2006 and 2012 as well as Corine Land Use 2010 datasets and individually uploaded ULL data resulting from modelling work. The report covered a detailed presentation of the results from the Berlin ULL. Main features showed for Berlin are UGI types and heat stress, an important indicator for the city, for different periods in time starting with the current and future climate projections. The OE platform is able to zoom into specific locations in the heat maps to show how far UGI types contribute to lower land surface temperatures. When hosted on the OE platform, end users are able to display and to query spatial areas within the ULL city regions. They are also able to see how the results for their area relate to other parts of town. In the future, a connectivity model may be added to this dataset, taking into account connectivity of habitat in predicting biodiversity levels. Opportunities may also exist to add a layer of biocultural diversity to the dataset in order to explore how socio-demographic make-up of estates ties in with UGI availability, accessibility and biodiversity levels.

3.5 Work package 4 – Contributing to the Green Economy

WP4 identified and evaluated monetary and non-monetary methods for assessing the benefits of ESS provided by urban green spaces and biodiversity. The WP also evaluated different ways of integrating ESS provided by urban green spaces into real economies, for example within the ULLs. Main outputs included a guide for integrated valuation and a learning module for policy and decision makers.

In total five Deliverables were produced in WP4.

3.5.1 Integrating Green Infrastructure Ecosystem Services into Real Economies (Deliverable 4.1)

This report reviewed and identified options for linking ecosystem services provisioning of UGI with economics drawing on experiences with integrating green space ecosystem services into real economies. The report highlights how good quality urban green spaces, linked up within urban green infrastructure (UGI), provide the benefit of multiple ecosystem services, and requires investment of capital and work. The goal of turning investments into high quality green space aligns with the goal of a 'green economy' in accordance with the definition of a green economy used on GREEN SURGE:

An economy that aims to improve human well-being and social equity while significantly reducing environmental risks and ecological scarcities. In its simplest expression, a green economy is low-carbon, resource-efficient, and socially-inclusive.

Green economy is best seen as a comprehensive umbrella covering a number of economic approaches and policy/governance strategies, where transitioning to an economy that supports sustainability targets could be achieved using these strategies individually or in combination. Green economy has at least four aspects that connect to UGI: economic competitiveness, business opportunities, economic efficiency (avoided costs) and investment in urban environmental quality. The evidence and support for these connections can be found both in the scientific literature and in the many and diverse projects that have sprung from a widespread, often city-led and initiated by local authorities, interest in urban sustainable development. A strategic focus on the UGI needed for different ecosystem services, not least for services with a direct economic relevance, has been shown to lead to cost savings and new business opportunities. In short, many of the cases are about strategic investment to either avoid costs or to increase benefits, or in some cases both, producing comprehensive value creation.

Decentralisation, outsourcing and an opening up of the "green" sector to new services and connections to society have created new business opportunities and invited new actors to engage with UGI. In this Deliverable we described the actors involved in the creation and maintenance of UGI. Various UGI governance approaches are discussed from an economic perspective, with a particular emphasis on their green economy context. Several boxes have been used to illustrate the contents of this Deliverable with real-life examples of projects and companies that integrate green space ecosystem services into real economies. These include fundraising schemes, consulting services, food production, storm water management, and horticultural therapy. A more extensive, cross-cutting example of urban forest restoration indicates how a major investment in UGI pays off well. The present Deliverable indicated several areas for further research which was investigated within GREEN SURGE. The analysis of integrating green space ecosystem services into real econ-

omies can be performed both qualitatively and quantitatively, and it was suggested that these two approaches can and should be combined. In addition, it is of key importance to study not just the rights of different stakeholders with regard to how they use UGI, but also their obligations related to the fact that they have the right to use it. Based on more detailed data on the costs and benefits related to specific urban green infrastructure components, better management of urban ecosystems could be facilitated.

3.5.2 Cash Flows generated by Urban Green Spaces: Methods for Identifying Indirect Values of UGI (Deliverable 4.2)

This Deliverable reported several preliminary studies carried out in GREEN SURGE Urban Learning Labs (ULLs) and GREEN SURGE Tier 2 cities. The aim of the report was to show that from an economic point of view, UGI governance (and maintenance) could be aided by a system of rights and obligations that could help finance UGI conservation. To support or create such a system one needs to disentangle the current system of property and use rights, as well as user obligations and UGI investment schemes. This marks a departure from the kinds of techniques currently used to value nature. Instead of stated preference valuation studies based on hypothetical scenarios, we argue for a move toward identifying real cash flows and beneficiaries that exist in and around UGI. The report presented a framework for assessing value based on green space quality, context and structural properties of the urban form and then explored how some of these values are translated into cash flows. Although the identification of cash flows is not always possible, there are several possible routes to understanding how value (of UGI) becomes money, and ways to use this information to support UGI financing. This report demonstrates some practical approaches to measuring cash flows and other connections between urban green space and business activity. One method is to map the number of businesses located around urban green spaces. Also included here is a study of the perceived benefits of close proximity of green space by representatives of one particular business sector that could benefit from nearness to green spaces: cafés. We also use a more traditional hedonic pricing method, albeit with innovative extensions, such as an automatic web-based tool for collecting data on apartment sales and heat maps to visualize the findings of this study. As posited, these studies indicated positive cash flows (or at least potential cash flows) related to UGI. Some expected connections were absent, such as in the case of medium-sized R&D companies in European cities, which could not be shown to be benefiting from locations in greener surroundings.

3.5.3 Report on the Potential for Integrating Monetary and Non-Monetary Valuation of Urban Ecosystem Services (Deliverable 4.3)

Within GREEN SURGE, integrated valuation has been one of the key issues for linking urban green infrastructure and green economy. In this Deliverable we explored more specifically the potential for integrating monetary and non-monetary valuation methods using three in-depth studies.

