



Planning and delivering Nature-based Solutions in Mediterranean cities

First assessment of the IUCN NbS Global Standard in Mediterranean urban areas



IUCN Centre for Mediterranean Cooperation



The designation of geographical entities in this report, and the presentation of the material, do not imply the expression of any opinion whatsoever on the part of IUCN concerning the legal status of any country, territory, or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries. The views expressed in this document do not necessarily reflect those of IUCN.

IUCN is pleased to acknowledge the support of its Framework Partners who provide core funding: Ministry of Foreign Affairs of Denmark; Ministry for Foreign Affairs of Finland; Government of France and the French Development Agency (AFD); the Ministry of Environment, Republic of Korea; the Norwegian Agency for Development Cooperation (Norad); the Swedish International Development Cooperation Agency (Sida); the Swiss Agency for Development and Cooperation (SDC) and the United States Department of State.

This publication has been made possible by funding from Mava Foundation.

Published by: IUCN, Gland, Switzerland.

Produced by: IUCN Centre for Mediterranean Cooperation.

Copyright: © 2021 IUCN, International Union for Conservation of Nature and Natural Resources.

Reproduction of this report for educational or other non-commercial purposes is authorised without prior written permission from the copyright holder provided the source is fully acknowledged. Reproduction of this report for resale or other commercial purposes is prohibited without prior written permission of the copyright holder.

Citation: IUCN (2021). Planning and delivering Nature-based Solutions in Mediterranean cities. First assessment of the IUCN NbS Global Standard in Mediterranean urban areas. Málaga, Spain: IUCN.173 pp.

English reviewer: Christopher Tribe

Cover photo: © Pere Sanz | Dreamstime.com

Layout by: Carmen Moreno

Available for download from: <https://www.iucn.org/regions/mediterranean/resources/thematic-documents>

About IUCN Centre for Mediterranean Cooperation:

IUCN, International Union for Conservation of Nature, is a membership Union composed of both government and civil society organisations. It harnesses the experience, resources and reach of its more than 1,300 Member organisations and the input of more than 18,000 experts. IUCN is the global authority on the status of the natural world and the measures needed to safeguard it. The IUCN Centre for Mediterranean Cooperation opened in Malaga (Spain) in October 2001 with the core support of the Spanish Ministry of Environment and the regional Government of Junta de Andalucía. The Centre's mission is to influence, encourage and assist Mediterranean societies to conserve and use sustainably the natural resources of the region and work with IUCN Members and cooperate with all other agencies that share the objectives of IUCN.

Planning and delivering Nature-based Solutions in Mediterranean cities

First assessment of the IUCN NbS Global Standard in Mediterranean urban areas

Table of contents

| | |
|--|------------|
| Acknowledgements | III |
| Foreword | IV |
| Introduction | 1 |
| 1. A Global Standard for Nature-based Solutions | 3 |
| 2. What is the purpose of the present assessment report? | 4 |
| 3. Scope and structure of the Standard: criteria and indicators for undertaking the assessment | 5 |
| 4. Methodological approach followed by this first assessment in Mediterranean cities | 9 |
| 5. General remarks | 13 |
| 5.1 On the evaluation method | 13 |
| 5.2 On the applicability and usability of the Standard as perceived by stakeholders | 14 |
| 5.3 On the review of the projects analysed | 18 |
| 5.4 On the review of the challenges considered in the Standard | 28 |
| Individual project forms. Type 1. URBAN REGENERATION IN A GLOBAL CHANGE CONTEXT | 34 |
| – AMMAN (Jordan). Urban agriculture. City Strategic Agenda | 35 |
| – MALAGA (Spain). Green Infrastructure Plan. Perchel Lagunillas | 43 |
| – PAVLOS MELAS (Greece). Integrated regeneration and Metropolitan Park | 50 |
| – THESSALONIKI (Greece). BlueHealth and resilience strategy | 56 |
| – OUED TINE VALLEY AREA (Tunisia). Environmental corridors. An example of a micro-project | 63 |
| – ZAGREB (Croatia). The Living Lab at Sesvete. NbS for post-industrial urban regeneration | 72 |
| – NICE (France). Nature in the heart of Nice – <i>La nature au coeur de Nice</i> | 81 |
| Individual project forms. Type 2. NbS FOR CLIMATE CHANGE AND WATER RESILIENCE | 88 |
| – FRENCH ALPS (France). Land use and ecosystem services in the Grenoble urban area | 89 |
| – JERUSALEM (Israel). Gazelle Valley. Urban Nature Park | 97 |
| – MALTA (Malta). The Alter Aqua. Non-Conventional Water Resources Programme | 103 |
| – TIRANA (Albania). Adaptation Action Plan: Northern Boulevard and River project & Magnet project area | 111 |
| Individual project forms. Type 3. NbS FOR COASTAL RESILIENCE IN A CONTEXT OF RISING SEA LEVELS | 118 |
| – MARSEILLE (France). New Stormwater Retention Basins | 119 |
| – ALICANTE (Spain). Park of the Sea – <i>Parque del Mar</i> | 125 |
| – MÁLAGA (Spain). Coastal Trail – <i>Senda Litoral</i> | 132 |
| – NAPLES (Italy). Regeneration of Bagnoli coastal area | 137 |
| Individual project forms. Type 4. MATURE PROJECTS | 144 |
| – BARCELONA (Spain). Green Infrastructure and Biodiversity Plan | 145 |
| – SLOVENIA. Establishing connectivity in the Ljubljanica River and Green Parks Strategy | 154 |
| – VITORIA-GASTEIZ (Spain). Urban Green Infrastructure System | 160 |

Acknowledgements

This report has been prepared in a highly collaborative manner, drawing on the expertise of a variety of people from within and outside IUCN. We would like to thank everyone who has contributed to this report, especially those who reviewed and provided extensive technical information on the case studies from local governments and other institutions:

- **Alberto Ruiz Carmena,**
Urban Environment Observatory, Málaga City Council.
- **Amanda Lind and Yael Hammerman,**
The Society for the Protection of Nature, Israel.
- **Amira Sansa and Edouard Jean,**
Association Les Amis de Capte Tunisie, Tunisia.
- **Anne Itziar Velasco and Blanca Marañón,**
Environmental Studies Centre, Vitoria-Gasteiz City Council, Spain.
- **Iva Bedenko,**
Zagreb Council, Croatia.
- **Jérôme Sieurin,**
Métropole Nice-Côte d’Azur, France.
- **Juan Jerez and Juan Antonio Ochando,**
Port of Alicante, Spain.
- **Konstantina Toli,**
Global Water Partnership Mediterranean.
- **Manuel Sapiano,**
Energy & Water Agency, Malta.
- **Margarita Pares and Coloma Rull Sabaté,**
Directorate of Green Spaces and Biodiversity–Urban Ecology, Barcelona City Council, Spain.
- **Maria Mavroudi,**
Pavlos Melas Council, Greece.
- **Mariló Recio,**
Málaga Provincial Council, Spain.

The document was elaborated by the team of the Energy and Environment Department. Climate Change Adaptation Group from TECNALIA Research & Innovation: Gemma García-Blanco, Igone García, Karmele Herranz, Bart Goes, and Pilar Fernández.

The project was coordinated by Lourdes Lázaro and Andrés Alcántara from the IUCN Centre for Mediterranean Cooperation.

Foreword

The IUCN Centre for Mediterranean Cooperation along with the IUCN Members in the region and key strategic partners are committed to promoting Nature-based Solutions (NbS), as approved in Resolution 34 **“The implementation of Nature-based Solutions in the Mediterranean Basin”** by the IUCN constituency in the framework of the World Conservation Congress 2020.

This Resolution also urges local authorities in the Mediterranean Basin to prioritise NbS in the strategies they adopt for the management of natural areas and urban zones, as well as in their green infrastructure strategies, and to give them priority in their land-use and urban policies.

