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Methodology on spatial analysis in front-runner and follower cities

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Partner organisations

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1	RWTH Aachen University	RWTH	Germany
2	URBASOFIA SRL	URBASOFIA	Romania

Abbreviations

proGReg	productive Green Infrastructure for post-industrial urban regeneration
WP	Work Package
FRC	Front-Runner City
FC	Follower City
NBS	Nature Based Solutions
GI	Green Infrastructure
SDG	Sustainable Development Goals
TRL	Technology Readiness Level

Executive Summary

This deliverable presents the proposed methodology for developing the Spatial Analyses in the 4 front-runner (FRC) and 4 follower cities (FC) within the proGReg project, and is part of the Task 2.1, Work Package 2 – Planning, design and participation processes for nature-based solutions (NBS) coordination. The guidelines in the present document will support a number of subsequent activities and processes in the project, including the local processes of co-design in FRC (T2.2) and FC (T2.3), as well as the NBS benefit assessment and monitoring (WP4) and communication (WP6) activities.

The document is structured into 4 main parts: Introduction, Methodology, Guidelines for the Spatial Analysis, and Toolkit for partners. At the end of the deliverable, a Glossary is provided identifying and explaining the technical terms used within the chapters, as well as a set of annexes providing additional details on the scoping survey developed within the task (Annex B), and the a set of tables detailing in extenso the spatial planning and policy framework documentations of the FRC and FC (Annex A).

Given that this is the first public deliverable of the proGReg project, a general introduction into the project aims and actions is provided within the first chapter, together with the scope of the Task 2.1 – Spatial analysis in front-runner and follower cities, as well as the process of elaboration, linkages with other tasks of the project, conditionalities and limitations which have been addressed within the methodological approach proposed.

The methodology explains the fundamental, descriptive research method model used and the primary components of the Spatial Analysis, which the FRC and FC will have to conduct (D2.2) with assistance from the task and WP leaders: 1) basic data collection and identification of the two territorial scales of analysis (metropolitan / city level and Living Lab (LL) / urban regeneration areas), 2) plan and policy framework analysis, 3) stakeholder identification, 4) Collection of statistical quantitative data and geodata, 5) Spatial indicators, and 6) Baseline assessment / SWOT analysis. The latter three components are built on the key scientific assessment domains of the NBS benefit assessment and monitoring: socio-cultural inclusiveness, human health and well-being, ecological and environmental restoration, economy and labour market.

Further, the guidelines for Spatial Analysis detail the concrete scope, approach and methods to realize the above-mentioned components by the FRC and FC, providing a common set of requirements for all partners. The guidelines for the spatial analysis relies on existing information and planning frameworks at local level (plans and policies), partner constellation knowledge on existing networks and key actors (stakeholder identification), requirements and procedures of the EC for spatial data (The Inspire Directive, Annexes I, II and III), as well as – for the purpose of creating a consistent and coherent indicator framework for the state of art assessment – previous work carried out in the Horizon 2020 „EKLIPSE” and „CityKeys” Projects. The deliverable provides a consolidated „long list” of state indicators specifically aimed at quantifying and assessing the current situation in the 8 project partners, which can be applied as a general approach to assessing the state of play / baseline in cities for NBS

implementation. The work carried out by partners will be summarized textually (SWOT analyses) and visually (thematic maps on the four key scientific domains).

Lastly, T2.1 proposes an easy-to-use toolkit for partners – templates for data collection and interpretation for the components of the Spatial Analysis, as well as references and examples for visually transmitting compelling synthetic illustrations of the FC and FRC baseline analyses.

1. Introduction

1.1. Introduction of the project and work package 2

Productive Green Infrastructure for Post-industrial Urban Regeneration (proGReg) focuses on developing and testing new Nature Based Solution (NBS)-oriented economies shared between public authorities, civil societies and industry / SMEs. Leveraging on the potential of Green Infrastructure (GI) as a driver for the creation of new ecosystems in cities, proGReg will demonstrate the integration of a number of **8 NBS into business models** which will be economically self-sustaining, and which will provide multiple benefits for the economic, ecological and social regeneration of deprived urban areas suffering from the consequences of de-industrialization. **The NBS will be tested within 4 Front-Runner Cities (FRC)**, while another **4 Follower Cities (FC)** will be supported to develop their strategies for embedding nature-based innovation at local level, though participatory processes (see Figure 1).



Figure 1 | The proGReg partnership. Source: RWTH,proGReg Application Form

Through the project, the Front Runner Cities (FRC) of Dortmund, Turin, Zagreb and Ningbo will pilot implementation of NBS within their GI network, creating, assessing and monitoring practices which will demonstrate:

- 1) **Technical innovation** – through deployment and improvement of the Technology Readiness Level of the 8 Nature-Based Solutions selected for proGReg;
- 2) **Social innovation** – through locally-rooted processes of co-design, co-creation and co-implementation of green infrastructure solutions together with the local communities in the living labs areas, which will be integrated into participatory urban regeneration plans.
- 3) **Economic innovation** – through market-ready business models for productive GI, collected within a business model catalogue.

The following Nature-Based Solutions, having varying Technology Readiness Levels (TRL)¹ will be deployed through proGReg and embedded into Living Labs working with the local stakeholder landscape in order to create ownership and locally root the solutions:

- NBS 1 - Renaturing landfill sites for leisure use and energy production (TRL: 8, future TRL through the project: 9)
- NBS 2 - New regenerated soil thanks to biotic compounds for urban forestry and urban farming (TRL: 5, future: 8)
- NBS 3 - Community-based urban farming and gardening on post-industrial sites (TRL: 7, future: 9)
- NBS 4 - Aquaponics as soil-less agriculture for polluted sites (TRL: 7, future: 9)
- NBS 5 - Capillary GI on walls and roofs (TRL: 5, future: 8)
- NBS 6 - Making post-industrial sites and renatured river corridors accessible for local residents (TRL: 8, future: 9)
- NBS 7 - Establishing protocols and procedures for environmental compensation at local level (TRL: 6, future: 9)
- NBS 8 - Pollinator biodiversity improvement activities and citizen science project (TRL: 5, future: 9)

The embedding of proGReg NBS within the local frameworks of the FRC and the planning frameworks of FC will be expected to contribute to:

- 1) European leadership in the global NBS market
- 2) Increased awareness in practice of NBS
- 3) Increased citizen ownership and understanding of GI as an urban common
- 4) Newly opened global market opportunities
- 5) Contributions to the implementation of several EU policies
- 6) Attaining of the Sustainable Development Goals (SDG), especially SDG 11 - Make cities and human settlements inclusive, safe, resilient and sustainable.

¹ Technology Readiness Level represents an abstraction of the technology maturity of a certain technological solution, a method used by the European Commission to estimate progress towards technology systems *actually proven in operational environments* (TRL 9, the highest ranking). In proGReg, the 8 NBS solutions have starting points ranging from TRL 5 („*technology validated in relevant environments*”) to TRL 8 („*system complete and qualified*”). Source: EC (2014), Extract from Part 19 – Commission Decision C(2014)4995, Annex G. Technology readiness levels.

In order to realistically measure success, proGReg will start with setting up a solid base for future planning and implementation, through **Work Package 2 – Planning, design and participation processes for NBS**. WP 2 consists of three tasks (T) (see fig. 2), the first of which is partly constituted by this report. The overall aim is to enable and prepare a location-based and locally adapted implementation of the NBS to be developed within the proGReg FRC and to identify the potential for their transfer to the project’s FC.

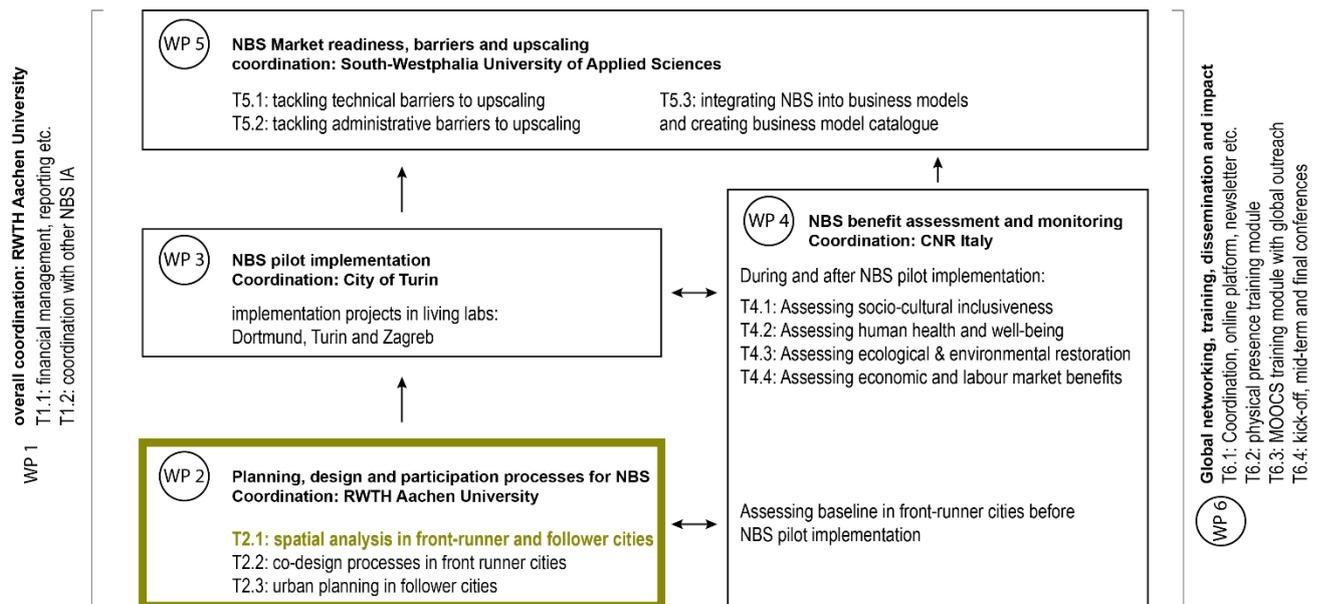


Figure 2 | Overview of Task 2.1 embedded in the whole project structure. Source: proGReg

1.2. Task 2.1: Spatial Analysis in front-runner and follower cities

Task 2.1 represents the first activity deployed which will yield deliverables in the project and will contribute to attaining the WP2 goals through assisting cities create a baseline for articulating the selected NBS with the local needs through a co-design process, supported by the spatial analysis in FRC and FC (T2.1).

The Spatial Analysis in FRC and FC will develop a common spatial framework based on spatial data (hard data) and also on soft contextual information, where this information is readily available, guiding proGReg implementation in FRC and FC. The Spatial Analysis essentially represents a baseline of the current situation within the proGReg cities, at urban / metropolitan and Living Lab area scale.

Task 2.1 has the following aims:

1. Supporting the **co-design activities** in FRC (T2.2) – through providing a useful Spatial Analysis of the FRC to be used in the participatory process;
2. Supporting the NBS benefit assessment and monitoring (WP4) with the necessary spatial data to provide **understanding of the FRCs local contexts** for the NBS implementation;
3. Preparing the framework for the FC in developing their **local sustainable Urban Plans (UP)** - replicating, embedding and integrating NBS in local context (T2.3)

Consequently, the spatial analysis will:

- Generate a comprehensive spatial data-base as baseline input („state of play”);
- Render a clear and holistic picture on the specific local issues and challenges in FRC and FC;
- Assist the benefit assessment and monitoring (WP4) activities in defining the set of spatial indicators which will allow the quantitative assessment of the current situation in FRC.