Our selected monetary approach was hedonic pricing, one of the valuation methods most commonly used in the context of urban green spaces. We first performed a typical hedonic pricing study to test its usefulness in our case study city (Lodz in Poland) and to be able to refer our integrated valuation results to this baseline study. Then we tested the potential to integrate hedonic pricing with non-monetary valuation of urban green spaces: their perceived value captured through the use of softGIS, one of the public participation mapping methods, and their biocultural value, reflecting an interdisciplinary concept of biocultural diversity. In the former study, we found out that hedonic pricing and softGIS mostly reveal consonant values, but also trade-offs between certain aspects of value. Some green spaces are portrayed as valuable by the softGIS but not necessarily when using hedonic pricing, indicating that what is valued in non-monetary terms does not necessarily have monetary value, at least not for real estate buyers, whose preferences and choices are depicted with hedonic pricing. In the latter study, we found out that high biocultural value of an area does not necessarily positively influence real estate prices, which illustrates another trade-off between the different value dimensions. Still, we consider these two integrated valuation examples successful in that they satisfied the basic objectives for integrated valuation introduced in our Milestone: that the studied value dimensions are logically commensurable, and that the methods are technically compatible.

We concluded that the potential for integrated valuation is larger than it is commonly assumed to be, and that indeed, integrated valuation reveals a broader perspective on the value of the environment. Encouraged by these successful examples, we consider integrated valuation as a fruitful direction for future research. We consider the assumption that integrated valuation provides a more comprehensive picture of the value of urban green spaces for at least partially substantiated, and that it could be more widely used in the practice of urban green space management.

3.5.4 Guide to valuation and integration of different valuation methods: a tool for planning support (Deliverable 4.4)

The GREEN SURGE work on green economy and urban green infrastructure (UGI) included the identification and evaluation of monetary and non-monetary methods for assessing the benefits of ecosystem services provided by urban green spaces and biodiversity. This report synthesises the insights from this work and presents the take home messages for valuation in practice.

Local context and specific questions make every valuation situation unique. Instead of providing a ready template or model for calculating the ‘value’ of UGI, the GREEN SURGE approach is to offer recommendations and advise for designing, or commissioning, context-tailored solutions. This Deliverable will help the user think through what type of valuation and which methods might be appropriate in different situations. Based on GREEN SURGE work it also provides a guide for how to think about integrated valuation and its uses. The Deliverable is primarily aimed to help anyone interested in valuation, or a value-based discussion for prioritization of policies, or both. The interest could be from the perspective of a politician or planner commissioning a report or starting up a dialogue, a consultant interested in offering valuation services, an NGO wanting to raise public awareness, or anyone else interested in value articulation and a deeper dialogue about UGI and its qualities.

3.5.5 Understanding and promoting the values of urban green infrastructure: A learning module (Deliverable 4.5)

This learning module focuses on key insights from the GREEN SURGE project and how these can be gateways to a deeper understanding of urban green infrastructure (UGI) as embedded in city systems. It draws on the many different Deliverables, Milestones and other outputs from GREEN SURGE and uses the game ‘GREEN SURGE City’ to give the user an experiential introduction to four core topics: green economy, valuation, planning and governance. The learning module will work best as a facilitated workshop for smaller groups of people and primarily targets people with an interest or stake in UGI, but without a deep, comprehensive expertise.

‘GREEN SURGE City’ is a science communication tool that makes the research of GREEN SURGE more accessible to practitioners, policy-makers, and students. The board game is an educational tool that allows participants to engage in collective action and test strategic ideas and options in a safe environment. This process allows the innovation of critical insight in the planning process. The game illustrates the key principles from GREEN SURGE – the spatially explicit nature of UGI, the collaborative decision making process around building UGI, the tradeoffs and synergies of ecosystem services in UGI planning, and the

benefits of specific UGI for mitigating the weather events precipitated by climate change. These principles are explored as players build UGI in an imagined city, negotiate space, balance costs and benefits, and experience changes in governance and dramatic climate events. The players may inhabit one of six roles, government, business, community, environmentalist, health and education NGO, or developer. These roles were chosen to best represent the stakeholders who have a vested interest in UGI and gain benefits from their use. In a turn, each role (which can be a single player or a team) may build up to 3 UGI components of their choice, provided they gain permission of the other roles required. Each individual may offer their political support to a UGI project to protect it from the developer. During game play, players receive tokens which represent the distribution of short-term benefits. The overall resilience of the built city is assessed at the end of the game to illustrate any missed opportunities, capture the value of long-term benefits, and highlight areas of successful green development.

3.6 Work package 5 - Green infrastructure planning and implementation

WP5 was tasked to advance UGI planning and implementation at the city and city-regional scale to more effectively promote urban biodiversity (BD) and ecosystem services (ESS) towards more resilient and low-impact European cities.

The main findings from WP5 are disseminated in three different comprehensive reports which are summarized below (three Deliverables).

3.6.1 Green Infrastructure Planning and Implementation (Deliverable 5.1)

The first task was to report on the status of European green space planning and management based on the analysis of the selected European city-regions. The report was the culmination of the first task and includes an overview of strategic Urban Green Infrastructure planning and implementation based on a literature review and an updated perspective based on an analysis of 20 European case study cities. To inform this perspective eleven research questions were designed to address three planning and implementation themes: adoption of principles and policy themes, implementation gaps and challenges and opportunities of current approaches. The themes were investigated using a review of public sector planning and policy documents, questionnaires, web analysis, maps and statistical data.

The planning principles defined through GREEN SURGE were applied to some extent in the 20 European case study cities but only two (Bristol and Barcelona) explicitly embedded the (Urban) Green Infrastructure concept (portraits of all 20 case cities are available from www.greensurge.eu). With respect to connectivity and multifunctionality, these planning principles showed a high degree of uptake across the cases, with little regional variation.

Considering all planning principles, the British Planning family was found to have addressed these the most and it was noted that National Planning Policy frameworks in these countries appear to be having an impact. However, a multi-scale approach is under-represented throughout all regions and this appears to be a weakness of current practice. Considerations for the integration of grey and green infrastructure is a further area with scope for improvement. For planning processes, it was concluded that most cities are looking at their green space strategically, although it appears weaker in the cities of the New Member States than elsewhere. Social inclusion in planning processes was notably weaker in the Mediterranean examples than elsewhere.