The NbS concept was also identified by the European Commission as a strategic solution for the development of more sustainable cities, with specific funding programmes on research and innovation (Horizon 2020 Programme).

A milestone in the support for NbS roll-out was the launch of the **IUCN Global Standard for Nature-based Solutions** in July 2020, which aims to create a common framework for the public, private, academic and civil society sectors to design, implement and scale up solutions through the timely and transparent provision of sound policies, actions and investment.

In pursuit of this goal, in 2020, TECNALIA¹ was commissioned by IUCN-Med to help in the assessment of the good projects identified in the publication **“Nature-Based Solutions in Mediterranean cities” (2019)** against the criteria of the IUCN Global Standard on NbS. This would be the first practical assessment of real projects and strategies (either implemented or in the design stage) from Mediterranean cities.

The following pages present **18 projects from existing NbS interventions in Mediterranean cities** that were assessed against the IUCN Standard.

The result of this exercise identified both the Standard’s potential in Mediterranean cities, and challenges in its use that must be resolved. The overall lessons learned from the assessment point to the need for continuing improvements in projects, especially the systematic evaluation of options, more inclusive public involvement, incorporation of adaptive management and establishment of monitoring systems for better reporting on the potential benefits of NbS in urban contexts.

To complement this assessment, a **summary for policy-makers** was also produced with key messages to enable them to understand this supportive framework and recognise windows of opportunity for advancing and promoting NbS in urban areas.

¹ Research and technological organization (RTO) based in Spain.

Introduction

The Mediterranean region has one of the fastest urbanisation rates in the world. Sixty per cent of the current population lives in urban settings, and it is expected that this trend will continue until 2030.

In this scenario of demographic growth, often with limited land available and also limited municipal resources and budgets, cities face increasingly complex challenges of competition and conflict over land use distribution, waste and energy management, guaranteed water availability and quality, reductions in CO₂ emissions and air and noise pollution, mobility, creation of economic opportunities and jobs, regeneration of degraded and unoccupied areas, biodiversity conservation, urban agriculture and food security, and so forth. All the solutions proposed are aimed at ensuring the health and well-being of a more inclusive, fair and equitable society as well as addressing the pressing need for adaptation and resilience to climate change.

Mediterranean cities share quite unique territorial and bioclimatic specificities that make them especially vulnerable to the effects of climate change.

Mediterranean cities share quite unique territorial and bioclimatic specificities that make them especially vulnerable to the effects of climate change, in that water shortages, extreme rainfall and flooding, droughts, forest fires and heat waves are becoming increasingly more frequent and intense.

The concept of Nature-based Solutions (NbS) is taking hold internationally, providing a genuine opportunity for cities to adapt to climate change and improve sustainability.

The IUCN defines NbS as actions to protect, sustainably manage and restore natural or modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits.

NbS, as the European Commission proposes, “helps society face environmental, economic and social challenges in a sustainable way” and is economically profitable.

NbS does not reject new technologies but, on the contrary, innovates by favouring the active participation of citizens in both the design and the management of their cities. A number of Mediterranean cities have already implemented urban renaturing programmes as a way to more responsibly and efficiently manage their current challenges, including their adaptation to climate change.



Nature-derived solutions



Nature-inspired solutions

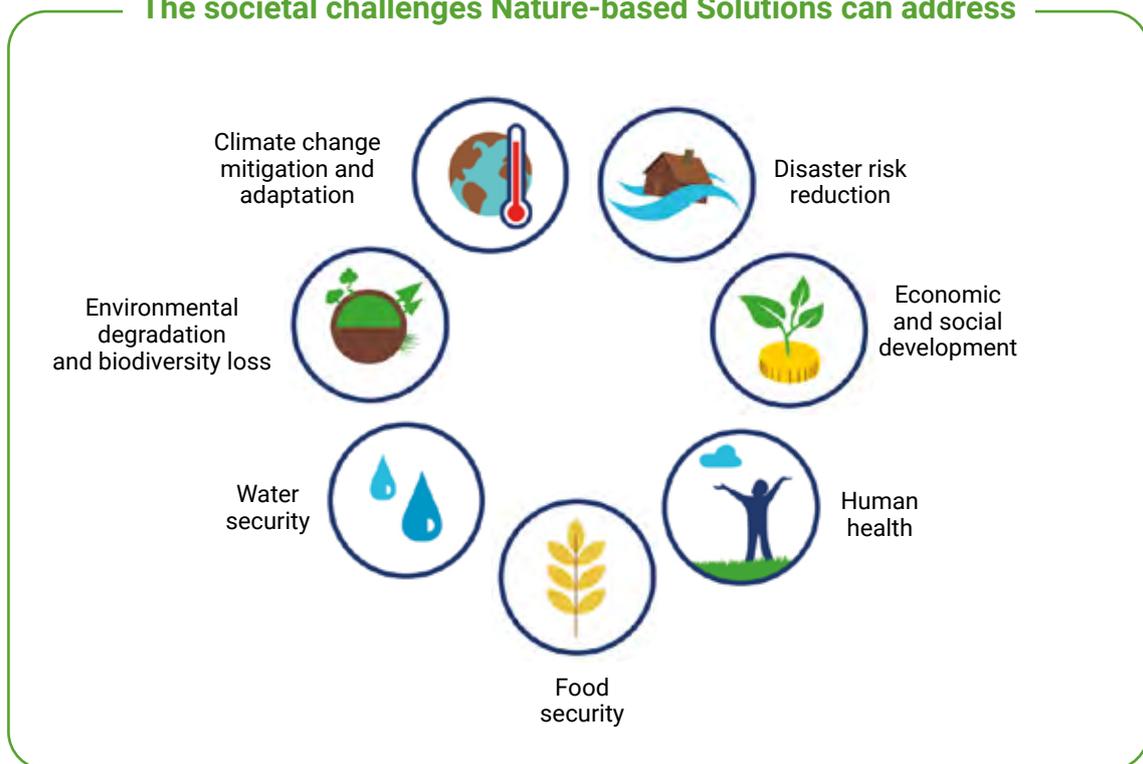


Nature-based solutions

In recent years, the European Union has played a prominent role in boosting the deployment of NbS in cities, including in the Euro-Mediterranean region. Beyond the general framework provided by the **European Urban Agenda 2050**, NbS in the EU are promoted in the cross-cutting European Cohesion Policy (2014–2020) and now the new **EU Framework Programme for Research and Innovation for 2021–2027**, connecting urban, regional and environmental policies and bringing together established ecosystem-based approaches such as ecosystem-based adaptation and ecological engineering with the social and economic dimensions.

Notwithstanding the developing global evidence base on the benefits of NbS in cities, it is still at a relatively early stage of development and consists of evidence that is currently not sufficiently detailed for the development of city-specific NbS strategies. Nor is there a sufficiently broad portfolio of case studies that are relevant and replicable outside their original location; those profiled to date typically rely on bespoke investment and delivery mechanisms. As this is an emerging policy area, cities are therefore currently having to deliver custom-designed local research and pilot projects to generate the knowledge and the evidence base on NbS benefits, and effectiveness they require for local policy development and investment attraction.

The societal challenges Nature-based Solutions can address



A Global Standard for Nature-based Solutions

IUCN is a membership Union composed of both government and civil society organisations. It provides public, private and non-governmental organisations with the knowledge and tools that enable human progress, economic development and nature conservation to take place together.

Recognising the lack of a common understanding and international consensus on NbS, IUCN has developed a Global Standard to mainstream the concept and to facilitate the verification, design and scaling-up of NbS, in a highly collaborative process.

As NbS are increasingly being adopted in everyday business, a standard will ensure the quality and credibility of these solutions, thus guaranteeing their effectiveness in providing benefits to both human well-being and biodiversity.

- A standard to **facilitate the verification, design and scaling-up of NbS** to achieve IUCN's ambitious transition towards a green growth recovery.