T2.1 analyses the **baseline conditions („state of play”)** for the 4 key scientific assessment domains defined in WP 4, based on the cross-disciplinary, multi-benefit approach used by the NBS assesment framework developed by the Expert Working Group (EWG) of the EKLIPSE project under EU-DG R&I request and further developed in Raymond et al. (2017) assisting FRC and FC in transposing at spatial-urban level the assessment domains:

1. Socio-cultural inclusiveness,
2. Human health and well-being,
3. Ecological and environmental restoration
4. Economic and labour market

The present report „Methodology on Spatial Analysis in Front-runner and Follower Cities” (D 2.1.) outlines the common working methodology and analysis guidelines for the FRC and FC, in order to provide a coherent and comparable approach between all involved cities and to allow the definition of the key spatial characteristics of the four considered planning domains. The scope of this methodology is to support partners in carrying out their analyses.

Based on the report at hand, FRC and FC together with their local constellations of partner stakeholders will each conduct their spatial analysis, with support from the task and WP leaders. The final “Spatial Analysis Evaluation Report” (D2.2) will encompass findings from the analyses – a baseline of the current situation of each city, from the planning, policy and investment / concerted actions point of view in the cities and their LL areas. The reports will inform the planning and implementation processes in T2.2 and 2.3.

Each FRC and FC in proGireg has a contributing local partner constellation directly involved in project activities (ranging from 2 to 4 partners, with the exception of FC Cascais). For T2.1 specifically, responsibilities for conducting the Spatial Analysis (D2.1) and delivering the Spatial analysis evaluation report (D2.2) rely on the following:

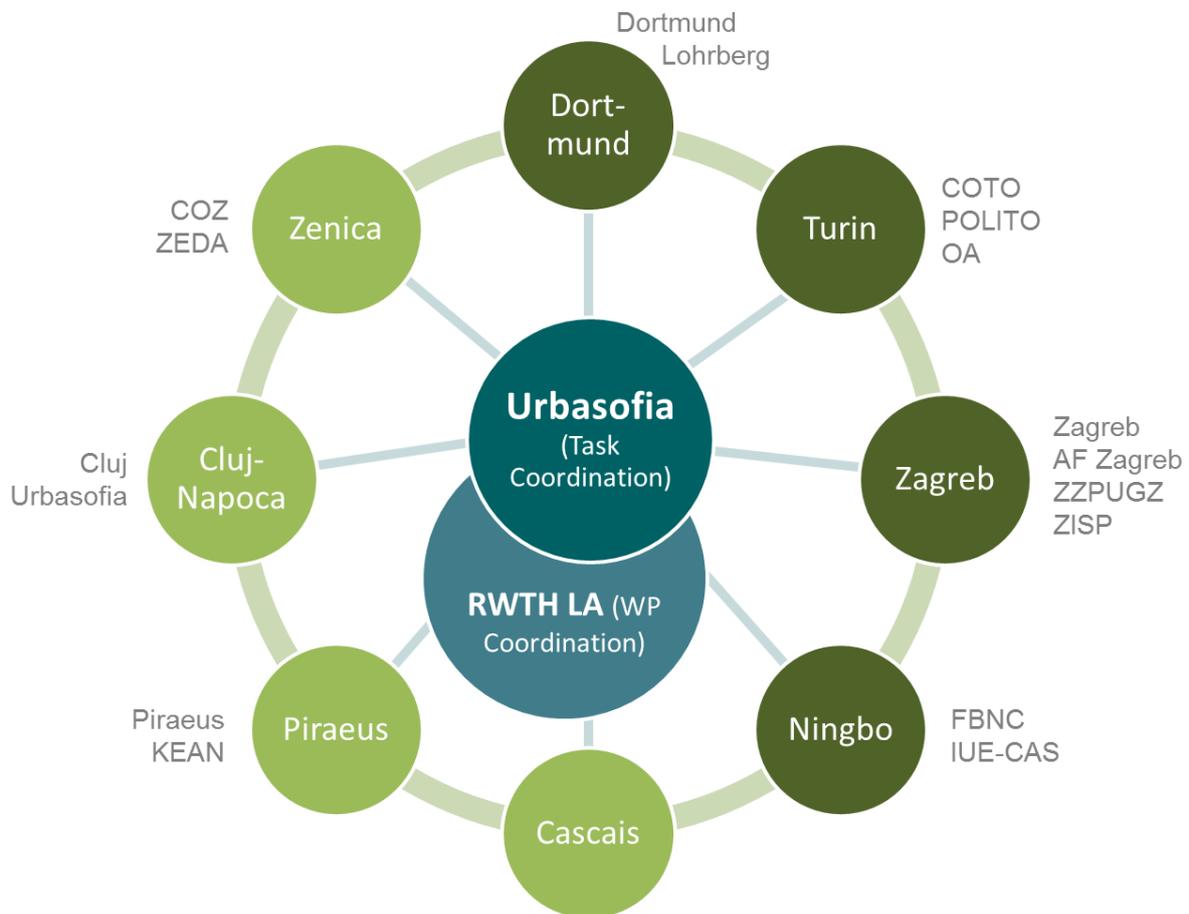


Figure 3 | The partner constellations of each proGReg city which will be involved in Task 2.1

In order to achieve the foreseen results, constant exchange will take place between the task 2.1 and other key tasks and work packages in the project, with which strong content links exist, in order to ensure consistency and an integrated approach:

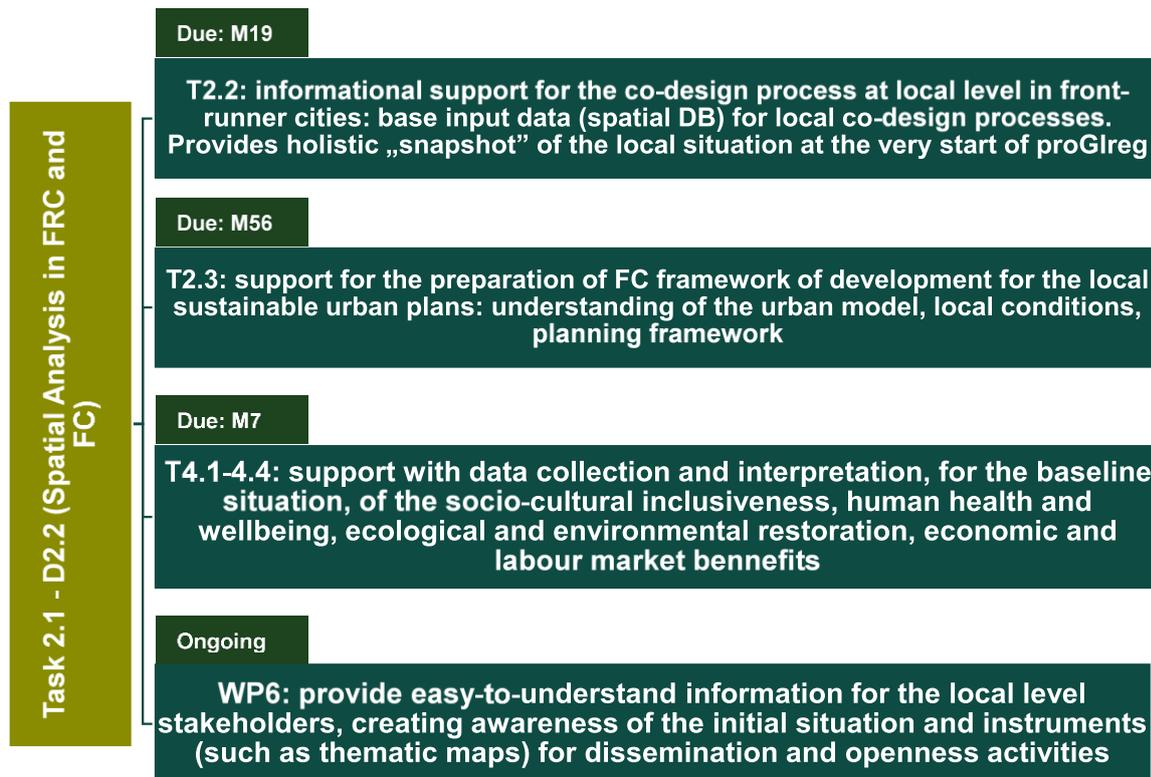


Figure 4 | Task 2.1 dependencies and linkages

Together with the cities and involved partners, for developing this deliverable, the following core steps have been taken from a methodological point of view:

1. A first focused discussion has been conducted during the proGReg kick-off meeting in Aachen (12-13 June 2018) pertaining to data needs and availability, as well as linkages and synergies, particularly with WP4;
2. Afterwards, a working group of partners has been appointed (see Figure 3) in order to set up the proper communication channels;
3. At the start of the task implementation, a short scoping survey on available data was developed, with the purpose of gathering insights on data availability in the proGReg cities (both FRC and FC) with respect to the four key scientific assessment domains (core findings of the survey are enclosed in Annex A).
4. After clarifying any outstanding questions with the working group, based on the data provided through the questionnaire and the provisions of the Application Form, as well as previous work carried out through the EKLIPSE project referenced therein (Challenges 1-2, 4-6 and 8-10 of the EKLIPSE project), the Methodology was prepared, and reviewed internally.

Several conditionalities and limitations have been considered in developing the Methodology on spatial analysis:

1. Albeit the Spatial Analysis Report represents an important stepping stone in the development of FRC and FC further activities in the project, the narrow implementation timeframe conditioned a very pragmatic approach to data collection and aggregation, with a lean and effective indicator list for the analysis;
2. Quantitative data availability is highly variable between partners, as well as the maturity of NBS initiatives, policies, plans and strategies/approaches. In order to ensure comparability between cities, but also sufficient data for a pertinent assessment, the Methodology provide cities with a “long list” of indicators to select based on availability, with a minimum and alternative options for partners (FC) which do not have access to data for the indicators on the list.
3. Qualitative data is not collected through this task, which means certain aspects pertaining to quality of life (specifically indicators within the categories socio-cultural inclusiveness, human health and wellbeing) will be assessed strictly through the statistical data available at local, regional or national level for the FRC and FC and might provide an incomplete picture both into the state of play as well as the drivers and issues behind the statistical phenomena. In order to deepen the understanding into these factors, the cities will rely on actions conducted under tasks 4.1 – 4.4.
4. Among the FC, the selection process of NBS is still incipient, and the analysis will be conducted strictly at urban / city level, while in the FRC the analysis will target both city and living lab areas.
5. Lastly, as some of the FRC are already in the process of implementing NBS at local level, the present analysis will not be a baseline in the strictest sense, but a snapshot of the state of play
6. in FC and FRC at the given time.

2. Methodological approach: Key components and dimensions of the Spatial Analysis in FC and FRC

2.1. Methodology: key steps

In developing the Spatial Analysis profiles of the FRC and FC, the proGReg local partners constellations will apply a fundamental, descriptive research method model based on readily-available statistical data, geodata as well as qualitative/"soft" data and information available within plans, programs, policies and projects in synergy with proGReg and insights pertaining to the general stakeholder landscape of each city and LL (FRC).