3.6.2 Advanced Urban Green Infrastructure Planning and Implementation (Deliverable 5.2)

This report presented the findings of the research on good practices of green infrastructure (UGI) planning and implementation in European urban areas. Four research questions guided the study:

- What are innovative strategies and approaches for UGI planning, especially in regard to challenges European cities are facing?
- What are common factors of success in strategy planning and implementation?
- What are limitations of current good practices in UGI planning and implementation?
- How important is the local context in identified factors of success and limitations? (transferability)

The report considered innovative strategies and approaches for UGI planning which included four main UGI planning principles – green-grey integration, connectivity, multi-functionality, and social inclusion – as well as four selected important policy challenges that can be addressed by UGI planning – biodiversity protection, climate change adaptation, promotion of the green economy, and social cohesion. A total of 14 case studies from 10 cities were studied in-depth. The potentials of UGI planning to advance green space planning in European cities were assessed according to the synergies between the four main principles of:

Green-grey integration aims at combining green space with urban development and grey infrastructures. Such an approach has the potential to further the integration of green space into urban development. The planning principle or integration helps to consider a broader variety of green and open spaces such as on private land as a vital part of a city's green network in order to provide ecosystem services and protect biodiversity.

Connectivity can advance planning if it is considered on different spatial scales in concert and for different functions, relevant for humans (social connectivity), biodiversity (ecolog-

ical connectivity), and other regulating functions, important for water or climate (abiotic connectivity).

Multifunctionality is important to address several urban challenges but also supports other UGI principles since it aims at creating synergies between them and stimulates the effective use of limited space.

Social inclusion helps to develop UGI in a way that corresponds to local needs and interests. Different social groups are taken into account in planning processes. This requires special efforts and tailor-made participatory tools that correspond to a diverse urban society.

3.6.3 Urban Green Infrastructure Planning - A guide for practitioners (Deliverable 5.3)

The findings from WP5 were all compiled into a guidebook for UGI planning. This guide was designed primarily for planners and local government decision-makers who are interested in ways to better plan and maintain urban green space networks. Allied professionals working in the broader field of urban planning, land management or sustainable urban development may also find it of use.

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.

3.7 Work package 6 - Innovative governance of urban green spaces

WP6 focused on governance that integrates participatory approaches (bottom-up) with planning approaches (top-down). It provided the evidence base for the facilitation of multi-stakeholder (including local communities and SMEs) participation in UGI planning and delivery, by identifying good practices and testing innovative governance approaches in the ULLs.

The WP resulted in three Deliverables.

3.7.1 The Governance of Urban Green Spaces in Selected EU-Cities (Deliverable 6.1)

This report covered the findings of the GREEN SURGE Work Package 6 Tier 1 research on identifying and conceptualising innovative participatory governance arrangements in regards to the management of urban green infrastructure. The study of the 20 EU-cities included application of the policy arrangement approach, which implies that, although governance arrangements are driven by agents, they operate within a structural context. Four main research questions were addressed: 1) Which trends affect the governance of urban green spaces? 2) How do governments deal with questions surrounding participation in their green space policies and related practices? 3) Who are involved with green space policies and who initiates what projects? And 4) what are the intended outcomes of initiatives?

Analysis of the materials revealed a total of six EU-wide trends in regard to participatory governance arrangements. Findings on policies, actors and initiatives have been linked to these trends where relevant. Policies and practices of participation could be grouped into five clusters. A distinction was made between two types of governance arrangements in which the government has the greatest impact on decision-making, co-governance and two categories of informal spontaneous activities occurring independently of government influence. Our findings on actors indicated involvement of a range of non-governmental actors in green space decision-making and very few calls for decreased involvement of any particular actor by city officials. Green space projects involving non-governmental actors tended to be initiated and led by government actors. In most cases, the intended outcomes of initiatives were either environmental or social in nature with many projects combining these types of objectives. Intended outcomes were delivered either through changing the physical environment or organising activities.

3.7.2 Innovative Governance of Urban Green Spaces – Learning from 18 innovative examples across Europe (Deliverable 6.2)

This report was based an investigation of 18 examples of innovative governance arrangements in urban green space management across Europe. In this analyses, we focused on

three inter-related research questions: i) What do innovative governance arrangements look like in terms of aims, actors, structure, contexts, dynamics, and which of their elements can be seen as innovative? ii) Which are the most important perceived effects of these arrangements in their environmental and political contexts? iii) What lessons can be drawn from the supporting and hindering factors for these arrangements, and the power dynamics that take place?

Based on our analysis, we identified six dominant governance arrangements, listed below. Although this typology is not exhaustive, it may help in mapping the diversity of arrangements across cities. These innovative governance arrangements showcase how planning styles across Europe are changing towards more flexible and networked governance arrangements and self-governance.

Municipalities mobilising social capital	Strategic planning instruments to invite grassroots and individual citizens to participate in place making or place-keeping
Green hubs	Experimental, creative coalitions connecting various networks and knowledges to develop community based solutions.
Grassroots initiatives	Relatively small scale initiatives located on public land, started and maintained quite autonomously by local residents.
Co-governance	Partnerships between municipality and citizens or grassroots with power being shared across actors.
Organization initiated grassroots	Social enterprises or NGO's mobilising community action, in focus and power located between co-governance and grass-roots initiatives.
Green barter	Maintenance or development obligation for businesses in exchange for a formalised right to use the values of space for business profits.

3.7.3 Innovative governance for urban green infrastructure: A guide for practitioners (Deliverable 6.3)

This guide aimed to provide a tool for navigating through some of the important UGI governance questions and issues. The guide synthesises results from GREEN SURGE on the current state-of-art of knowledge and innovative practice of UGI governance. It addresses

the interests of a broad range of urban stakeholders and practitioners, but the primary audience are those urban planners and decision-makers from various departments and areas who deal with urban green spaces. The guide might also be of use for allied professionals working in the larger field of community development and community involvement in land management and sustainable urban development. In order to address this diversity of the guide's potential users, it intends to offer a careful compilation of material, tools and information that may be tailored to individual interests, capacities, backgrounds and needs.