- Based on **knowledge co-creation**, involving conservation science, social science and traditional knowledge.

- Crowd-sourced drafts developed through two rounds of **open consultation**, 500+ people across 100 countries, 1000s of comments, each comment and response tracked.

- Developed to be **compatible** with the ISEAL Alliance Code of Good Project revised every four years.



© ASSOCIATION LES AMIS DE CAPPE TUNISIEBIZERTE

The Standard also aims to increase demand for NbS, thus bringing about positive sustainable change. To mainstream NbS, a common language and framework are required to bring partners together to address common challenges. This is where the Standard comes in.

The Standard with its guidance document and self-assessment tool was officially launched in July 2020.

The Global Standard can be found online at <https://www.iucn.org/theme/nature-based-solutions/resources/iucn-global-standard-nbs>

What is the purpose of this assessment report?

This report presents the results of an initial assessment of a number of projects in Mediterranean cities against the IUCN Global Standard.

It is worth mentioning that the practices analysed have been assessed as potential Nature-based Solutions despite the fact that they may not have been designed as such in the first place.

The projects were selected to be evenly distributed around the Mediterranean, to be representative of the Mediterranean climate region and its idiosyncrasies, and to deal with a range of climate risks, urban development, planning culture and systems, governance, etc., at different scales from regional to city and district levels.

Target audience. Governments and authorities at all levels, non-governmental organisations, private companies, urban planners and practitioners, the financial sector and local communities – basically all parties that might be involved in creating or implementing NbS.

The analysis sought to:

- **Assess examples of good practice** in different Mediterranean cities in terms of the benefits of NbS and their contribution to societal challenges, using the criteria and set of indicators suggested by the Standard.
- **Identify gaps** in the projects and explore niches for improvement and opportunities for enhancing the NbS interventions and the implementation process.
- **Identify lessons learned** for practical application and usability of the standard, and extract messages and elements that can be shared with other practices.
- **Evaluate the adaptability of the Standard** and how it could be reviewed and customised.



© RADIO KAFKA | DREAMSTIME.COM

Scope and structure of the IUCN Standard: criteria and indicators for undertaking the assessment

The Standard is structured around eight challenges as shown in Figure 1 below, namely:

1. Societal challenges
2. Design at scale
3. Biodiversity net-gain
4. Economic feasibility
5. Inclusive governance
6. Balance trade-offs
7. Adaptive management
8. Mainstreaming

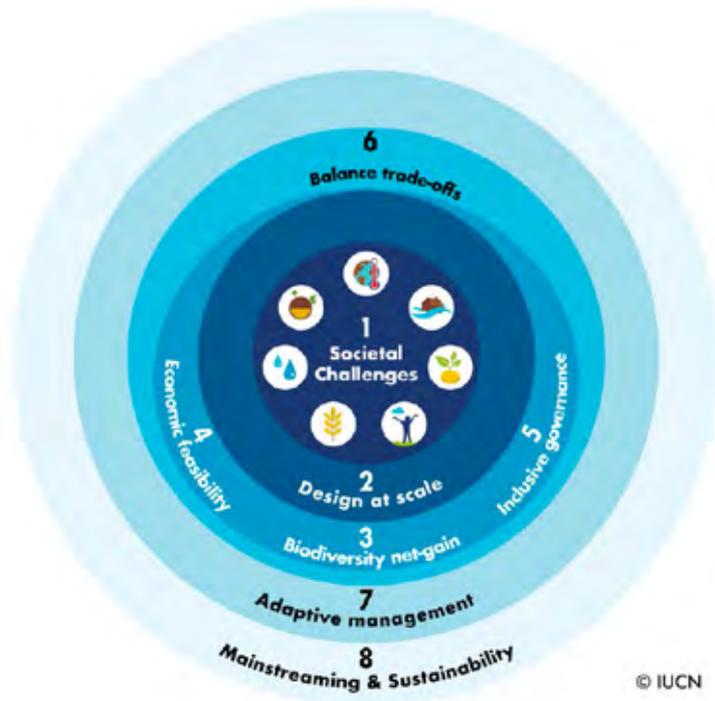


Figure 1: The eight Criteria that make up the IUCN Global Standard for NbS are all interconnected.



Criteria and indicators of the IUCN Global Nature-based Solutions Standard, adapted from IUCN (2020).

Global Standard for Nature-based Solutions. A user-friendly framework for the verification, design and scaling up of NbS. First edition. Gland, Switzerland: IUCN.

Table 1. This table describes in detailed each of the challenges covered by the Standard as well as the criteria and the associated indicators.

| ISSUE BEING ADDRESSED | CRITERIA | INDICATORS |
|---|--|---|
| <p>Societal challenges The purpose of this Criterion is to ensure that the NbS is designed as a response to one or more societal challenges that have been identified as a priority by those who are or will be directly affected by them. All stakeholders, especially rights holders and beneficiaries of the NbS, must be involved in the decision-making process used for identifying the priority challenge or challenges (Criterion 5).</p> | <p>1 NbS effectively address societal challenges</p> | <p>1.1 The most pressing societal challenges for rights holders and beneficiaries are prioritised.</p> <p>1.2 The societal challenges addressed are clearly understood and documented.</p> <p>1.3 Human wellbeing outcomes arising from the NbS are identified, benchmarked and periodically assessed.</p> |
| <p>Design at scale The purpose of this Criterion is to encourage NbS designs that recognise the complexity and uncertainty that occur in living dynamic land/seascapes. Scale applies not only to the biophysical or geographic perspective but also to the influence of economic systems, policy frameworks and the importance of cultural perspectives. NbS design will be informed by what stakeholders know about the interactions between different aspects of a land/seascape using a three-scale framework that considers the parts within the land/seascape, the land/seascape itself and the wider environment around the land/seascape. One example would be households within villages within a local authority area. Understanding the interactions which affect attributes like cultural values, laws, soils, forests and water are important in this regard, as they are relevant to the assessment of the risk of undesirable change, or the probability of creating desirable change. NbS design seeks to maintain the productive capacity of ecosystems as well as the production of benefits necessary for human well-being.</p> | <p>2 Design of NbS is informed by scale</p> | <p>2.1 Design of NbS recognises and responds to the interactions between the economy, society and ecosystems.</p> <p>2.2 Design of NbS integrated with other complementary interventions and seeks synergies across sectors.</p> <p>2.3 Design of NbS incorporates risk identification and risk management beyond the intervention site.</p> |
| <p>Biodiversity net-gain NbS are derived as goods and services from ecosystems, and therefore strongly depend on the health of an ecosystem. Biodiversity loss and ecosystem change can have significant impacts on the functioning and integrity of the system. Therefore, NbS design and implementation must avoid undermining the integrity of the system and, instead, proactively seek to enhance the functionality and connectivity of the ecosystem. Doing so can also ensure the long-term resilience and durability of the NbS.</p> | <p>3 NbS result in net gain to biodiversity and ecosystem integrity</p> | <p>3.1 NbS actions directly respond to evidence-based assessment of the current state of the ecosystem and prevailing drivers of degradation and loss.</p> <p>3.2 Clear and measurable biodiversity conservation outcomes are identified, benchmarked and periodically assessed.</p> <p>3.3 Monitoring includes periodic assessments of unintended adverse consequences for nature arising from the NbS .</p> <p>3.4 Opportunities to enhance ecosystem integrity and connectivity identified and incorporated into the NbS strategy.</p> |
| <p>Economic feasibility The return on investment, the efficiency and effectiveness of the intervention, and equity in the distribution of benefits and costs are key determinants of success for an NbS. This Criterion requires that sufficient consideration is given to the economic viability of the intervention, both at the design stage and through monitoring the implementation. For NbS to be sustainable, there must be strong consideration of the economic aspects as, most likely, long-term gains must be balanced against short-term costs, with short-term actions developed within the context of long-term (over generations) goals and plans. If the economic feasibility is not adequately addressed, NbS run the risk of being short-term projects, where, after closing, the solution and benefits provided cease to exist, potentially leaving the landscape and communities worse off than before. Innovative and evidence-based tools for the valuation of nature, along with ideas for NbS contributions to markets and jobs, encourage creative (blended) financing of NbS, thereby increasing the likelihood of their long-term success.</p> | <p>4 NbS are economically viable</p> | <p>4.1 The direct and indirect benefits and costs associated with the NbS, who pays and who benefits, are identified and documented.</p> <p>4.2 A cost-effectiveness study is provided to support the choice of NbS including the likely impact of any relevant regulations and subsidies.</p> <p>4.3 The effectiveness of an NbS design is justified against available alternative solutions, taking into account any associated externalities.</p> <p>4.4 NbS design considers a portfolio of resourcing options such as market-based, public sector, voluntary commitments and actions to support regulatory compliance.</p> |