Delivering an insightful spatial analysis takes access to data, information on the local development and regulatory/normative frameworks and on the end beneficiaries (target groups) of the proGReg NBS solutions.

Ideally, when assessing the baseline conditions ("state of play") at any given situation within cities and specifically, the project's Living Lab areas, the analysis should focus not only on the description of the "snapshot" in time from several perspectives (environmental, infrastructural, social, economic, cultural, etc.) but should also consider the specific local circumstances which led to the baseline situation: local drivers, needs, main problems, consequences and effects. These are often outlined and analysed within planning documentations at local level. In other words, to connect the present territorial situation with the past actions (research docs, plans, initiatives...) and with the local actors' landscape.

Several approaches relate to a comprehensive spatial analysis. For proGReg, the methodology used in this study relies predominantly on:

1. **Analysis of the existing plans and policies framework** – survey and analysis of existing strategic and normative planning documentations at different territorial scales, in order to contextualize and frame implementation of NBS (FRC) or development of the Urban Plans (FC), from a regulatory, environmental, geographic, historic, demographic, socio-cultural, political, economic, infrastructural point of view.
2. **Quantitative methods** for collection, processing, analysis of pre-existing indicators and GIS data at city / metropolitan area level (FRC, FC) and Living Lab area (FRC), consistent with the project Methodology and its key references (EKLIPSE / EWG assessment framework).
3. **Spatialisation of findings** from the previous steps, mainly quantitative, but also leading to a qualitative set of final conclusions, through a set of 4 maps corresponding to the key scientific assessment domains (mapping as a way to link issues and places);
4. **Formulation of conclusions** per city, through a typical SWOT analysis;
5. **Drawing of overall conclusions for the Spatial Analysis final report.**

2.2. Structural components of the Spatial Analysis in FRC and FC

2.2.1. City (FRC, FC) and Living Lab (FRC) basic data

The aim of this first section is to provide a general context for the analysis, framing the baseline assessment of local conditions and the spatial indicators, while also synthesizing the main characteristics of the cities / metropolitan areas involved in the project in a way which can be compared and disseminated at local and project level.

proGReg will implement NBS which have the potential of generating positive impacts for the whole urban area, especially in what concerns the social and economic benefits of the NBS ecosystems set up in the Living Labs. Contextualizing this change implies conducting a baseline spatial analysis at **two different territorial scales**. Hence, in order to achieve a comprehensive result, the Spatial Analysis (D2.2) will be delivered through a simultaneous approach at:

- 1) the city/metropolitan analysis scale, and
- 2) the LL analysis scale (FRC) / local level of the regeneration areas (FC)

The delineation of the spatial analysis area for the city / metropolitan scale will be conducted considering the **administrative border of the city and / or the limit of the metropolitan area or metropolitan association area**, depending on the partner.

The delineation of the spatial analysis area for the LL / regeneration areas will be conducted considering at minimum the sites themselves, with an offset of one urban island around them

It is to note that even if FC have not yet delineated concretely the areas on which they will focus for developing the Urban Plans (Task 2.3) – urban regeneration areas, or the approach for the spatial analysis of the city for the UP, it is still important to outline a strategic approach to their area-based initiative for integrating innovative NBS and already identify the general zones of relevance for proGReg, which should be explored and analysed further. If data at sub-local level for these areas exist, FC will conduct spatial analysis for both city and the selected potential areas of urban regeneration as well.

The requested information in the basic data component will refer to general characteristics of the two scales of the analysis, such as: administrative information, location, size, population, density, short descriptive profile of the city and main aims pertaining to proGReg, NBS solutions to be tested (FRC) / of interest (FC) – preliminary selection. An indicative fiche model is enclosed in Chapter 4.2.

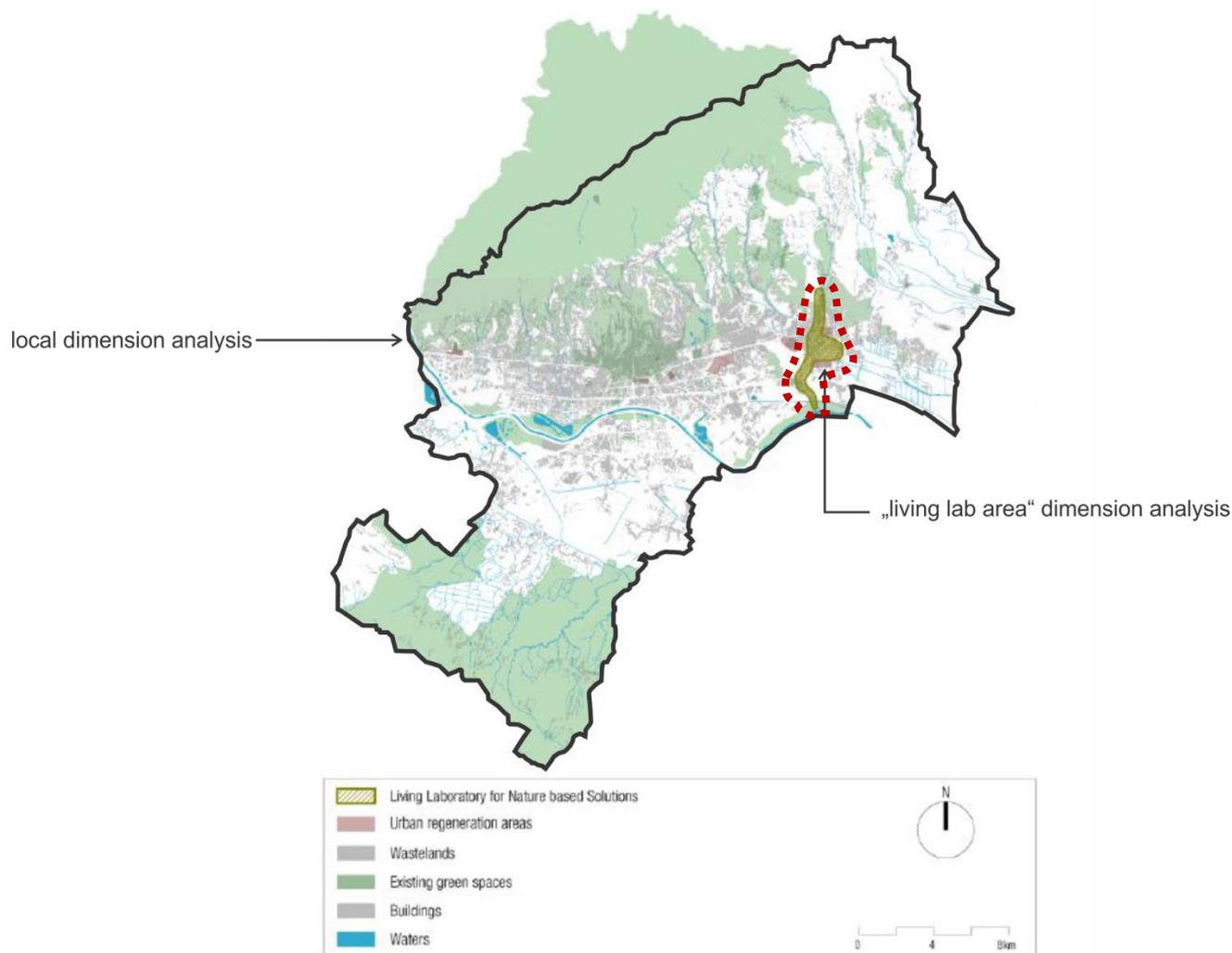


Figure 5 | The two scales of spatial analysis in FC and FRC - example. Source image: proGReg AF

2.2.2. Plan and Policy Framework

In order to create the better conditions for a well-contextualized and locally rooted implementation of piloting in FRC and of urban development in FC, an advanced analysis of the major planning instruments is conducted by the cities through this task. The planning framework analysis provides the strategic and governance context:

- Set the normative framework for NBS implementation in the FRCs, specifically the living lab area defined in the Application Form;
- Assist FCs in the process of analysing the context of the potential areas for NBS implementation.

The framework analysis provides an overview of the partners' current planning tools of relevance for GI and NBS implementation through proGReg, at different territorial governance levels - from national / regional planning acts to local urban policies / initiatives

for GI management and/or NBS implementation, if present, and regulatory instruments and specific provisions for GI, or specifically the LL areas (FRC).

Within their reports, each of the partners (FC and FRC alike) will identify the existing local planning frameworks (i.e. urban and territorial planning documents, strategic documents etc.), programmes and actions which are already foreseen for the development / implementation of NBS at local level. Furthermore, each city will extract regulations for green infrastructure and nature based solutions, where existing, from normative plans in force.

Furthermore, both FRC and FC will compile a list of NBS-focused programmes, actions and projects either foreseen, under development or under implementation (within the framework of proGReg or as parallel initiatives), which are going to be considered within WP 3.

2.2.3. Stakeholder identification

An important definition of the term *stakeholders* has been coined by R.E. Freeman, a front-runner of the stakeholder approach to business strategy: “Group of people who can affect or can be affected by the achievement of the organization’s objectives” (Freeman, 1984). In the process of public participation, **stakeholders** are individuals, institutions, organizations, or specific groups of people with different concerns and interests in the project that could also be potentially affected by its delivery or outputs. Defining a stakeholder base planning process permit to deal with potential arising conflicts before of initiating any form of implementation, moreover, it consents to have a wider and more comprehensive idea of local problems and consent to design “local rooted” solutions, that is getting high degree of sustainability.

Hence, involvement of stakeholders in the NBS implementation and Urban Plan development processes is crucial from several points of view, allowing for:

- **Integration** (of information systems, institutions, resources);
- **Cooperation** (vertical, horizontal and transversal);
- **Continuity** (transcending political mandates);
- **Transparency** (open, public and understandable);
- **Accountability** (visibility of the shared policy process).
- **Sustainability of the whole process.**

All the above listed elements are the pillars for designing effective and efficient policies, or plans, having effectiveness and efficiency both in terms of territorial/urban governance and in results delivered to the affected/involved community.

Because the Spatial Analysis evaluation report (D2.2) will support both FRC and FC with a basis for their participatory processes, a preliminary (general) analysis of main stakeholder groups is important at this stage in order to gauge the level of interest and importance of the local actors and target beneficiaries of proGReg.

Stakeholders can be divided according to their interests and influences into **primary and secondary stakeholders** (Clarkson, 1995). Primary stakeholders have a high level of

interactivity and are vital for the success of a project. Secondary stakeholders affect or are affected by the project and its results, but are not essential for its success.

A general starting point for the stakeholder identification and analysis in FRC and FC starts from the target groups identified in the Application Form of proGlgreg:

- Scientific community inside and outside the consortium
- City representatives and decision-making groups
- Civil societal associations
- Industry / SME representatives with a potential interest in replicating NBS
- Politics
- Civil society
- The general public.

The aim is that of guiding FC and FRC partners to consider potential perspectives of interest for the Spatial Analysis, and most importantly, potential data sources. As data on municipal infrastructure, workforce, social services, etc. oftentimes comes from sources outside the municipality or local partnerships, for the LL interventions foreseen in the project as well as the development of Urban Plans (FC), knowing whom to involve is an important step for ensuring sustainability. In Chapter 3.2, a reference model of stakeholder identification is provided.