The guide is organised into seven chapters as follows:

CHAPTER 2: KINDS OF GOVERNANCE. Deciding why and how to build governance is important. The range of different, innovative and evolving types of UGI governance arrangements across Europe is described. A typology of governance arrangements explains the governance context and opportunities for municipalities to engage with different types of governance. The concept of Active Citizenship is introduced.

CHAPTER 3: CITIZEN-LED GOVERNANCE. This chapter looks at innovative initiatives that are initiated, developed and led by citizens, civil society organisations and organisations, and what they offer in terms of potential benefits for UGI and municipalities. The challenges to for municipalities are outlined.

CHAPTER 4: INVOLVING BUSINESS. Introduces ways in which businesses can be included as part of UGI governance. The concept of Green Barter is investigated in some detail, to show what municipalities and UGI can gain when businesses are involved in the delivery and maintenance of urban green spaces.

CHAPTER 5: SOCIAL INCLUSION. The cross-cutting issue of social inclusion is described in some detail, and examples are given which show how different kinds of governance through active citizenship can have different kinds of outcomes for different groups of people in society at different scale levels.

CHAPTER 6: SUSTAINABILITY ISSUES. Place keeping and continuity in UGI governance is discussed in this chapter, covering ideas and examples of how different kinds of active citizenship address the maintenance of UGI through time.

CHAPTER 7: BENEFITS OF GOVERNANCE. The social, economic and ecological benefits of active citizenship associated with different kinds of urban greenspace are explored. The chapter shows how different green spaces can provide multiple benefits depending on how the interaction with active citizens, civil society groups and businesses is organised.

3.8 Work package 7 - Urban Learning Labs (ULLs)

WP7 focused on two-loop learning (bringing together a science-based and a stakeholder-based approach) in Learning Alliances in the five ULLs. The WP activated the knowledge, evidence and good practices collated and created through the work of the other WPs.

3.8.1 Local Learning Alliances and Corresponding Advisory Boards Established in Five Urban Learning Labs (Deliverable 7.1)

This report outlines the process of identifying stakeholder composition and structure for the establishment of local Learning Alliances (LAs) of the Urban Learning Labs (ULLs), Task 7.1 within GREEN SURGE (GREEN SURGE), an EU FP7 collaborative project, FP7-ENV.2013.6.2-5- 603567 (2013-2017). The overarching aim of Work Package 7 (WP7) is to facilitate collaborative learning and knowledge production between practitioners, policy makers, researchers and other stakeholders who collaborate with each other under the umbrella of a LA. Through a range of different learning processes, top-down and researched knowledge comes together with, and is tested against, bottom up stakeholder knowledge through a series of activities in each of the 5 ULLs: Bari, Berlin, Edinburgh, Ljubljana and Malmö.

The project's Description of Work (DOW) describes Task 7.1 as : *A stakeholder analysis template will be developed to help identify relevant stakeholder groups and define their respective interests and potential involvement with urban green infrastructure (UGI) and the different GREEN SURGE WPs. Stakeholder groups will be surveyed and mapped at city region and local (neighbourhood and community) level and will include public bodies, developers, architects, communities, NGOs, the private sector and other interested parties. This task will include a needs assessment exercise aimed at identifying desired changes and/or conflicts associated with biocultural diversity (BCD) and the functional linkages between green spaces, biodiversity (BD) and the provision of ecosystem services (ESS). An advisory board for each LA will be drawn from prominent practitioners with an interest in UGI.*

This milestone acts as both a marker of where the process of developing the ULLs is as of month 15 of the GREEN SURGE project, for the deliverable D7.1 Report on stakeholder composition and structure, and participation process based on a stakeholder engagement plan. To this end the report sets out the methodology and background to the stakeholder engagement plan and analysis; it provides a synthesis of the stage each of the ULLs in relation to the development of the LAs. This is achieved by presenting the ULLs matrices and mind maps for the key themes that relate to the overall research project. This is a significant part of the process of identifying the key GREEN SURGE issues within each city. These issues form the basis of the action research that is to be undertaken using the LA approach.

This report acknowledges that the process of developing the ULLs progresses at different rates in each of the five ULLs and cities, reflecting the complex nature of stakeholder engagement. The ULL process has been developed so that it is equally applicable and adaptable to the circumstances that are prevalent in each of the cities. It also should be acknowledged that the ULL and LA process is a continual one and will develop over the length of the GREEN SURGE project. As a result the reporting on the ULLs and LAs also

needs to be continual as the relationships between stakeholders and researchers develop dynamically.

3.8.2 Iterative Place-based Knowledge Gathering in Urban Learning Labs (Deliverable 7.2)

This Deliverable served the purpose of facilitating knowledge exchange between Urban Learning Lab (ULL) Coordinators, who are engaging with urban green infrastructure (UGI) stakeholders in five European ULL cities, and the other researchers within GREEN SURGE. A framework to help understanding the knowledge needs in each of these cities was introduced, describing how different elements of local knowledge could be combined to make a judgement based on knowledge and experience.

The supply and demand of knowledge is described for each of the five ULLs from which key interests at ULL level are synthesized. These so-called ULL syntheses are expected to aid in shaping future research and practitioner support provided by GREEN SURGE, and are therefore central to this Deliverable. The demand of knowledge by ULL stakeholders has been gleaned from the central topic of the Focal LA, as well as ULL workshops organized with this specific purpose in mind. Research already supplied by GREEN SURGE also revealed key areas of interest at ULL level, as well as specific external research carried out by researchers in these cities. The ULL synthesis is used to suggest new ideas for research within, and engagement with stakeholders by, GREEN SURGE WPs 2-6. These, combined with the ULL synthesis, are envisioned to be at the basis of discussions between all GREEN SURGE researchers around shaping activities as part of the Tier 3 stage of our research.