| ISSUE BEING ADDRESSED | CRITERIA | INDICATORS |
|---|---|---|
| <p>Inclusive governance This criterion requires that NbS acknowledge, involve and respond to the concerns of a variety of stakeholders, especially rights holders. Good governance arrangements are proven to not only reduce an intervention’s sustainability risks, but also to enhance its social ‘licence to operate’. Conversely, inadequate governance provision for otherwise well-intended actions can adversely affect the legitimacy of benefit- and cost-sharing arrangements. As a minimum, NbS must adhere to and align with the prevailing legal and regulatory provisions, being clear on where legal responsibilities and liabilities lie. However, as often is the case with natural resources, basic compliance will need to be complemented with ancillary mechanisms that actively engage and empower local communities and other stakeholders.</p> | <p>5 NbS are based on inclusive, transparent and empowering governance processes</p> | <p>5.1 A defined and fully agreed upon feedback and grievance resolution mechanism is available to all stakeholders before an NbS intervention can be initiated.</p> <p>5.2 Participation is based on mutual respect and equality, regardless of gender, age or social status, and upholds the right of Indigenous Peoples to Free Prior and Informed Consent (FPIC).</p> <p>5.3 Stakeholders who are directly and indirectly affected by the NbS have been identified and involved in all processes of the NbS intervention.</p> <p>5.4 Decision-making processes document and respond to rights and interests of all participating and affected stakeholders.</p> <p>5.5 Where the scale of the NbS extends beyond jurisdictional boundaries, mechanisms are established to enable joint decision making of the stakeholders in the affected jurisdictions.</p> |
| <p>Balance trade-offs Trade-offs in land and natural resource management are inevitable. Ecosystems provide a wealth of different benefits and not everyone values each of them in the same way. While trade-offs cannot be avoided, they can be effectively and equitably managed. This Criterion requires that NbS proponents acknowledge these trade-offs and follow a fair, transparent and inclusive process to balance and manage them over both time and geographic space. This involves a credible assessment, full disclosure and agreement among the most affected stakeholders on how the trade-offs should be addressed. Fair and transparent negotiation of trade-offs and compensation among potentially affected parties for any damages or trade-offs to local opportunities and livelihoods provides the basis for successful long-term NbS outcomes. Critically, it is important to recognise that trade-offs have social and ecological limits beyond which point certain values or benefits can be lost in perpetuity. This means that safeguards will be necessary to ensure, inter alia, that the integrity of ecosystems and the long-term stabilising properties of ecosystem services are not exceeded.</p> | <p>6 NbS equitably balances trade-offs between achievement of their primary goal(s) and the continued provision of multiple benefits</p> | <p>6.1 The potential costs and benefits of associated trade-offs of the NbS intervention are explicitly acknowledged and inform safeguards and any appropriate corrective actions.</p> <p>6.2 The rights, usage of and access to land and resources, along with the responsibilities of different stakeholders are acknowledged and respected.</p> <p>6.3 Established safeguards are periodically reviewed to ensure that mutually agreed trade-offs limits are respected and do not destabilise the entire NbS.</p> |
| <p>Adaptive management This Criterion requires that NbS implementation plans include provisions to enable adaptive management as a response to uncertainty and as an option to effectively harness ecosystem resilience. A degree of uncertainty is inherent when managing most ecosystems due to their complex, dynamic and self-organising nature. This also means that ecosystems have greater resilience, which confers a wider range of options to respond to unanticipated social, economic or climate events. The foundation of adaptive management is the evidence-base provided by regular monitoring and evaluation, drawing on scientific understanding as well as indigenous, traditional and local knowledge. By proactively adopting an adaptive management approach, the NbS can continue to be relevant through the lifecycle of the intervention and the risk of redundancy and stranded investments minimised.</p> | <p>7 NbS are managed adaptively, based on evidence</p> | <p>7.1 A NbS strategy is established and used as a basis for regular monitoring and evaluation of the intervention.</p> <p>7.2 A monitoring and evaluation plan is developed and implemented throughout the intervention lifecycle .</p> <p>7.3 A framework for iterative learning that enables adaptive management is applied throughout the intervention lifecycle.</p> |

| ISSUE BEING ADDRESSED | CRITERIA | INDICATORS |
|--|---|---|
| <p>Mainstreaming This Criterion requires that NbS interventions are designed and managed with a view to long-term sustainability and that they take account of, work with and align with sectoral, national and other policy frameworks. There are various approaches to mainstreaming NbS; however, all rely on strategic communications and outreach. Audiences to consider include individuals (e.g. the public, academics), institutions (e.g. national government, start-ups, businesses, and organisations) and global networks (e.g. Sustainable Development Goals, Paris Agreement).</p> | <p>8 NbS are sustainable and mainstreamed within an appropriate jurisdictional context</p> | <p>8.1 NbS design, implementation and lessons learnt are shared for triggering transformative change.</p> <p>8.2 NbS inform and enhance facilitating policy and regulation frameworks to support its uptake and mainstreaming.</p> <p>8.3 Where relevant, NbS contribute to national and global targets for human wellbeing, climate change, biodiversity and human rights, including the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP).</p> |



© JOYFULL | DREAMSTIME.COM

Methodological approach used for this first assessment in Mediterranean cities

a) Case identification and information gathering

18 projects were selected for this assessment report. Cases to be analysed as examples of good practice were identified through desk-based research. The criteria for selecting the most relevant NbS were:

- **An even distribution** of projects throughout the Mediterranean bioclimatic zone;
- **The challenges for which they were designed** (adaptation to climate change, urban regeneration, health, social inclusion, etc.);
- **The scale of the interventions** (e.g. urban acupuncture scale, district scale, city scale);
- **Implementation models** (governance, concretion, management, financing, etc.).

Professional online searching of available and accessible information followed, with the involvement of TECNALIA's Business Intelligence Department.

Finally, a search of research papers and grey literature provided additional information on the projects.

b) Analysis of the projects against the Standard indicators

In a second step, each selected project was then assessed against the 28 indicators grouped under the 8 Criteria of the Standard, in order to:

- **Highlight** the most **relevant aspects** of each solution;
- **Identify potential gaps** and explore opportunities for improvement;
- **Extract key messages** and lessons learned that could be transferred to other urban contexts;
- **Improve the applicability** of the Standard itself. Individual project briefing forms are provided for each project.

c) Obtaining preliminary findings and messages

Semi-quantitative analysis of the available information was used to draw conclusions on both the review of NbS projects in Mediterranean cities and the evaluation method advised by the Standard.



Two different speeds were detected in the way the selected cities implement NbS in the Mediterranean region: Advanced and mature cases, which have a long tradition and experience in using ecosystem-based approaches, green infrastructure and NbS in urban planning and management; and other good practice cases which reveal interesting examples for boosting NbS in their urban planning and management. We decided to classify these two different speeds into four types of case studies:



Type 1:

Urban regeneration in a global change context:

Focusing specifically on urban interventions for social inclusion and socio-economic improvement of degraded areas, with a strong bottom-up, citizen engagement and multi-agent participatory approach.