2.2.4. Collection of statistical quantitative data and geodata

In order to support the definition of a common spatial framework, and transpose at spatial-urban level the components of each city's spatial analysis, it is necessary to conduct a process of data collection. Data collection falls under the responsibility of each partner constellation at local level, for the FRC and FC, and is a key component not only for the spatial analysis and tasks 4.1-4.4, but also for the development of local planning processes (T2.2 and T2.3).

The survey on available data indicated that all partners have access to municipal data – local statistics pertaining to the Spatial Analysis, and / or GIS datasets.

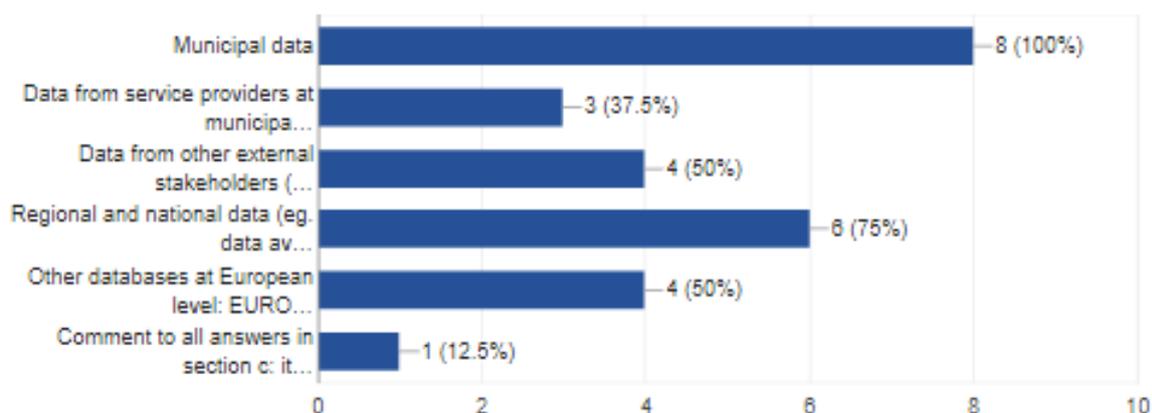


Figure 6 | Sources for available data in FRC and FC. Source: Scoping survey, URBASOFIA.

One of the main challenges of the spatial analysis is to bring all cities to a **common denominator – framework for baseline analysis**. Given the wide variance of data availability, especially between FRC and FC, the missing data issue can be solved through:

- Excluding indicators from the list until a coherent common database of primary indicators exists across partners;
- Defining proxy indicators or alternatives for which data is available (secondary indicators);
- Include the indicators, collecting data where it is available for the baseline and collecting primary data through proGlgreg for the subsequent assessments, acknowledging that baseline measurements will not be available for some of the partners.

Each city will be in charge of collecting the data and indicators proposed in the framework, with assistance from their local partners, and under guidance of URBASOFIA

Data collection for the spatial analysis involves „hard” data – quantitative indicators are best fitting for the assessment of the four domains in this stage and subsequent further co-design and implementation. As quantitative data could miss critical elements pertaining especially to the socio-economic indicators, it will need to be complemented in subsequent tasks by qualitative data (tackled through the questionnaires of WP4 and the local processes of T2.2 and T2.3).

Generically, data required for the analysis are data already collected, categorized as:

- (1) **Spatial data:** Available geodata, based on the Infrastructure for Spatial Information in Europe (INSPIRE) Directive (2007) Data Themes, targeting spatial data which can be used in environmental studies, planning framework and policy design
 - Maps, either raster or vector - computer data files (GIS, dwg, etc.)
 - Remotely sensed data such as satellite imagery or orthophoto plans
- (2) **Non-spatial data, i.e. statistical indicator sets on municipal / metropolitan scale as well as LL / urban regeneration analysis area scale**
 - Tables
 - Graphs and charts

The main data sources for FRC and FC, are the following:

1. Municipal databases, municipal / metropolitan GIS data (ideally microdata for pilot sites)
2. Data from service providers at municipal level (eg. contracted GIS services outside municipal departments, utility management companies)
3. Data from other external stakeholders (business register, NGOs, chambers of commerce, etc)
4. Regional and national data (eg. data available from the national statistics institutes, nation-wide census data)
5. Other databases at European level: EUROSTAT, OECD, ESA Copernicus, Europe's soil database, data from ECMWF, European vegetation survey, etc.
6. Existing documentations and grounding studies

The proGReg database for Spatial Analysis will be an organized collection of data, to be used to integrate all information about the state of art and trends in the environment, social, economic and health/wellbeing sectors for the cities and the LL / regeneration analysis areas. Partner datasets will be collected within the proGReg website intranet.

2.2.5. Spatial indicators

Urban planning and territorial management set up participatory processes in order to design the appropriate framework of sustainable activities. The contribution of spatial indicators to shape these processes is of relevant importance, because of improved processing (effectiveness, efficiency, transparency) and spatial analysis capabilities. Spatial indicators refer to different categorizations.

A **statistical indicator** is the representation of statistical data for a specified time, place or any other relevant characteristic, corrected for at least one dimension (usually size) so as to allow for meaningful comparisons (EUROSTAT definition). At territorial level, statistical indicators represent the numerical expression of territorial, economic or social categories defined according to time, space and organizational structure.

The indicators allow perception of differences - territorial disparities, improvements or developments related to a desired change or in a certain context – specifically, the outcomes and future impact of proGReg in LL and urban context.

From a typology point of view, indicators can be quantitative or qualitative.

Quantitative indicators illustrate a number, index or ratio / percentage, being widely used in planning because they provide a **clear measure of the analyzed situation** and are **numerically comparable**. Quantitative indicators are preferred to qualitative ones because they are not biased, requiring only mechanical collection methods that (theoretically) deliver the same results, irrespective of the institution or individual making the measurement.

Qualitative indicators do not present numerical measures as such, but describe the status of a qualitatively analyzed issue. Although qualitative indicators are rarely used in spatial analyses, they can better capture information on quality of life, health, wellbeing. The qualitative approach represents a parallel process in the project, conducted through the WP4

tasks. There is no competition between quantitative and qualitative indicators – a good baseline assessment, as well as the subsequent analyses, should involve both instruments.

We further differentiate between:

1. **Pressure, process or control indicators:** These indicators are used to diagnose and measure the process that will influence the state of progress; these are often the factors or forces for substantiating territorial processes (e.g. population dynamics, consumption, poverty);
2. **Status indicators:** Indicators aiming to provide a simple description of the current state of development resulting from pressures or processes (e.g. air pollution level, soil degradation, etc.)
3. **Target, response or performance indicators:** they assess the impact of changes brought about by policies.

Focusing on the assessment indicator framework for proGInreg, we take into account the following mandatory characteristics of indicators:

1. **Indicators must be already available at local level in FRC and FC (ideally, all of them):** the D2.2 provides a state-of-play assessment, qualitative, in the 8 cities, but it **does not collect new indicators**. The analysis will be based on data available either at local level (directly from the municipalities or other data owners), or at regional / national level (e.g. National Statistics Institutes), and European level.
2. **Selected and used indicators must represent free data:** This conditioning excludes any database that needs to be purchased. proGInreg will embed data that is either publicly available or provided by partner organizations or other interested parties in order to be analyzed and the results to be published freely, non-profit, online, including as a means for disseminating the project.
3. **Indicators must be SMART:**
 - 1) **SPECIFIC:** precisely formulated, with the possibility to be translated in operational terms, and which correspond to the measurement of the four main assessment categories of the project, being linked to the result and unambiguous.
 - 2) **MEASURABLE:** quantifiable, having a unit of measurement or measurement methodology that allows the replication and obtaining of the same result by others or in the future, for monitoring purposes;
 - 3) **ACCEPTED:** Indicators are achievable if the performance target specifically specifies the amount or level of what is to be measured.
 - 4) **RELEVANT:** Selected indicators need to directly pertain to the evaluation of GI and its impacts / potential impacts at physical, social and economic levels, and collection should be realistic in terms of conditioning (time, resources, effort).
 - 5) **TIME-BOUND:** having a clear and appropriate reference for a given period, while also providing recurrent measurements and allowing the tracking of changes at the desired frequency for a set period.
4. **The indicators should be simple:** the concepts conveyed must be simple and easy to understand, and their definition must be widely accepted (a complex obscure indicator raises a wide range of issues of availability, replicability, utility, etc.)
5. **Finally, the spatial analysis set of indicators must ensure a degree of comparability across FRC and FC, while being sufficiently compact to be operational:** As a rule of thumb, a relevant common final set of no more than 20 primary indicators (common across the board) and 10-15 secondary ones (common for FRC) should provide a good basis for analysis.

Taking into account all the above requirements, through this deliverable, proGReg defines a **set of spatial indicators** for the analysis of the baseline („state of play”) in FC and FRC cities, at the two spatial levels described in chapter 2.2.1.

T2.1 does not develop new indicators or collect new data. Instead, T2.1 leverages on the following indicator and information frameworks and Key Performance Indicator (KPI) sets previously developed either as part of European Commission (EC)-funded projects, or pertaining to sustainable development:

- Horizon 2020 „EKLIPSE” Project (<http://www.eklipse-mechanism.eu/>), Report - An impact evaluation framework to support planning and evaluation of nature-based solutions projects.
- Horizon 2020 „CITYKEYS” Project (<http://citykeys-project.eu/>), key performance indicators and data collection procedures for the common monitoring and comparability of smart city solutions across European cities.
- UNECE ITU-T Smart and Sustainable Cities and Communities indicators (<https://www.itu.int>)

In order to ensure relevance, integration and a coherent approach between the front runner cities and the follower cities in the process of spatial analysis, the proGReg methodology for Spatial Analysis further breaks down the main domains in WP4 into sub-categories, each to be assessed (baselined) by cities through the set of spatial indicators in Chapter 3.3.2:

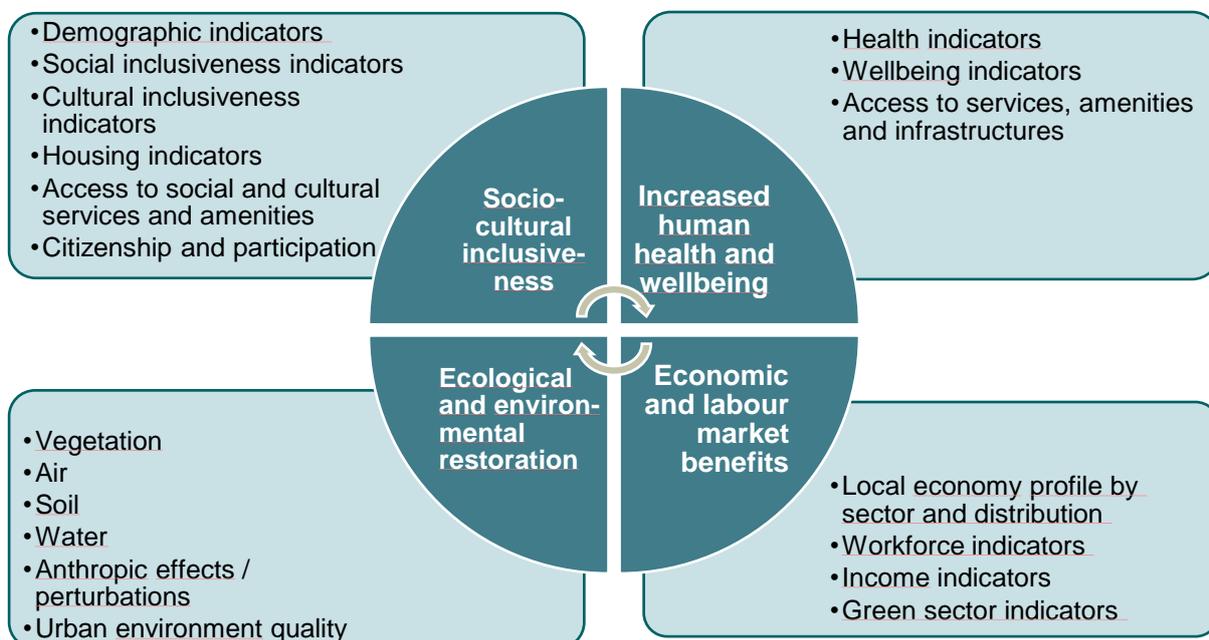


Figure 7 | Main spatial indicator categories in proGReg

2.2.6. Baseline assessment / SWOT Analysis

As outlined above, the Spatial Analysis will be conducted based on information and data already available at local, regional and national level (see chapter 4), from multiple sources: available datasets, indicators, information sourced from up-to-date planning documentations and grounding studies.