We conclude by reflecting on the variation between ULL-cities regarding i) the role of the Focal LA within the ULL, ii) topics of key interest, and iii) opportunities for engagement. This Deliverable demonstrates that, where opportunities have arisen, GREEN SURGE has been successful in joining existing partnership initiatives aimed at UGI improvements. It also reveals an apparent positive relationship between pre-existing empowerment of non-governmental actors in UGI decision-making and success in engaging a wide range of actors. Key topics of interest across the ULLs included: i) inspiring examples and practical tools to better integrate the concept of ecosystem services in spatial planning practice, and ii) methods and tools that empower non-governmental actors to take on aspects of green space development and maintenance, including financing. There was also widespread interest in the themes of biocultural diversity and urban agriculture. The GREEN SURGE consortium is faced with the challenge of presenting research findings in more accessible language and formats to UGI practitioners. Equally, ULL coordinators need to intensify communications with researchers in the other WPs regarding stakeholder activities. Finally, ULL coordinators highlighted the need for practitioner engagement beyond the mere

sharing of ideas, in order to overcome any institutional or regulatory barriers that could stand in the way of meaningful change to the status quo regarding UGI management.

3.8.3 Cities and Researchers Learning Together: What does it take? Evaluating the process of iterative knowledge exchange and outcomes generated in each of the Urban Learning Labs and Learning Alliances (Deliverable 8.7)

The Learning Alliance (LA) approach in the GREEN SURGE research project describes an innovative vision to iterative knowledge exchange between researchers and practitioners. Local knowledge on urban green infrastructure (UGI) is shared with researchers who design their studies in order to provide findings relevant to addressing urban challenges. Findings are applied at the local level as part of an iterative process of experimenting with effective solutions.

To this end, we introduced the LA process evaluation protocol of which we present the results in this Deliverable. The protocol comprises two main components: 1) Evaluating the outcomes of the stakeholder engagement process, and 2) evaluating the “double helix” process of knowledge exchange between researchers and practitioners. We distinguish between five types of outcomes and impacts: *instrumental*, *conceptual*, *capacity-building*, *enduring connectivity* and *attitudinal / culture change*. We “operationalized” the “double helix” of knowledge exchange by specifying four different milestones on the trajectory between LA establishment and implementation of innovative UGI planning and governance. These milestones are:

- a) *LA process initiation*,
- b) *effective facilitation and coordination*,
- c) *iterative knowledge exchange and experimentation*, and
- d) *implementation of the LA process outcomes*.

In addition to evaluating the LAs, we also studied the outcomes and functioning of ULLs, which acted as platforms for knowledge sharing and exchange. This served to learn about key issues in the city and to explore a range of possible collaborations between researchers and stakeholders developing and managing UGI. We used three methods for data collection to assess outcomes and milestones: 1) semi-structured interviews with facilitators of, and 2 to 4 practitioners in, LAs (*outcomes & milestones*), 2) semi-structured interviews with Work Package (co-)leaders who engaged with LAs and ULLs (*outcomes* and feedback on process), and 3) a questionnaire distributed to (one-off) participants in ULL workshops and events (*outcomes*).

Regarding outcomes, we find that despite the short-term nature of the research project, tangible impacts on urban green spaces and UGI planning approaches have been made in the majority of ULL cities. Both the LA and ULL evaluations revealed that the impacts on ways of thinking about UGI (*conceptual* outcome) and on knowledge and resources to deliver UGI (*capacity-building* outcome) have been most widespread. Participants in these processes got inspired to consider new planning concepts and got more familiar with innovative ways of planning and governing UGI. Practitioners also increased their confidence in effectively planning UGI, which is partially due to experience with planning instruments such as the Ecometrica OurEcosystem mapping application and access to new funding sources. In the LAs, characterized by a fixed membership building a working relationship through repetitive meetings, the impacts on *enduring connectivity* and *attitudinal / cultural change* had been strong, while less so in the ULLs that met infrequently. The connections between practitioners had led some to see the relevance of their work across different policy domains. The impacts on (partnership working) culture change have been most profound in those places and for those people that had relatively little experience in collaborative processes. Researchers also benefited from collaborating with practitioners as evidenced by their improved ability to access local knowledge used for scientific purposes and a small number of partnerships which plan to continue working together on new ideas and projects.

All of the LAs reported to have partially or fully met the four milestones of the LA process. This logically follows from the evidence that the majority of LAs managed to influence UGI planning and governance in their respective cities through partnership working, which requires at least partially meeting the penultimate *implementation of the LA process outcomes* milestone of the LA process. Surprisingly, the first milestone of *LA process initiation* was perhaps the biggest hurdle for LAs due to a lack of funding for LA partners and limited understanding of what the research could offer. There was also mixed success in meeting the milestone of *effective facilitation and coordination*; while the chairing of events was typically done in a pleasant and inclusive way, facilitators experienced challenges around maintaining a regular schedule of meetings and making the most of support tools, such as the OurEcosystem platform, made available by a partner in the GREEN SURGE research consortium. There were also some particular challenges around the *iterative knowledge exchange and experimentation* milestone, which was due to research carried out by the research consortium not always matching local policy priorities, shifts in political leadership or support of previously agreed LA topics at the local level and time constraints. Finally, the biggest challenges with regard to *implementation of the LA process outcomes* milestone were to apply to gain political support for ideas developed through the LA process and to ensuring long-term continuity of new green spaces that had been developed as a result of the LA process.

We conclude that researchers interested in applying this approach could benefit from the lessons drawn from this evaluation in order to enhance their impact of their research in real-life contexts. Amongst key recommendations are: providing a schedule of frequent meetings, providing (balanced) funding to partners, agreeing on a key topic for LAs early on, applying stakeholder identification and monitoring tools, documenting and sharing research findings at frequent points throughout the project in accessible language, tailoring tools and instruments to local needs, providing professional training to non-expert facilitators and reserving sufficient time for the stakeholder engagement process.