Type 2:

NbS for climate change and water resilience:

Driven by climate change adaptation needs, mainly interventions designed to cope with water management (either flood risk or water scarcity) and thermal stress.



Type 3:

NbS for coastal resilience in a context of rising sea levels:

The Mediterranean Sea is always an important presence in all the cities assessed. However, this group includes projects where the NbS have a strong blue component to deal with specific coastal challenges faced by coastal cities (i.e. sea level rise, seaport infrastructure, maintenance of ecosystem services and biodiversity conservation).



Type 4:

Mature projects: More advanced practices in terms of NbS a longer experience applying this approach into local planning.

The extent to which the project complied with each of the 28 indicators defined in the Standard was evaluated at one of two levels:

- Indicator is not considered at all;
- Indicator is fully covered, or some work has been done around some of the elements of the indicator.

In the context of this first screening assessment we have not considered intermediate scoring scales, since, to be able to approach it in this way, a much more accurate knowledge of the practices and all their content would have been required. Furthermore, the case-studies assessment was undertaken between February-September 2020, thus when the Global Standard's self-assessment was not yet available in its current version. Therefore, we used a 2-levels (0 or 1) evaluation system, as opposed to using the currently available 4 levels self-assessment (insufficient, partial, adequate, strong).

Each of these levels was standardised in order to obtain a percentage for the extent to which the projects complied with each of the indicators of the Standard. This provided information at two levels, both for the analysis of the projects as a whole and for the types defined above. That allowed us to draw conclusions on:

- **Revision of the Standard as a self-assessment tool**, identifying the criteria and the indicators which are the most challenging to address and to comply with. Conclusions can then be drawn on the applicability and usability of the Standard and tools to support its use can be identified.

- **Analysis of how the projects meet the criteria and indicators**, identifying strengths, gaps and opportunities for improvement NbS deployment.

The preliminary findings and messages obtained for each project were then validated with a number of stakeholders². An online working session was organised on 16 July 2020 with representatives of the Spanish projects analysed (in Málaga, Alicante, Vitoria-Gasteiz and Barcelona) in order to:

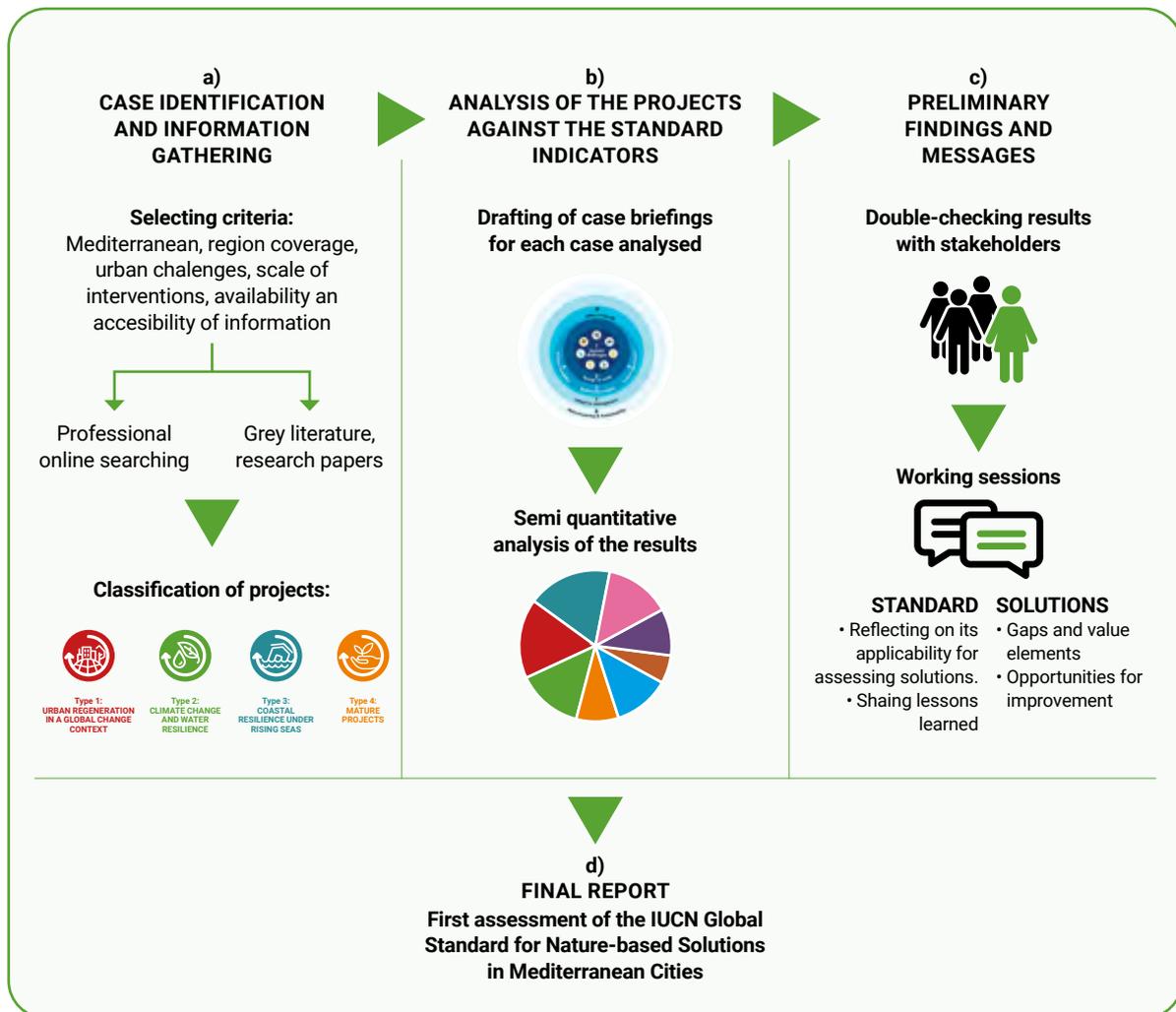
- Reflect on the applicability and usability of the Standard to assess NbS projects in Mediterranean cities;

- Share lessons learned;
- Identify gaps and value elements in these projects;
- Detect opportunities for improvement.

d) Preparation of the final report

The procedure, final findings and individual project briefings make up the present report, produced with the support of the IUCN Centre for Mediterranean Cooperation, and will be disseminated at the IUCN World Conservation Congress to be held in Marseille in 2021.