The analysis will rely on the structured set of spatial indicators developed in this report for the quantitative assessment of socio-cultural inclusiveness, human health and well-being, ecological and environmental restoration, economic and labour market, establishing a baseline for further re-assessment within the implementation lifetime of proGReg.

An interpretation of the data will be provided by each FRC and FC in the forms of:

1. **A SWOT analysis of the current situation (baseline)** on the four key scientific assessment domains of the NBS benefit assessment and monitoring (WP4), both at the level of the city / metropolitan area as well as at the analysis level of the LL / Regeneration areas (see chapter 2.2.2)
2. A spatialisation of the findings in the SWOT analysis, through a set of 8 thematic maps (2*4), corresponding to 1) the two territorial analysis levels and 2) the four key scientific assessment domains defined in WP 4: socio-cultural inclusiveness, human health and well-being, ecological and environmental restoration and economic and labour market.

Relying on each FRC and FC baseline assessment, an overall „state of art” overview will be provided by URBASOFIA.

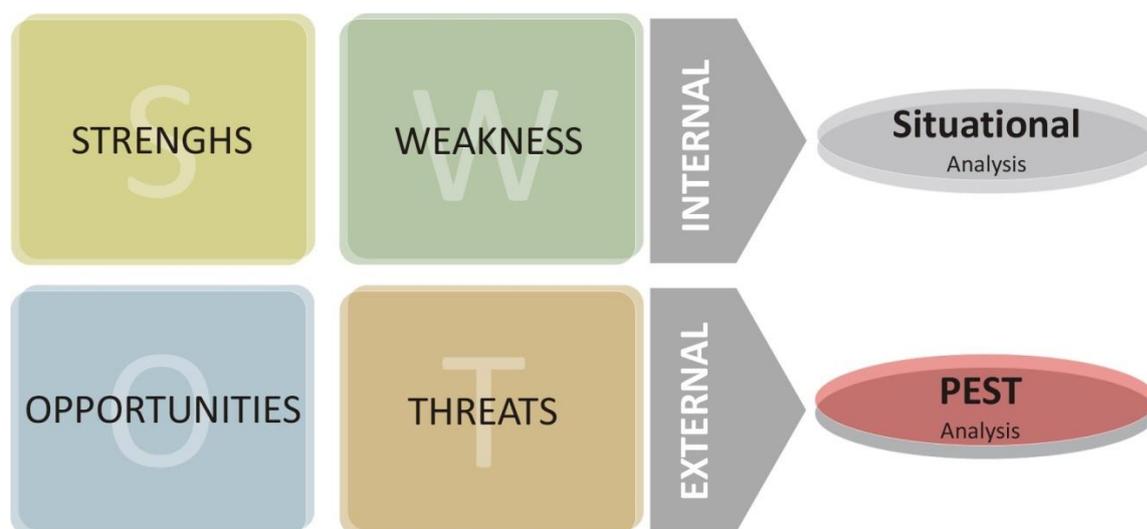


Figure 8 | Spatial Analysis - data interpretation through the SWOT analysis instrument. Source: own design

3. Guidelines for the Spatial Analysis

Guidelines for the Policy Framework analysis

Through the Scoping Survey deployed within this task, the cities have already identified the key strategic and normative plans, as well as policies on urban development, urban regeneration, green infrastructure and other foci of interest for the proGReg project. This has been especially helpful for providing a first insight into the policy and planning framework within which each city will implement either the NBS foreseen in the LL areas (FRC) or Urban Plans foreseen for implementation after the project lifetime (FC).

These documents will be reviewed by the partners, for the following scopes:

- Providing a planning framework for the actions of the project, both in FRC as well as FC;
- Contextualizing the LL interventions (FRC) and Urban Plans (FC) and integrating the vision of the project with the one of higher administrative levels;
- Ensuring alignment with normative provisions for the cities, especially FRC, and compliance with regulations at local level for the LL interventions;
- Identifying initiatives pertaining to green infrastructure and NBS at higher territorial levels (national, regional) which have a potential impact on the proGReg implementation and which could be capitalized upon during the project.

Distinctively, a selection of relevant objectives, policies, programmes, actions and projects as well as rules and regulations (normative) will be carried out by the partners, which will analyse the existing plans and policies by having in mind the following issues:

1. At regional level (FC and FRC):
 - The vision and strategic objectives to which NBS development and piloting through proGReg subscribe, pertaining to available strategies, documents or policies for: urban development, green infrastructure development and regeneration of post-industrial landscapes;
 - Existing regional / higher-scale initiatives and projects on GI / NBS, if the case;
2. At city / metropolitan area level (FC and FRC), with specific focus on the LL sites (FRC):
 - Provisions pertaining to social, economic and physical regeneration of communities within municipal plans, policies and strategies for urban development;
 - Provisions pertaining to green infrastructure, environmental management and sustainable development within municipal plans, policies and strategies for urban development, sectoral strategies, and other documentations of interest.
 - Local policies and programmes for participation, community involvement, social inclusion and social innovation;
 - Policies, instruments and facilities for supporting the local business environment and employment at local level, specifically in domains connected to GI;
3. At Living Lab / local level (FRC, potentially FC if a delineation of the Urban Plans areas has already been identified): Existing grounding studies, surveys, programmes conducted at Living

Lab scale pertaining to: GI, social innovation and inclusion, economic redevelopment, participation and active citizenship.

Key topics of interest for NBS implementation	Regional level	Local level	Other city investments / actions
Urban development Green infrastructure Regeneration Participation, social inclusion Other connected topics of interest	<ul style="list-style-type: none"> - Contextualisation: strategic objectives of the identified plans to which proGReg initiatives correspond to; - Provisions of regional plans (i.e. landscape plans) which affect the implementation of the project (LL implementation) or condition the Urban Plans (FC) through specific constraints or opportunities (i.e. linking of NBS implemented within a higher-level, regional GI framework) - Synergies: policies, programmes or projects at regional level dealing with the key topics of interest for NBS implementation, which can be linked to the project; - Opportunities: support for NBS implementation (i.e. Operational Programmes) 	<ul style="list-style-type: none"> - Contextualization: provisions of master-plan and sectoral plans and strategies on the key topics of interest for NBS implementation; - Contextualization: local policies for NBS implementation, for participation, community involvement, social inclusion; - Constraints: provisions of normative plans, specifically for the LL / regeneration areas; - Opportunities: policies, instruments and facilities useful for NBS implementation; 	<ul style="list-style-type: none"> - Synergies: other actions which are already foreseen for the development /implementation of NBS at local level (i.e. regeneration of other neighbourhoods); - Specifically for FC: projects and programmes foreseen in integrated or sectoral strategies which should be considered when developing the Urban Plans, either as elements of constraint, or as potential actions in synergy, for joint capitalization or cross-fertilisation.

For reference, summary / list of the existing repository for the plan and policy framework analysis is listed in the Annex A, based on the scoping survey filled in by the partners.

3.1. Guidelines for the Stakeholder Identification

As each city has a specific stakeholder landscape and culture of participation further refinement or a more accurate separation into categories and types of stakeholders will be conducted case by case by the cities involved in proGReg. For the purpose of this deliverable, only an identification of the main stakeholder groups will be requested.

A starting point to be considered is the following separation, adaptable at each city/metropolitan area scale and LL / regeneration area analysis scale (defined as in Chapter 2.2.2):

Primary stakeholders:

- Public authorities and decision-making groups on different administrative levels (municipality – relevant departments, Metropolitan Area, district government bodies if existing, neighbourhood structures);
- Policy-makers at local level;
- Service providers at city and local level;
- Deconcentrated institutions at local / regional level;
- Industry representatives and SMEs;
- Civil society (specific organisations relevant for the LL area, for example social, health, environmental organizations, housing associations, education / local schools in the LL areas, etc.)
- Citizens un-affiliated to an organisation, which can be considered target groups for an NBS implementation, for example refugees to be involved in the NBS no.5 implementation in the Dortmund Living Lab.

Secondary stakeholders:

- Civil society (other relevant organisations such as clubs, associations and activist groups, whose involvement in the project is beneficial, but not essential).
- Research and academia at local level (which can be even primary stakeholders, depending on the scope of piloting activities)
- General public
- Media, press

Regarding the role of each stakeholders, a delineation should already be established at this stage between users / beneficiaries, providers, governance stakeholders and possible influencers.

Each of the cities should identify, the specific organisations they foresee to involve in the proGReg activities (either for implementing LL activities – FRC, or for developing the Urban Plans – FC) and provide a stakeholder identification map:

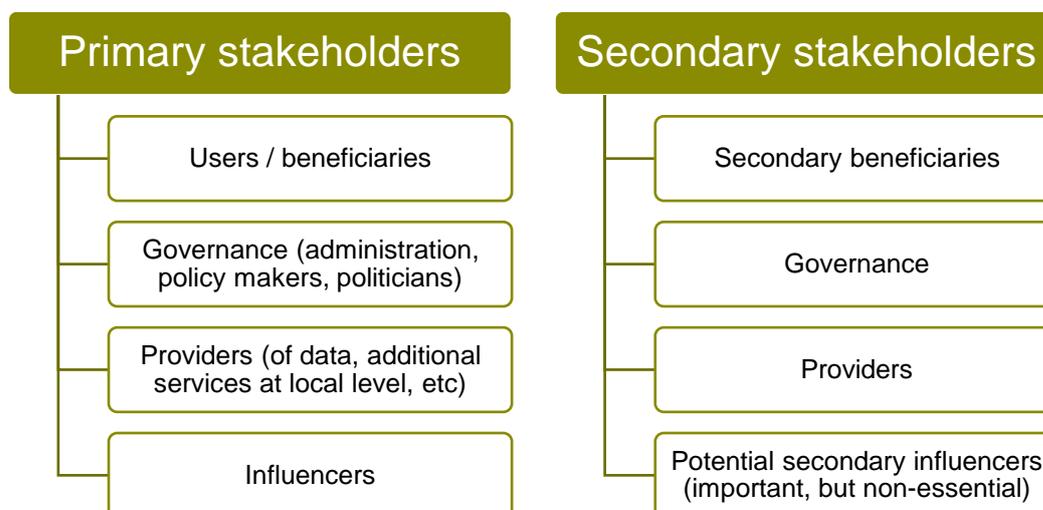


Figure 9 | Stakeholder mapping by role in ProGlgreg

3.2. Guidelines for the Spatial Analysis

3.2.1. Geodata / spatial data

As Task 2.1 aims to generate a comprehensive spatial data-base (i.e. geodata) as the necessary baseline input data, partner representing the 8 cities in the project will provide their set of available geodata. Most of the partners, according to the scoping survey, use their GIS systems for mapping (5/7), and analysis (4/7).