4 POTENTIAL SOCIO-ECONOMIC IMPACT AND WIDER SOCIETAL IMPLICATIONS & THE MAIN DISSEMINATION ACTIVITIES (MAX 10 PAGES)

4.1 Summary of potential socio-economic impacts and societal implications

The project's impact on city planning and governance now and in the future are described in details below. To summarise shortly, this impact includes foremost the work undertaken in the five Urban Learning Labs, but also a wider influence on all 20 Tier 1 case study cities in GREEN SURGE, as well as other European and global cities in terms of the impact of the developed guidelines, recommendations, learning modules and the printed and online handbook which have been disseminated widely to practice in Europe and globally e.g. through the networks of the GREEN SURGE partner ICLEI (International Council for Local Environmental Initiatives, the Local Governments for Sustainability, representing 1200 cities in 84 countries). Furthermore, the project also served to implement various EU policies mainly focused on green infrastructure, a green economy, and nature-based solutions. And finally, the project also had an impact on the private sector in terms of the work undertaken by the SMEs in the project.

4.1.1 The potential impact on the five ULL cities

The five European cities of Bari (Italy), Berlin (Germany), Edinburgh (UK), Malmö (Sweden) and Ljubljana (Slovenia) have collaborated closely with GREEN SURGE throughout the project duration. Municipal officials and other stakeholders shared their local knowledge on urban green infrastructure with the project's researchers. In turn, the researchers carried out locally relevant research on valuing, planning and governing urban green spaces. The main potential socio-economic impact from the projects derives from this close collaborative work within the five Urban Learning Labs (ULLs) and Focal Learning Alliances (FLAs) settled in the five cities. This impact includes influences on the local city policy level, i.e. development of policies, the overall governance processes, strategic planning practice, and management and conservation approaches, as well as influence on more regional strategic planning approaches. A substantial part of this influence is in the form of a mutual learning process between practitioners and researchers focused on discussion of new ideas, concepts, principles, and strategies supporting the different dimensions of urban green structure development, management and conservation. The influence of these processes will become evident from the ongoing policy work in these cities. However, taking the time horizon of planning into consideration, we believe the main impact of these processes will surface during the governance, planning and management on the long term (during the next 5-10 years), e.g. as impacts in terms of more sustainable green infrastructures securing both social cohesion and justice, the local biodiversity, ecosystem services and benefits, and the green economy.

GREEN SURGE has evaluated these processes and turned the experience made along the way into recommendations for municipal officials and researchers who want to work together in future. The brochure *“Working together – learning together – succeeding together: How researchers and municipalities can work better hand in hand”* outlines what both need to keep in mind to learn from each other and effectively work together to promote urban green infrastructure in European cities. And furthermore, the evaluation report on what it takes for cities and researchers to learn together provides solid arguments and evidence with impact on future collaborative works between cities and researchers in other projects and contexts (Deliverable 8.7).

On a more concrete level, the Focal Learning Alliances included the planning, design and implementation of an edible school garden in Berlin as well as a self-determined restoration of a neglected green space by a youth group in Ljubljana. These two re-developed green spaces will be left as good examples for inspiration and wider influence on similar future green space development projects in a UGI perspective. Furthermore, the online GIS-based knowledge portals (Our Ecosystems) developed within the ULLs are another example of a concrete project output with potential impact on the future UGI planning in the ULL cities.

4.1.2 The potential impact at Tier 1 study level (20 European cities) and beyond

In addition to the work within the five urban learning labs, GREEN SURGE worked with 15 additional cities in the so-called Tier 1 study. This work included planning document analyses but also min. 2 interviews with responsible planners in each city (see map of GREEN SURGE case cities). Thereby, planners learned about the GREEN SURGE approach and were influenced to some degree by novel ideas, concepts and principles from the urban green infrastructure research frontier addressing e.g. biocultural diversity, multifunctionality, ecosystem services and benefits, ecological connectivity, social cohesion, environmental justice, integrated valuation, and real marketing of green space benefits.

The work with the ULL cities and the Tier 1 case study cities resulted in multiple outputs targeted different aspects of successful urban green infrastructure governance, planning, management, and conservation. Through a transdisciplinary learning approach applied at the interfaces between biodiversity, biocultural diversity, ecosystem services, green economy and UGI, GREEN SURGE developed tools, learning modules, strategies, guidelines and recommendations useful at the local and city regional level to assess and react to the effects of urbanisation and environmental change. All these outputs are believed to hopefully result in impacts on urban green infrastructures in all European cities resulting

in better harvesting of the multiple benefits and services from UGI leading to multiple positive socio-economic impacts such as improved public health, climate adaptation, social cohesion, and a green economy. Furthermore, this work has also resulted in putting a European UGI approach to the forefront of global GI research (see the list of scientific papers and presentations) thereby inspiring an urban green infrastructure focus in cities outside Europe.

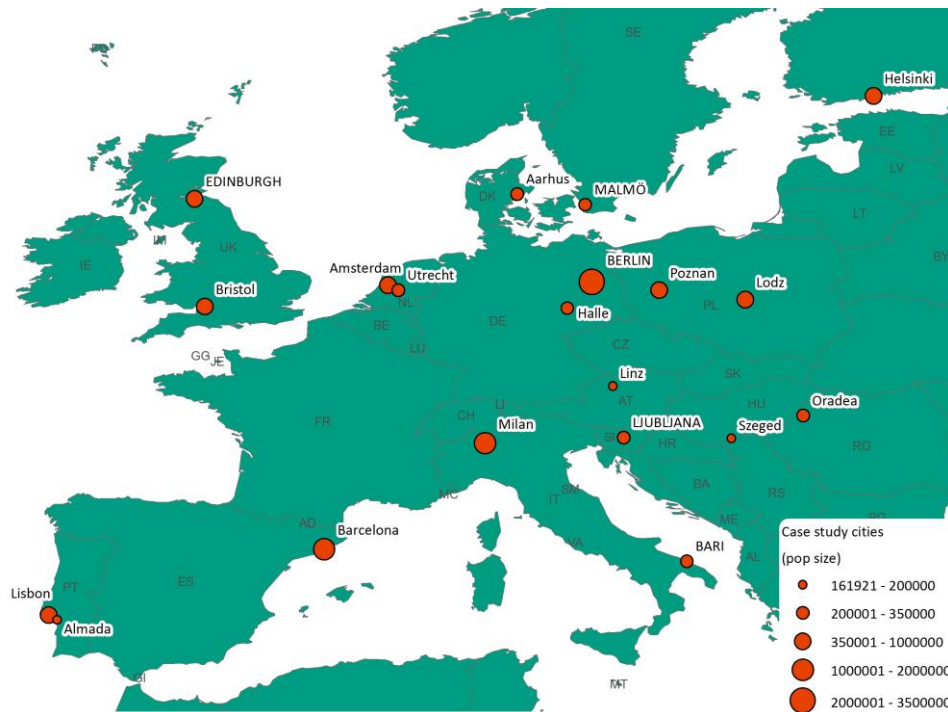


Figure 1. Case cities in GREEN SURGE whom directly benefited from the work undertaken within GREEN SURGE.