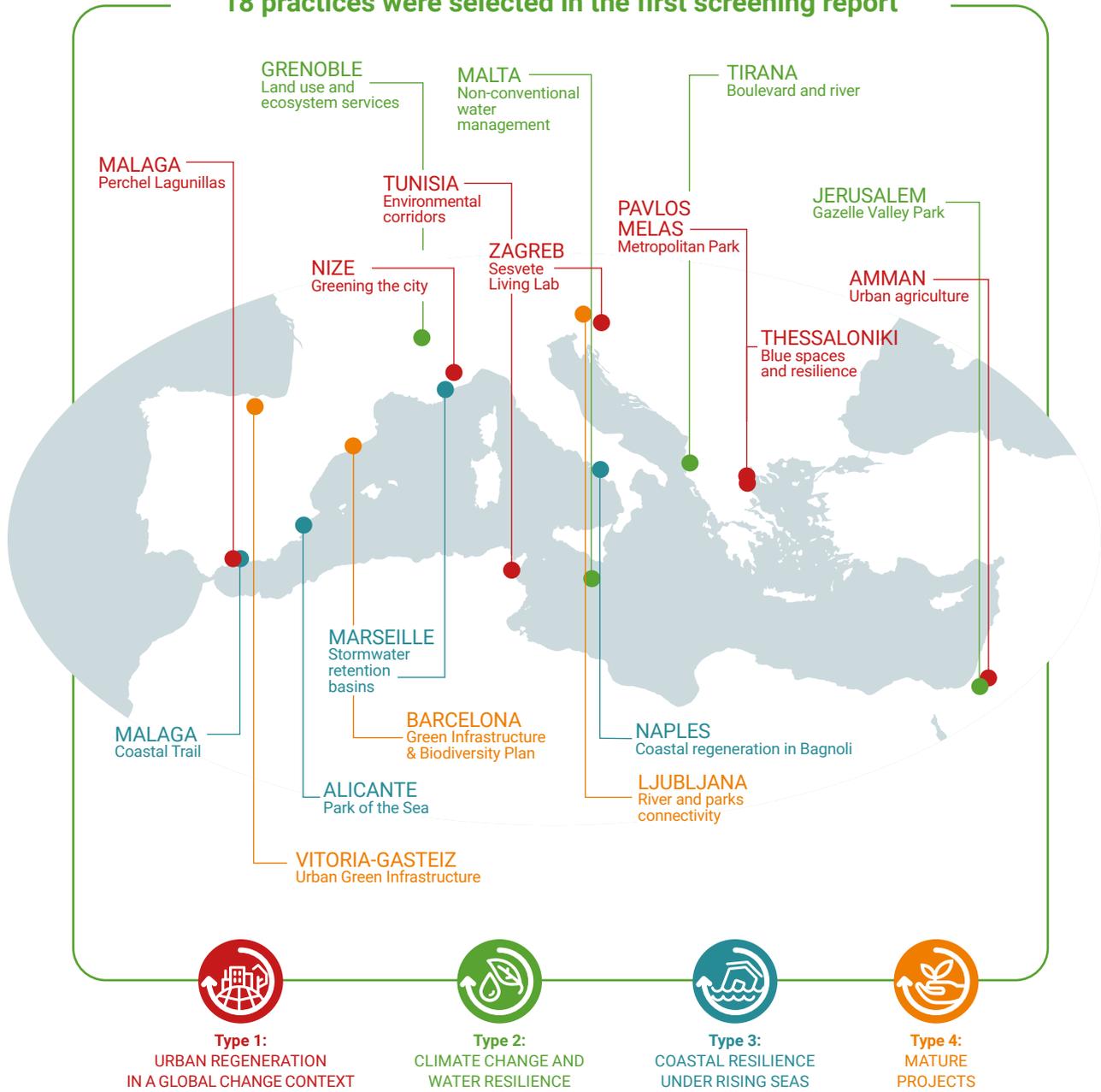
Figure 2: Summarizes the methodology followed for the elaboration of the first screening of the IUCN Standard in Mediterranean cities.



² Disclaimer: Most of the individual project briefing forms have been validated with government stakeholders in bilateral meetings. However, for 6 case studies (Amman, Marseille, Grenoble, Tirana, Naples, Ljubljana) no feedback was received in time for final consolidation.

Figure 3

18 practices were selected in the first screening report



© WOVEVALEI DREAMSTIME.COM

5 General remarks

5.1 On the evaluation method

For the evaluation method a total of 28 indicators were used, grouped under 8 categories or criteria. The answers obtained varied strongly with the city and the indicator.

In the case of Zagreb evidence was found for a highly satisfactory number of indicators, namely 24 out of 28. Concerning the criterion 1 and indicator 1.1 “The most pressing societal challenges for rights holders and beneficiaries are prioritised” is the one for which most useful information was found for all cities. However, for indicator 6.3 “Established safeguards are periodically reviewed to ensure that mutually agreed trade-off limits are respected and do not destabilise the entire NbS” no evidence was

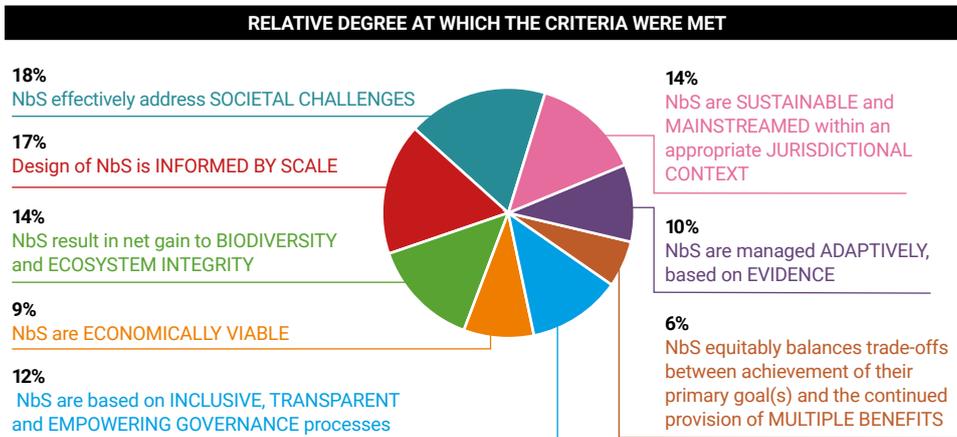
found at all. Other indicators with very low values (5 answers or less out of 18) are the ones on Economic feasibility (4.1, 4.2, 4.3), the remaining ones on Balance trade-offs (6.1, 6.2) and 7.3. on Adaptive management. On the other hand, Indicators with very high values (15 answers or more out of 18) are the ones dealing with Societal challenges, as already stated, Design at scale (particularly 2.1 and 2.2) and Biodiversity net-gain (3.1). The graphic below summarises the availability of information for each criterion.

As can be clearly seen from the figure, a reasonable amount of information was available for most criteria, especially criteria 1 and 2. Conversely, less information was found for criteria 4 and 7, while serious problems were encountered in obtaining evidence for criterion 6.

Project contributions to each criterion of the Standard

Each percentage shows how each criterion was relatively met by the case-studies, all together.

| INDICATOR CLASS RELEVANCE | |
|--|-----|
| 1. NbS effectively address SOCIETAL CHALLENGES | 93% |
| 2. Design of NbS is INFORMED BY SCALE | 91% |
| 3. NbS result in net gain to BIODIVERSITY and ECOSYSTEM INTEGRITY | 71% |
| 4. NbS are ECONOMICALLY VIABLE | 50% |
| 5. NbS are based on INCLUSIVE, TRANSPARENT and EMPOWERING GOVERNANCE processes | 63% |
| 6. NbS equitably balances trade-offs between achievement of their primary goal(s) and the continued provision of MULTIPLE BENEFITS | 30% |
| 7. NbS are managed ADAPTIVELY, based on EVIDENCE | 52% |
| 8. NbS are SUSTAINABLE and MAINSTREAMED within an appropriate JURISDICTIONAL CONTEXT | 74% |



5.2 On the applicability and usability of the Standard as perceived by stakeholders

How is the Standard generally perceived?



"It could be very useful, especially if used in the planning phase, which is over for us at the moment. I personally would like to revisit it from time to time, as it can provide new insight in every phase, but its main strength would be in the initial phases".

City of Zagreb



"It provides a consistent way in which practices can be analysed and reported easing the identification of opportunities and niches for improvement".

Málaga provincial authority

"It proposes a very valuable approach for the valuation of biodiversity in urban contexts". "It can contribute to improving the way of reporting to citizens and different agents with focus on the relevant involvement of the private sector in the NbS implementation".

Barcelona City Council



"It offers the opportunity for strategic view and thinking, although lack of time and resources are always a constraint for those responsible for the practices".

Barcelona City Council



"While the balance between economic variables and biodiversity and sustainability is difficult to achieve it is also seen as an opportunity to verify the need to consider all dimensions beyond the economic viability towards successful implementation".