The basic list of spatial data necessary for the Spatial Analysis (and further tasks in WP2 and WP4) relies on the INSPIRE Directive, Annexes I, II and III (**Data specifications – Themes**), with the first two annexes mandatory as a minimum requirement for conducting the analysis.

As far as software is concerned, necessary for the Spatial Analysis, 4 partners use AutoCAD (Zenica, Zagreb, Piraeus, Cluj), Dortmund uses MapInfo (DORIS and GRAPPA), Torino uses ESRI, ArcGis, QGis, Autocad and other software as well, while Cascais uses QGIS. Partners will provide the above-mentioned geodata (as available), preferably in SHP / DXF and TIFF (for raster images, i.e. orthophotoplans) formats.

ANNEX I	ANNEX II	ANNEX III
Administrative Units	Elevation	Agricultural and aquaculture facilities
Transport networks	Land cover	Area management
Hydrography	Geology	Atmospheric conditions
Protected sites	Orthoimagery	Bio-geographical regions
Cadastral parcels		Buildings
		Environmental monitoring facilities
		Habitats and biotopes
		Human health and safety
		Land use
		Meteorological geographical features
		Population distribution and demography
		Soil
		Species distribution
		Utility and governmental services

3.2.2. Set of spatial indicators

For the purpose of the baseline („state of art”) analysis, as explained in chapter 2.2.5, a set of spatial indicators was developed combining basic state and pressure indicators, common to integrated baseline assessments, with existing indicator frameworks priorly developed through the Horizon 2020 „EKLIPSE” Project (<http://www.eklipse-mechanism.eu/>), Horizon 2020 „CITYKEYS” Project (<http://citykeys-project.eu/>), and UNECE ITU-T Smart and Sustainable Cities and Communities indicators (www.itu.int). This tentative list will be refined in cooperation with WP4.

As most of the indicators within these publications **are key performance indicators (KPI) aimed at assessing the impact of a certain action or project**, for the purpose of the baseline, these process indicators have been transformed into (initial) state indicators, e.g.:

Process indicator provided through EKLIPSE / CITYKEYS / UNECE-ITU KPI	State indicator to be used in the baseline Spatial Analysis
EKLIPSE: Number of green jobs created (Forestry Commission, 2005);	ProGReg D2.1: Existing number of green jobs

The tentative extensive („long”) list of indicators on each of the four thematics is expressed below, with basic indicators potentially available in all partners (considered minimum requirements) in bold:

Main categories	Thematics	Indicators	Scale
Socio-cultural inclusiveness	Demographics	Population density	City, LL
		Population growth rate	City, LL
		Migration rate	City
		Median age	City, LL
	Social and cultural inclusiveness	Material deprivation rate	City
		Wealth	City
		Income inequality / Gini coefficient	City
		Number of immigrants	City, LL
		Educational attainment	City
	Access to social and cultural services and amenities	Facilities/Services destined for disadvantaged groups (immigrant integration, persons with disabilities, etc.) – no.	LL
		Recreational or cultural facilities – no.	LL
		Accessibility of green areas	City
	Housing	Affordable / social housing availability	City, LL
		Density of the built environment	City, LL
	Citizenship and participation	Consultation on rule-making	City
Voter turnout		City	
Human health and wellbeing	Health	Amount of cause-specific hospital admission (allergic conditions, cancer, mental diseases and disorders)	City
		Incidence of cardio and respiratory diseases	City
		Incidence of chronic stress and stress-related diseases	City
		Obesity rate	City
	Wellbeing	Access to green space (% dwellings within 300m radius)	City / LL
		Green space per capita	City / LL
		Safety: number of reported crimes	City
		Time spent on leisure activities (for people between 25-64) - if available;	City
		Exercise hours per week	City
		Modal split during working days	City

	Access to services, amenities, infrastructures	Leisure services and amenities	LL
Ecological and environmental restoration	Vegetation	Urban land use - % of green spaces (- dynamic)	City
		Accessibility of green areas	City
		Absorption capacity of green surfaces	City
	Air	Concentration of SO₂,NO₂, O₃, CO and PM_{2.5-10}	City
		Intensity of greenhouse effect	City
	Soil	Soil composition and quality	City, LL
		Surface of brownfields	City, LL
		Surface of fertile soils	City
	Water	Water quality (free O, N, pollutants)	City
	Anthropic effects and urban environment quality	Heat island effect	City
Economic and labour market	Local economy	GDP per capita	City
		Local economy profile by sector and distribution	City
		Turnover in the green sector	City
		Productive urban agricultural surface	City
	Workforce indicators	Existing number of green jobs	City
		Employment / unemployment	City
	Income indicators	Median income	City
		Minimum wage (if existing)	City
	Resource efficiency	CO ₂ balance	City
		No. Of heating-cooling days	City
Property value (average, EUR/sqm, single- and collective housing)		LL	

All cities will collect the indicators listed above, based on their availability (including for the LL analysis / urban regeneration area if existing and listed). If the data is available with yearly periodicity, the cities will use the last five years (2013-2017) in the analysis for process indicators.

3.3. SWOT Analysis/Drawing conclusions

Both FC and FRC will develop a short SWOT analysis on the four main categories of the NBS benefit assessment and monitoring (WP4), based on the findings of the analysis. The approach proposed is further detailed within the Toolkit included in Chapter 4. The SWOT will be incorporated in the final assessment of the FRC and FC spatial profiles by URBASOFIA, in charge of developing the final overall D2.2 Report.

It is to note that Task 2.1 does not foresee the collection and prioritisation of data through a participatory processes, this action being further conducted through subsequent tasks (T2.2, T2.3, WP4). Because of the concentration on quantitative indicators, a further validation with local stakeholders of the findings is necessary.

The spatialization of this data, using the geodata collected, will be conducted at the two spatial levels outlined in Chapter 2.2.2. Eight thematic maps (Four maps at each of the two analysis scales) will be realized by the partners to provide an easy-to-understand visual assessment of the conclusions within the SWOT analysis, touching on synthesis aspects such as:

- Degree of connectivity / fragmentation of green areas in the city
- Areas concentrating social problems – deprived neighbourhoods
- Quality of connections between residential and green areas
- Areas with high population density outside the radius of a green space (300m)
- Property values in conjunction with GI, etc.

The thematic maps will conform to the NBS benefit assessment and monitoring (WP4) key scientific assessment domains:

1. Socio-cultural inclusiveness,
2. Human health and well-being,
3. Ecological and environmental restoration
4. Economic and labour market

All partners will be supported by the task leader in elaborating their SWOT analyses and thematic maps, with partner cities not using GIS technologies for the latter being further assisted to visualise the state of art through the Spatial Analysis (D2.2) deliverable.

4. Toolkit for partners

4.1. Reference Table of Contents - Spatial Analysis reports for each city partner

Introduction

City identification fiche

Stakeholder identification

 Primary stakeholders

 Secondary stakeholders

Analysis of the existing plans and policies

 Regional / National level

 City / Metropolitan level

 Living lab / local level

 Current and planned interventions in synergy with proGReg

City spatial indicators

 Indicator database

 Spatial datasets

Spatial analysis

 Socio-cultural inclusiveness

 Human health and wellbeing

 Ecological and environmental restoration

 Economic and labour market

 For each of the above domains:

 (1) Baseline: SWOT - quantitative assessment based on the set of spatial indicators

 (2) Spatialisation of results – thematic map (1 at city/metropolitan area level, 1 at LL analysis area / urban regeneration area level) synthesizing main problems and positive aspects

Conclusions

4.2. Reference data collection and analysis tables

1. PROGIREG FRC AND FC IDENTIFICATION FICHE		
Localization of City / Living Lab	Region / NUTS 2*	
	Province / NUTS 3*	
	Coordinates	
Information about the city / metropolitan area	Population	
	Surface Area (km ²)	
	Density	
	Average elevation (m)	
	Climate	
	Average temperature in winter	Avg. High °C
		Avg. Low °C
	Average temperature in summer	Avg. High °C
	Avg. Low °C	
Information about the LL Analysis area² (FRC) / regeneration areas (FC)	Population	
	Surface Area (km ²)	
	Density	
Contact and information from the municipality	Municipal website	
	Contact e-mail address of municipal offices	
	Data sources	
Description of context	Specific objective(s) for proGireg implementation	
	Past interventions	
	Planned interventions	
City plan (map)		
LL / regeneration area(s) maps, delineated		

² The Living Lab analysis area represents the area used within the baseline assessment, which represents the area of immediate impact for the proGireg NBS implementation. As reference, a minimum of a one-block offset will be considered additional to the actual LL area. For a visual reference, refer to chapter 2.2.2.

2. STAKEHOLDER IDENTIFICATION

PRIMARY STAKEHOLDERS		
Stakeholder role	Stakeholder type	Stakeholder (organisation) name
Users / beneficiaries	(e.g. Civil society, SME, Education...)	
Governance	(e.g. Policy makers, politicians, metropolitan area..)	
Providers	(e.g. Public service providers...)	
Influencers	(e.g. Important local organisations which can „champion” the initiative)	

3. SWOT ANALYSIS

CITY LEVEL				
	Strengths	Weaknesses	Opportunities	Threats
Socio-cultural inclusiveness	<i>E.g. High social housing availability</i>			
Increased human health and well-being				
Ecological and environmental restoration				
Economic and labour market benefits				
LIVING LAB LEVEL (FRC) / REGENERATION AREA(S) (FC)				
	Strengths	Weaknesses	Opportunities	Threats
Socio-cultural inclusiveness	<i>E.g. Low median age – active population</i>	<i>E.g. Higher material deprivation rate – enclavisation</i>		
Increased human health and well-being				
Ecological and environmental restoration				
Economic and labour market benefits				

Note: the SWOT analysis, as per Chapter 3 / Guidelines provisions, will be conducted on the basis of the analysis indicators provided through the present methodology and will refer to the existing baseline („state of art”), leveraging on the most recent available data (if the indicators have a limited periodicity, eg. 10-year census data) or available data for the 2013-2017 period (if the indicators have a yearly periodicity of collection).

4.3. Per-partner thematic maps

Each partner will develop a set of 4 thematic maps at two levels (city / metropolitan and LL / regeneration area), summarizing the findings of the SWOT analysis for each of the key reference domains:

1. Socio-cultural inclusiveness (state of play at city and LL / regeneration area);
2. Human health and well-being,
3. Ecological and environmental restoration,
4. Economic and labour market.

The design of the thematic maps will need to conform to the visual communication guidelines of the project, and will rely on specifications which are currently under development in Work Package 6 (Communication): the proGireg corporate layout, the project colour palettes.

As a general principle, the maps will be developed with simplicity and ease-of-understanding in mind, given that one of their use will be as a communication tool with the local stakeholders in the participatory processes in FRC and FC.