4.1.3 Implementation of EU policies

GREEN SURGE contributed to the implementation of a range of policies and regulations. Its aims were aligned within the EU policy agenda on Sustainable European Cities, described in the Leipzig Charter and focusing on common principles and strategies for urban and rural development policy; integration of EU policy into national, regional and local development policy; and developing an integrated approach to tackling issues of connecting green spaces, biodiversity, people and the green economy. Successful GI delivery helped realise Biodiversity2020 objectives in reversing biodiversity loss. The European Landscape Convention considers it as essential to strike a balance between preserving the nat-

ural and cultural heritage, and using landscape as an economic resource. GREEN SURGE enhanced awareness among decision makers and the public about the qualities of urban landscapes. The project operated in accordance with European environmental and spatial/physical development policies as outlined in, for example, the European Spatial Development Perspective from 1999 (i.e. to work towards a balanced and sustainable development of the territory of the European Union). The general quality of the environment in urban regions – including the natural assets and recreational qualities – is one important component of “making Europe a more attractive place to invest and work in” (Lisbon Strategy). The project also contributed to the European Commission’s Thematic Strategy on the Urban Environment which emphasises the importance of avoiding urban sprawl, land use planning to consider environmental risks, and the need to undertake urban environmental management on a well-informed basis. This innovative approach has been elaborated in the related Guidance, ‘Integrated Urban Environmental Management’, which draws upon the Integrated Management System developed in the projects Managing Urban Europe-25 and CHAMP – Local Response to Climate Change, which also provides a capacity development training package. TEEB has suggested the application of Integrated Management System to the management of biodiversity and ecosystem services.

4.1.4 Potential impact on the private sector, SMEs and NGOs

A total of 10 SMEs were a part of the GREEN SURGE consortium. These SMEs benefited directly from the collaborative work carried out within GREEN SURGE in terms of capacity building and an expanded European network of research bodies and other SMEs. Furthermore, the final produced UGI guides, recommendations and principles do not only support public governments, but certainly also private consultancies who are in the GI business with focus on e.g. green space restoration, ecosystem restoration, climate adaptation, urban renewal, biodiversity protection, and urban greening. The interest from the private sector in the results from GREEN SURGE was e.g. evident from the many private consultancies that joined the final project conference in Malmö, Sweden in September 2017.

4.2 The main dissemination activities and exploitation of results

4.2.1 Summary of dissemination activities

The project has had a large number of dissemination and networking activities, led by WPs 8 and 1. These includes activities focusing on the European Commission (e.g., through active participation in several nature-based solutions seminars) and other relevant European projects and initiatives, and authorities and other stakeholders in the participating cities. Key outputs of the project have been widely disseminated through the project website, an European learning alliance, newsletters, popular science publications, recommendations and guidelines, as well as scientific conference presentations and scientific articles.

4.2.2 The GREEN SURGE website

The GREEN SURGE website (www.greensurge.eu) has been the main public dissemination platform throughout the project lifetime. The website has been continually updated with upcoming events and latest project outputs like reports and scientific papers. Furthermore, a feature on the website called 'Meet GREEN SURGE' announced upcoming events and conferences with talks from mainly researchers within the project. From the website it was furthermore possible to sign-up for e-newsletter and join the European Learning Alliance.

The website has been relatively successful in disseminating GREEN SURGE. The numbers of unique visitors per month during the 4 years have increased from an average of 570 unique visitors in 2014 to an average of 6,166 unique visitors per month in 2017. During September 2017, the month of the international final conference, the project website had more than 10,000 unique visitors from a total of 136 different countries all over the world. However, the website has had a global audience already since 2014, with a lot of monthly visitors from e.g. USA and China as well as other countries in Asia and also Africa. The website will be online and accessible minimum during the coming 3 years after the termination of the project.

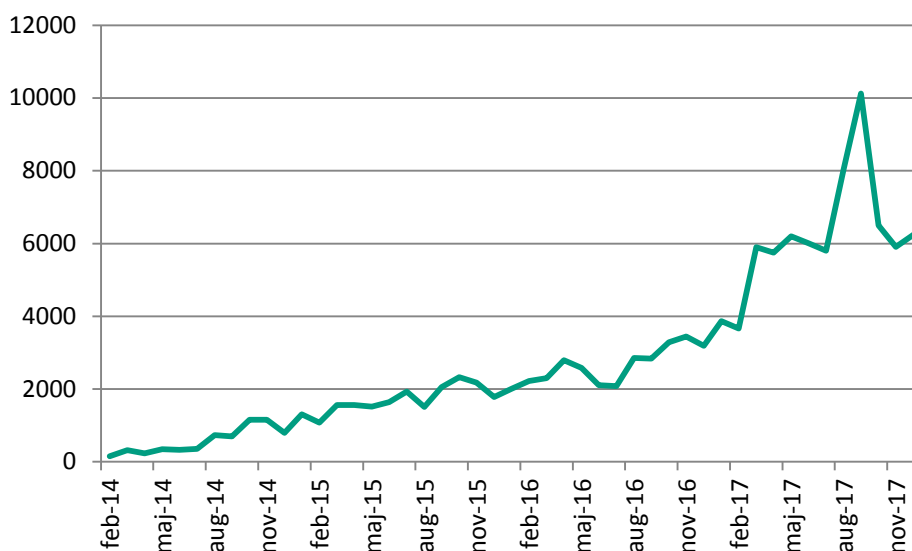


Figure 2. Numbers of unique visitors per month to the GREEN SURGE website (www.greensurge.eu) from February 2014 to December 2017.