Vitoria-Gasteiz City Council

"The assessment with the NbS criteria will allow us to implement the new Standard when designing, writing, implementing and monitoring our future projects. We will enrich our database of monitoring and evaluation measures of ecosystem services generated by our agroforestry projects with this methodology. We hope to get to know and have more opportunities to collaborate with other projects and members of the civil society involved in the assessment of Standard and also to strengthen our chances of accessing more funding."

Association Les Amis de Capte Tunisie-Bizerte (Tunisia)



What is the general feedback on the structure and content of the Standard?

A certain bias towards biodiversity was perceived by most stakeholders, to the detriment of other societal challenges. However, it provides interesting and detailed keys to bringing about changes in green management, given the specificity of the urban environment in compact Mediterranean cities³: evaluating green infrastructure projects for their overall Biodiversity net-gain is of great value.

Three criteria of the Standard were highlighted as the most difficult ones to evaluate and also to comply with, as explained below:

Economic feasibility:

Its evaluation raises two problems:

- How to monetise NbS benefits versus traditional interventions is difficult to analyse; there is still a lack of available tools and expertise and the studies (i.e. natural capital accounting) are time consuming and resource intensive, difficult to be assumed by most municipalities consulted. These kinds of analysis are in any case normally subcontracted on demand for the assessment of specific interventions, but there is not yet a standard procedure, not even for the most advanced and mature projects analysed.

- Evaluation in economic terms is not always feasible or even desirable. Some green interventions are not sustainable in economic terms since the investment will not have an economic return, but the intervention is still strategic and will have a huge impact in social and environmental terms, which justifies its implementation. However, there is a lack of good evaluation methods for assessing return on investment. Natural Capital Assessment and Social Return on Investment are tools worth exploring, but they have not yet produced reliable results in terms of public health, for instance.

Consideration of benefits and trade-offs:

Although this criterion is considered very relevant, the studies and analysis required to evaluate benefits and trade-offs are time consuming and resource intensive and they are not delivered on a regular basis. These studies may be subcontracted *ad hoc* for a certain intervention, particularly strategic projects, but this is usually not yet done in the projects evaluated, and it remains a challenge even for the most mature ones.

Adaptive management:

This is a relatively new concept that has not yet been incorporated or internalised in territorial and urban planning and therefore it is too ambitious to try to evaluate it in the context of NbS implementation.



³ Barcelona City Council.



© MARTIAPUNTS | DREAMSTIME.COM

What are the main barriers to its use?

“Standard with interesting and innovative criteria but also with very ambitious indicators”

While the Standard offers an interesting and innovative criteria, it is also contained very ambitious indicators to really assess the current state of projects⁴. Lack of monitoring data could be an issue and there is still a need for a more comprehensive approach to knowhow and who should evaluate each indicator (including economic ones).

Lack of data is seen as a constraint but also as an opportunity to challenge the local authorities and responsible bodies of the practices in the search for new elements or development criteria. In general terms, it was understood that a qualitative assessment of the indicators is possible, but a quantitative assessment, although useful, would be so complex that it would be very difficult to carry out⁵.

It is necessary to know in detail the scope of the object of evaluation: is it the plan or strategy or a specific project? The Standard seems valid for both, but perhaps it seems more appropriate for use at a strategic level⁶.

It seems that the Standard works better on the conceptual, abstract and strategic approach (top-down) rather than the more operational approach (bottom up) that cities actually adopt in their day-to-day urban management⁷.

“Availability and accessibility of information”

Availability and accessibility of the information in order to apply the Standard versus the day-to-day work in reality – there is a need for an extra effort to give more visibility to the studies and analyses that are carried out in each city and region.

In some cases, there were enough studies and information to respond to some of the NbS criterion but the day-to-day work of civil servants does not allow to have enough time to find the data available from various sources of documentation. There is a need for an extra effort to give more visibility to the studies and analyses that are carried out in each city and region and systematise the information to make it more accessibility for easy consultation and further follow-up.

⁴ Málaga provincial authority – shared by all.

^{5,6} Vitoria Gasteiz Centre for Environmental Studies, Vitoria-Gasteiz City Council.

⁷ Barcelona City Council.

What challenges and opportunities does the Standard present?

“Inspiration for improvement”

The strategic and abstract vision provided by the Standard, in the shape of criteria and indicators, is considered an opportunity to undertake a qualitative, strategic reflection that could lead to improvements in the implementation and deployment of NbS and their incorporation into the local political agenda. However, it is also perceived as a difficult tool to apply to urban projects, particularly in the context of compact cities in the Mediterranean region and the increasingly limited resources available.

“Governance”

There is a need for a systemic, multiscale approach to NbS implementation with a view to fostering the transition between the consolidated urban fabric and other natural or semi-natural green and blue spaces in peri-urban and rural areas. Some examples of this approach are Málaga’s green corridors, the Green Infrastructure Strategy in Vitoria Gasteiz and the Metropolitan Park in Pavlos Melas, amongst others, which seek to establish such a link between these areas.

The lack of multilevel (vertical) and interdepartmental (horizontal) coordination remains a challenge, and the need for a specifically metropolitan approach⁸ was highlighted by several stakeholders.

The complexity in governance and the distribution of powers and responsibilities between different governmental levels and even between departments within the same authority was perceived as a key challenge, alongside unbending planning instruments. There is a need for innovative governance models and more agile and flexible planning instruments that can facilitate the implementation process.

“Systematic approach to biodiversity and green management”

Green management has been on the political agenda for many years for most of the projects analysed. Environmental quality is seen as a driver for dialogue with citizens. In Barcelona, green management is particularly driven by the biodiversity challenge, which is reflected in profiles and organisational charts, as well as spatial information systems and formal planning documents. The Standard can help to systematise the way green management and biodiversity are addressed in the political agenda, to further advance NbS deployment.

“Public procurement”

Public procurement⁹ was also highlighted as a valuable tool that could aid sustainable NbS implementation. Clear guidelines, criteria and design standards could facilitate the process (e.g. by selecting species adapted to climate change while increasing autochthonous biodiversity).

“Social acceptability”

The importance of social acceptability¹⁰ and responding to social demands and population needs remain a challenge for most projects. Working towards liveable and healthy public spaces through NbS could be a way to respond to social demands.

A proactive approach to citizens’ concerns, motivations and demands through public consultations guarantees acceptance without having to mobilise huge resources. A lack of social involvement in decision making could result in social non-acceptance or even generate a backlash against green interventions (misperception of insecurity and environmental risks, dirtiness, etc.). Co-creation and co-design processes, effective evaluation and good communication channels are vital for increasing awareness, sensitivity, equity and acceptance and there is room for innovative approaches here.

“It helps to put NbS on the political agenda and on the list of concerns of society”.

⁸ Barcelona City Council, Málaga provincial authority.

⁹ Barcelona City Council.

¹⁰ All stakeholders.

5.3 On the review of the projects analysed

Even though the 18 projects examined are very diverse in their contents, *statu quo*, scope, resources and budget, they all show good examples of the use of NbS approach to cope with relevant city challenges. They also provide evidences of significant improvement on the performance of one or more of the following dimensions: health, human well-being, resilience to climate change, biodiversity, solidarity among inhabitants, gender equality, healthy food production, more efficient water use, labour conditions, etc. We congratulate all the promoters on this, and we are impressed by the advances made. Some of the projects were carried out by associations, as in the case of Les Amis de Capte in Tunisia, while most were created and led institutionally, usually by the city council.

The tables on the following pages summarise the practices contribution to the Standard criteria and indicators, by challenge and by typology of practice analysed.

The projects were given one of two ratings:

- 0 when there was no evidence of the project responding to the indicator;
- 1 when there was evidence of the project analysed responding to the indicator completely or to a certain extent.

Intermediate ratings were not used for this rapid assessment, since that would have required much more detailed knowledge of the projects and all their content.