Examples – illustration techniques for thematic maps

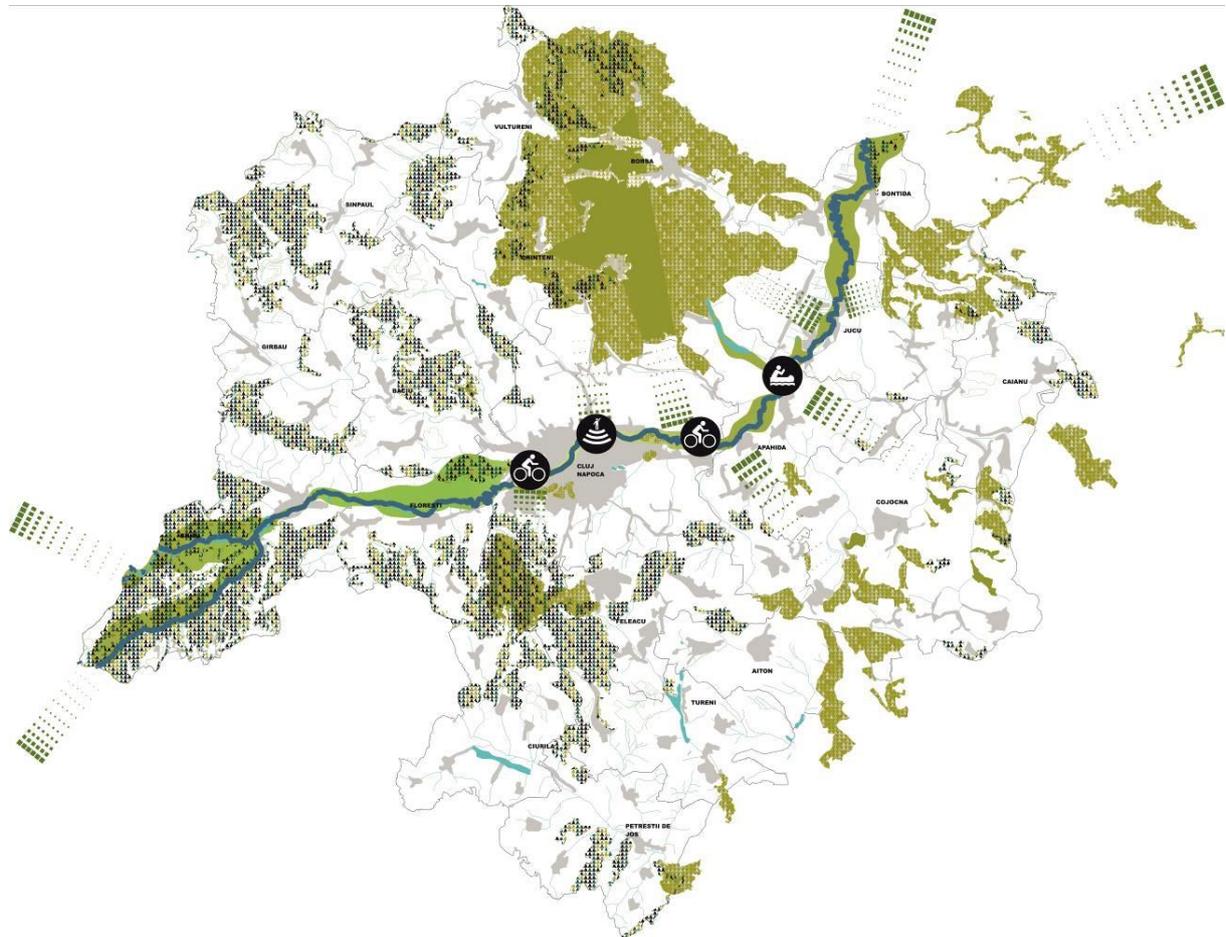


Figure 10 | Spatial representation of blue-green network. Integrated Strategy for the Cluj Metropolitan Area, Urbasofia (2015)



Figure 11 | Visualisation of services for GI. Parcul Feroviarilor Competition submission, Urbasofia, Tasca Studio (2018)

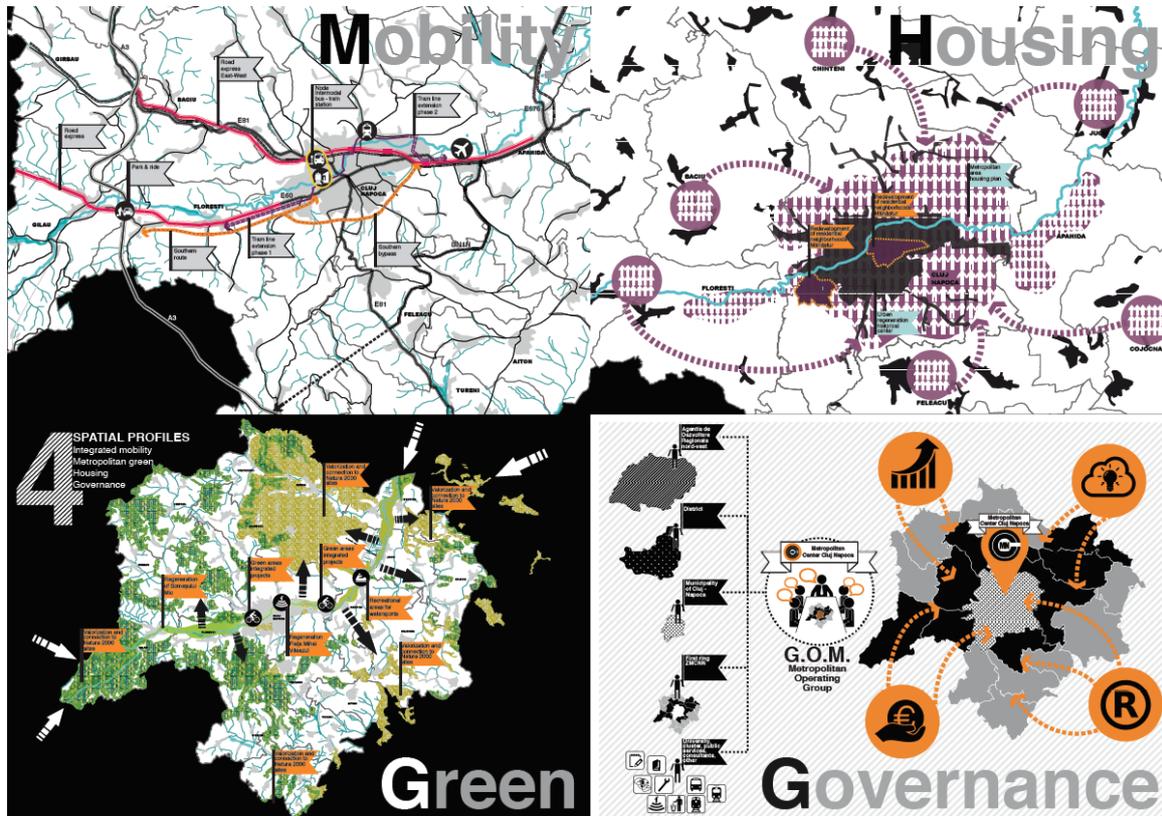


Figure 12 | Spatial profiles (proposal). Integrated Strategy for the Cluj Metropolitan Area, URBASOFIA, Tasca Studio (2015)

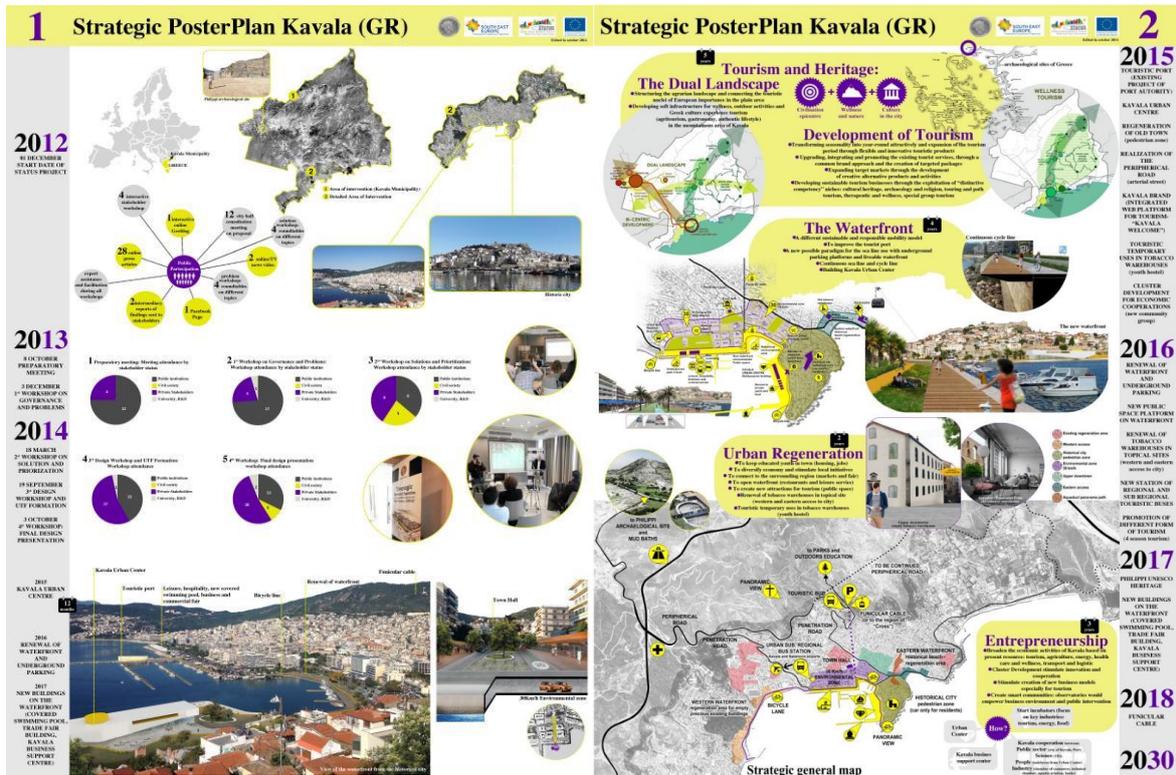


Figure 13 | Strategic Poster Plan for Kavala, developed through the SEE STATUS Project (2012-2014); URBASOFIA (2014)

Glossary

An area-based approach seeks to address an urban planning issue starting from its delineation at the spatial, or geographic level, rather than from a theme / category or a beneficiary group. Area-based approaches develop integrated actions for a purpose (i.e. urban regeneration) and a target group specific to a particular area, defined and delimited beforehand.

Spatial analysis is a type of geographical analysis which seeks to explain patterns of human behavior and its spatial expression in terms of mathematics and geometry, that is, locational analysis. (Mayhew, 2004)

Spatial data, geospatial data or geographic information it is the data or information that identifies the geographic location of features and boundaries on Earth, such as natural or constructed features, oceans, and more. Spatial data is usually stored as coordinates and topology, and is data that can be mapped. Spatial data is often accessed, manipulated or analyzed through Geographic Information Systems (GIS). (Beal, Webopedia)

State of play represents the particular way in which an event or a situation is happening, or developing. Pertaining to urban analysis, a state of play analysis offers a clear snapshot in time of a particular development situation.