4.2.3 Stakeholder Dialogue Forums and Webinars

A series of stakeholder dialogue forums and webinars were arranged and conducted within GREEN SURGE for a direct dissemination of project results. The stakeholder dialogue forums were all face-to-face workshops arranged as part of bigger public events, while the webinars were online allowing everybody to tune in. The three webinars and the three stakeholder forums are all listed in the Table.

30 October 2017	Webinar #3 “How can cities and universities work hand in hand effectively? A conversation with urban planners, facilitators and researchers on bridging institutional interests and cultures to build greener cities together”
20 July 2017	Webinar #2 “No space left for urban green”? A conversation with Melbourne and London on why denser cities and green infrastructure do not exclude each other”
21 June 2017	Webinar #1 “Can urban green infrastructure solve it all? A conversation with leading researchers”
10 May 2017	Stakeholder Dialogue Forum #3

Essen, Germany	“Making cities more cohesive and attractive: How to use urban green to transform neighbourhoods?”
26 April 2016 Bilbao, Spain	Stakeholder Dialogue Forum #2 “Exploring local government strategies of partnering with private sector actors to lead urban development in a greener direction”.
13 October 2015 Brussels, Belgium	Stakeholder Dialogue Forum #1 Green Infrastructure for and with citizens: How can local governments make it happen?

18.1.1 Newsletters

GREEN SURGE also produced two printed newsletters (8 pages and 12 pages). These printed newsletters functioned as a type of project leaflets describing the entire project (#1) followed by a more detailed description of the Urban Learning Labs (#2).

In addition to the printed newsletter, GREEN SURGE produced five E-newsletters featuring various results and on-going investigations during the project. The E-newsletters were emailed to persons who had signed-up on the website. In the end of the project 329 people had registered for receiving these news. These subscribers came from various institutions and countries.

18.1.2 Other project dissemination (publications and presentations)

Other project dissemination activities from all beneficiaries included: 250 appearances at events and conferences (incl. presentations and the chairing and moderation of sessions), 25 media activities (incl. website publications, media briefings, articles in the popular press, and TV video clips). And finally, 38 scientific publications were accepted and published in various scientific journals, while many more are under review or preparation for e.g. the upcoming GREEN SURGE special issue in *Urban Forestry & Urban Greening*.

18.1.3 Final project conference

Under the banner of "Connecting People and Nature for Sustainable Cities", the GREEN SURGE project's final conference took place in Malmo, Sweden, from 20 to 21 September 2017. The highly interactive conference welcomed around 250 participants from 37 countries, among them 80 speakers in 14 thematic sessions.

The highly interactive conference featured interactive discussion formats and sessions including a talk from Gil Penalosa, Founder of 8 80 Cities, on low cost high impact ways to bring city dwellers and nature closer together. He emphasised that cities have to move from good practices of urban green infrastructure to making them the general practice.

A special issue of the scientific journal Urban Forestry & Urban Greening, Elsevier, is under preparation featuring main outputs from GREEN SURGE as well as invited paper presented in Malmö.

18.1.4 European Learning Alliance

GREEN SURGE also set-up an European Learning Alliance featuring various urban green infrastructure experts on LinkedIn. This learning alliance supported all type of knowledge exchange and furthermore allowed to continue the conversation and exchange beyond the end of GREEN SURGE. Close to 350 urban green infrastructure practitioners and researchers are members in the LinkedIn Group "[European Green Infrastructure Practitioners' Network and Learning Alliance](#)".

18.1.5 The GREEN SURGE handbook

GREEN SURGE has produced an illustrative and useful handbook for local government planners and decision-makers, who want to expand, revive and manage their urban green infrastructure better. The handbook includes two guides, which outline principles and steps of planning and governing urban green infrastructure. It also contains shorter materials, which provide facts and policy recommendations on a range of green infrastructure aspects, a learning module on valuing urban green as well as brief summaries of all research studies that were done. The handbook was printed and distributed during the final conference in Malmö as well as other urban green infrastructure and nature-based solutions events. The handbook material has also been collected in an online version available as e-books on the conference website (www.greensurge.eu).

18.1.6 Guides for urban practitioners on urban green infrastructure planning and governance

GREEN SURGE has produced two illustrative guides on planning urban green infrastructure as well as ways of governing it together with people and organisations in cities. It outlines principles of sustainable planning and governance as well as steps to make efforts last and create connected, multifunctional green infrastructure, whilst at the same time enhancing biodiversity, adapting to the effects of climate change and making green space accessible to all living in cities. The guides for practitioners for planning and innovative governance of urban green infrastructure can be downloaded from the project website.

18.1.7 Guide to valuation and integration of different valuation methods and learning module

The GREEN SURGE work on green economy and urban green infrastructure included the identification and evaluation of monetary and nonmonetary methods for assessing the benefits of ecosystem services provided by urban green spaces and biodiversity. GREEN SURGE has synthesised the insights from this work and presents the take home messages for valuation in practice in a new guide. The guide will help the user think through what type of valuation and which methods might be appropriate in different situations. In addition to this guide, a learning module was produced in GREEN SURGE in the form of a science communication tool that makes the research of GREEN SURGE more accessible to practitioners, policy-makers, and students. The board game is an educational tool that allows participants to engage in collective action and test strategic ideas and options in a safe environment. This process allows the innovation of critical insight in the planning process. The guidelines and description of the learning module can both be downloaded from the website.

18.1.8 Policy recommendations and fact sheets on aspects of urban green infrastructure

GREEN SURGE has issued policy recommendations to better use the potentials of green infrastructure to manage some of the most pressing contemporary challenges in cities. Their main target audience are urban planners and city officials across all departments who are curious about ways and means in which urban green infrastructure can help to address a wide range of policy priorities and take more effective and efficient action on the road to sustainable cities. All policy briefs and fact sheets can be downloaded from the project website.

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