A **baseline study** is an analysis of the current situation to identify the starting points for a programme or project. It looks at what information must be considered and analyzed to establish a **baseline** or starting point, the benchmark against which future progress can be assessed or comparisons made. (EUROSTAT Glossary)

Urban Plans are, in the context of the project, strategic planning documentations developed by Follower Cities for the purpose of embedding innovative NBS within their strategic development framework at local level, geared toward implementation of GI solutions which will address the sustainable development and renewal of communities from a physical, ecological, socio-cultural, and economic point of view.

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Annexes

Annex A – Survey outcome for the FRC and FC – Policy and planning framework, references

FRONT RUNNER CITIES

1. Policies at the regional level

Front Runner City	Urban development	Green infrastructure	Regeneration of post-industrial sites
Dortmund	Gebietsentwicklungsplan Regierungsbezirk Arnsberg, Teilabschnitt Oberbereich Dortmund - westlicher Teil -/ Regional plan (2004)	Emscher Landschaftspark/ Emscher Landscape Park, Position 2020+ ELP/ Position 2020+ELP (2013), Masterplan/ Master plan (2005)	Route Industriekultur
Torino	Regional Landscape Plan /Piano Paesagistico Regionale - PPR (2017), Regional territorial plan/Piano territoriale regionale - PTR (2011), Integrated Territorial Programs /Programmi Territoriali Integrati – PTI (2005), European structural and investment funds/POR FESR 2014/2020 (Axis VI, “Sustainable Urban Development”), Territorial coordination plan/Piano territoriale di coordinamento – PTC2 (2011)	Regional Forest Plan/Piano Forestale Regionale (2017)	-
Zagreb	City of Zagreb Development Strategy 2020 (2017), Urban agglomeration Development Strategy Zagreb 2020 (2017), Spatial Plan City of Zagreb (2016)	-	-

2. Policies at local level

Front Runner City	Urban development/Urban regeneration	Green infrastructure	Environment management and sustainable development	Participation or social inclusion
Dortmund	Flächennutzungsplan der Stadt Dortmund/ Zoning Plan City of Dortmund (2004), Entwicklungsbericht Dorstfeld/ Development Report Dorstfeld (2014), nordwärts / going North (project, 2015-2025)	Landschaftsplan der Stadt Dortmund/ Landscape plan City of Dortmund (3 parts: 1990, 1996, 2002 and first amendment: 2005), Radial-konzentrisches Freiraumkonzept / radial-concentric green space concept (1998), Umweltplan/ Environmental plan (2004)	Masterplan Energiewende/ Master plan Energy Transition (2014), Handlungsprogramm Klimaschutz 2020/ Action Programme Climate protection 2020 (2011), Lärmaktionsplan Dortmund / Action Plan Noise (2015)	Aktionsplan Soziale Stadt Dortmund / Action Plan Social City Dortmund (2007), Agenda 21
Torino	Complex urban programs/ Programmi Urbani complessi (1990-2015): Urban Regeneration Programme/Programma di rigenerazione urbana PRU/PRIU (1996/1998)- Special Project for suburbs/ Progetto Speciale Periferie (1999), Metropolitan Turin 2025 /Torino Metropoli 2025 (2015), Municipal General Master Plan/ Piano Regolatore Generale PRGC (1995- under revision), Metropolitan Strategic Plan/ Piano strategico metropolitano 2018-2020 (2017), Actions for suburbs/Azioni per le periferie torinesi AxTO (2017)	Turin City of water/ Torino Città d'Acque (1995), Unesco Man and Biosphere Programme -Piano gestione MAB Po Collina (2016)	Sustainable Urban Mobility Plan/ Piano urbano della mobilità sostenibile – PUMS (2010), Sustainable Energy Action Plan/ Piano d'Azione per l'Energia Sostenibile PAES (2010), Smart Mobility, Inclusion, Life&Health, Energy Master Plan /Torino S.M.I.L.E. (2013), Cycle plan/ Piano della Mobilità ciclabile - BICIPLAN (2013), Turin City to Cultivate/ Torino Città da Coltivare T.O.C.C. (2013)	Turin Smart School (2012), Regulation on urban common goods/Regolamento sui beni comuni urbani (2016), City Plan 2018-2021/ Documento unico di programmazione 2018-2021 (2017)

Zagreb	Master Plan City of Zagreb (2015), Master Plan Sesvete (2015). Among these plans, several studies were conducted: Green and Blue Sesvete (2016), Landscape study Sesvete, Archaeological sites in a tourist offer Sesvete,	Green and Blue Sesvete (2016), Bicycle lane from Sesvete to Vugrovec (5 km, 2016.)	Sustainable Energy Action Plan Zagreb - SEAP (2010) Among this plan: Green and Blue Sesvete (2016).	Law on the Right of Access to Information (2015).
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3. Other useful materials for NBS implementation:

Dortmund - Ökoprofit / Ecoprofits, Landschaftsplan Stadt Dortmund / Landscape plan Dortmund (current updating process)

Torino - Green Belt/ Corona Verde 2 (2010), Torino Action Plan for Energy/ Piano d'Azione per l'Energia Sostenibile TAPE (2010), Integrated District Adaptation Plan for Industrial areas / Piano di Adattamento ai Cambiamenti climatici/ IDAP (2018)

Zagreb - Urban gardens in Zagreb, University Campus Borongaj (It is planned as a green campus with zero CO2 emission and social innovation programs)

FOLLOWER CITIES

1. Policies at the regional level

Follower city	Urban development	Green infrastructure	Regeneration of post-industrial sites
Zenica	Spatial plan of special characteristics for Federation of Bosnia and Herzegovina "Corridor 5C Highway"	-	-
Cascais	PROT-OVT: Plano Regional de Ordenamento do Território do Oeste e Vale do Tejo (The West and Tagus Valley Regional Land Use Plan), PROT-AML: Plano Regional de Ordenamento do Território da Área Metropolitana de Lisboa (Lisbon's Metropolitan Area Regional Land Use Plan - year of adoption: 2002)	Plano Setorial da Rede Natura 2000 (Natura 2000 Network Sectorial Plan - year of adoption: 2008), POPNSC: Plano de Ordenamento do Parque Natural Sintra-Cascais (The Sintra-Cascais' Park Land Use Plan)	-
Piraeus	Urban planning document at Ministry of Environment	Green areas at the Municipality	Renewal postindustrial documents
Cluj-Napoca	Integrated Strategic Plan for Cluj-Napoca Metropolitan Area (2017), Sustainable Urban Mobility Plan (2017)	-	-

2. Policies at the local level

Follower city	Urban development/Urban regeneration	Green infrastructure	Environment management & sustainable development	Participation or social inclusion
Zenica	Spatial plan of the City of Zenica for period 2016-2036, adopted in 2017, General Urban plan for the City of Zenica , adopted 1985, Regulation plans (8) for certain parts of the city - implementation phase 2018 and 2019 - to be adopted, Integrated Local Economic Development Strategy for 2012-2022	-doesn't have any The Regulation plans for certain areas include conservation plans/landscape plans in needed. All those plans are integrated into Regulation plans for specific area of the city.	SEAP - for period from 2011 to 2020 They are in process of creating SECAP document which is to be done this year.	Each plan before being adopted by the city council must pass the phase of public hearing. It is a part of procedure for plan adoption. Public is included.
Cascais	PDM: Plano Diretor Municipal (Municipal Master Plan - year of adoption: 2015), PEDU: Plano Estratégico de Desenvolvimento Urbano (Urban Development Strategic Plan)	Plano de Ação da Estrutura Ecológica Municipal (Municipal Ecological Structure Action Plan - year of adoption: 2015), PAAACC: Plano de Ação para Adaptação às Alterações Climáticas de Cascais (The Cascais' Climate Change Adaptation Action Plan - year of adoption: 2017)	PAAACC: Plano de Ação para Adaptação às Alterações Climáticas de Cascais (The Cascais' Climate Change Adaptation Action Plan - year of adoption: 2017), POPNSC: Plano de Ordenamento do Parque Natural Sintra-Cascais (The Sintra-Cascais' Park Land Use Plan), Estratégia Terras de Cascais ("Terras de Cascais" Strategy - year of adoption: 2017), Matriz Energética de Cascais (Cascais' Energy Matrix 2015)	Orçamento Participativo (Participatory Budget - year of adoption: 2011), Rede Social (Social Action Network)
Piraeus	Masterplan, Greenway planning, Develop green strategy, Organise Green Urban plan	ecological network plan, biodiversity strategy, green infrastructure strategy	Sustainable energy and climate actions, climate change adaptation plan, air quality plan, urban agricultural plan, sustainable mobility plan	environmental strategy, public participation, biodiversity strategy

Cluj-Napoca	General Urban Plan (2015), Neighborhood Regeneration Plans (2018), Sustainable Energy Action Plan (2011)	Somes River Masterplan (2018)	Sustainable Energy Action Plan (2011), Sustainable Urban Mobility Plan (2017)	Public participation initiatives
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3. Other useful information for NBS implementation:

Zenica: Green City Action Plan. City of Zenica is going to implement this project. Kick of Conference is planned in September of 2018. Duration of the project is 1 year. This plan should be adopted by the City Council in Fall of 2019.

Cascais: Fundo Ambiental (Portuguese Environmental Fund - support environmental policies for the pursuit of sustainable development objectives, contributing to the achievement of national and international objectives and commitments, including those related to climate change, water resources, waste and nature conservation and biodiversity.)

Piraeus: There are different designs and plans that made from the Municipality and the University

Cluj-Napoca: Somes river regeneration, Cluj bypass

4. Recent (last 5 years) grounding studies and surveys conducted at Living Lab / implementation area scale:

FRONT RUNNER CITIES

- **Dortmund** - Grünzug Emscher Nordwärts / green corridor Emscher North (current planning process), Stadtumbaugebiet Huckarde/ urban restructuring area Huckarde (current process), Internationale Gartenausstellung Metropole Ruhr 2027/ International Garden Exhibition Metropolis Ruhr 2027 (current process)
- **Torino** – Living Lab Campidoglio Evaluation document (Politecnico of Torino), Bachelor thesis on Turin Living Lab (University of Torino)
- **Zagreb** - Urban regeneration projects: Gredelj, Blok Badel, Zagreb Fair

FOLLOWER CITIES

- **Zenica** - They do not have regulations or laws to support such actions. For example, it is still impossible to register electrical car in Bosnia and Herzegovina due to lack of supporting legislation. The country is not in EU and they must obey existing regulations and laws.
- **Cascais** - PAAACC: Plano de Ação para Adaptação às Alterações Climáticas de Cascais (The Cascais' Climate Change Adaptation Action Plan - year of adoption: 2017), Estratégia Terras de Cascais ("Terras de Cascais" Strategy - year of adoption: 2017)
- **Piraeus** - They are planning to have a policy in place for managing green infrastructure based on innovative approaches.

Projects that are currently implemented in Piraeus:

1- Transformation of the Saint Dionysus area, previously used for industry purposes, into a bicycle lane, low traffic roads and greened walking routes.

2- Transformation of the Mikrolimano area (part of the Piraeus shore), including the demolition of unauthorized constructions, rearrangement of road traffic and restoration of the view over the sea

- **Cluj-Napoca** - There isn't a strategy for managing GI. The plan is to prepare one and include it in the GUP.

Annex B – Scoping survey on available data