© LIJBOV | DREAMSTIME.COM

Table 2.1



Type 1:
Urban regeneration
in a global change context

Status: FINALISED / ON-GOING / INCEPTION

| Issue + Criterion | Indicator | Zagreb | Tunisie | Málaga Perchel | Tesalonica | Amman | Pavos Melas | Niza | N° of answered indicators | Issue relevance |
|---|---|--------|---------|----------------|------------|-------|-------------|------|---------------------------|-----------------|
| SOCIETAL CHALLENGES 1. NbS effectively address societal challenges | 1.1 The most pressing societal challenges for rights holders and beneficiaries are prioritised | 0,5 | 1 | 1 | 1 | 1 | 1 | 1 | 7 | 100% |
| | 1.2 The societal challenges addressed are clearly understood and documented | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 7 | |
| | 1.3 Human wellbeing outcomes arising from the NbS are identified, benchmarked and periodically assessed | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 7 | |
| DESIGN AT SCALE 2. Design of NbS is informed by scale | 2.1 Design of NbS recognises and responds to the interactions between the economy, society and ecosystems | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 7 | 90% |
| | 2.2 Design of NbS integrated with other complementary interventions and seeks synergies across sectors | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 7 | |
| | 2.3 Design of NbS incorporates risk identification and risk management beyond the intervention site | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 5 | |
| BIODIVERSITY NET-GAIN 3. NbS result in net gain to biodiversity and ecosystem integrity | 3.1 NbS actions directly respond to evidence-based assessment of the current state of the ecosystem and prevailing drivers of degradation and loss | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 7 | 79% |
| | 3.1 NbS actions directly respond to evidence-based assessment of the current state of the ecosystem and prevailing drivers of degradation and loss | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 6 | |
| | 3.1 NbS actions directly respond to evidence-based assessment of the current state of the ecosystem and prevailing drivers of degradation and loss | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 4 | |
| | 3.1 NbS actions directly respond to evidence-based assessment of the current state of the ecosystem and prevailing drivers of degradation and loss | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 5 | |
| ECONOMIC FEASIBILITY 4. NbS are economically viable | 4.1 The direct and indirect benefits and costs associated with the NbS, who pays and who benefits, are identified and documented | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 4 | 46% |
| | 4.2 A cost-effectiveness study is provided to support the choice of NbS including the likely impact of any relevant regulations and subsidies | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | |
| | 4.3 The effectiveness of an NbS design is justified against available alternative solutions, taking into account any associated externalities | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 3 | |
| | 4.4 NbS design considers a portfolio of resourcing options such as market-based, public sector, voluntary commitments and actions to support regulatory compliance | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 4 | |
| INCLUSIVE GOVERNANCE 5. NbS are based on inclusive, transparent and empowering governance processes | 5.1 A defined and fully agreed upon feedback and grievance resolution mechanism is available to all stakeholders before an NbS intervention can be initiated | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 6 | 71% |
| | 5.2 Participation is based on mutual respect and equality, regardless of gender, age or social status, and upholds the right of Indigenous Peoples to Free Prior and Informed Consent (FPIC) | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 6 | |
| | 5.3 Stakeholders who are directly and indirectly affected by the NbS have been identified and involved in all processes of the NbS intervention | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 7 | |
| | 5.4 Decision-making processes document and respond to rights and interests of all participating and affected stakeholders | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 5 | |
| | 5.5 Where the scale of the NbS extends beyond jurisdictional boundaries, mechanisms are established to enable joint decision-making among the stakeholders in those jurisdictions affected by the NbS | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | |

| Issue + Criterion | Indicator | Zagreb | Tunisie | Málaga Perchel | Tesalonica | Amman | Pavos Melas | Niza | N° of answered indicators | Issue relevance |
|---|---|-----------|-----------|----------------|------------|-----------|-------------|-----------|---------------------------|-----------------|
| BALANCE TRADE-OFFS 6. NbS equitably balances trade-offs between achievement of their primary goal(s) and the continued provision of multiple benefits | 6.1 The potential costs and benefits of associated trade-offs of the NbS intervention are explicitly acknowledged and inform safeguards and any appropriate corrective actions | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 19% |
| | 6.2 The rights, usage of and access to land and resources, along with the responsibilities of different stakeholders are acknowledged and respected | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 3 | |
| | 6.3 Established safeguards are periodically reviewed to ensure that mutually agreed trade-offs limits are respected and do not destabilise the entire NbS | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| ADAPTIVE MANAGEMENT 7. NbS are managed adaptively, based on evidence | 7.1 A NbS strategy is established and used as a basis for regular monitoring and evaluation of the intervention | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 5 | 52% |
| | 7.2 A monitoring and evaluation plan is developed and implemented throughout the intervention lifecycle | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 4 | |
| | 7.3 A framework for iterative learning that enables adaptive management is applied throughout the intervention lifecycle | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | |
| MAINSTREAMING 8. NbS are sustainable and mainstreamed within an appropriate jurisdictional context | 8.1 NbS design, implementation and lessons learnt are shared for triggering transformative change | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 6 | 76% |
| | 8.2 NbS inform and enhance facilitating policy and regulation frameworks to support its uptake and mainstreaming | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 4 | |
| | 8.3 Where relevant, NbS contribute to national and global targets for human wellbeing, climate change, biodiversity and human rights, including the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 6 | |
| | TOTAL | 25 | 24 | 16 | 15 | 14 | 18 | 4 | | |
| | % OF INDICATORS ANSWERED | 88 | 86 | 57 | 54 | 50 | 64 | 14 | | |

Zagreb prioritizes citizen well-being with nature-based solutions



© IMAGE SOURCE: <https://progrreg.eu/news/?c=search&id=GF4MZ9WK>

Table 2.2



Type 2: Climate change and water resilience

Status: FINALISED / ON-GOING / INCEPTION

| Issue + Criterion | Indicator | Grenoble | Malta | Tirana | Jerusalem | Marseille Stormwater | N° of answered indicators | Issue relevance |
|---|--|----------|-------|--------|-----------|----------------------|---------------------------|-----------------|
| SOCIETAL CHALLENGES 1. NbS effectively address societal challenges | 1.1 The most pressing societal challenges for rights holders and beneficiaries are prioritised | 1 | 1 | 1 | 1 | 1 | 5 | 80% |
| | 1.2 The societal challenges addressed are clearly understood and documented | 1 | 1 | 1 | 1 | 1 | 5 | |
| | 1.3 Human wellbeing outcomes arising from the NbS are identified, benchmarked and periodically assessed | 1 | 0 | 0 | 1 | 0 | 2 | |
| DESIGN AT SCALE 2. Design of NbS is informed by scale | 2.1 Design of NbS recognises and responds to the interactions between the economy, society and ecosystems | 1 | 1 | 1 | 0 | 1 | 4 | 80% |
| | 2.2 Design of NbS integrated with other complementary interventions and seeks synergies across sectors | 1 | 1 | 1 | 1 | 1 | 5 | |
| | 2.3 Design of NbS incorporates risk identification and risk management beyond the intervention site | 1 | 0 | 1 | 0 | 1 | 3 | |
| BIODIVERSITY NET-GAIN 3. NbS result in net gain to biodiversity and ecosystem integrity | 3.1 NbS actions directly respond to evidence-based assessment of the current state of the ecosystem and prevailing drivers of degradation and loss | 1 | 1 | 1 | 1 | 1 | 5 | 60% |
| | 3.1 NbS actions directly respond to evidence-based assessment of the current state of the ecosystem and prevailing drivers of degradation and loss | 1 | 0 | 0 | 1 | 0 | 2 | |
| | 3.1 NbS actions directly respond to evidence-based assessment of the current state of the ecosystem and prevailing drivers of degradation and loss | 0 | 0 | 1 | 1 | 1 | 3 | |
| | 3.1 NbS actions directly respond to evidence-based assessment of the current state of the ecosystem and prevailing drivers of degradation and loss | 0 | 0 | 1 | 1 | 0 | 2 | |
| ECONOMIC FEASIBILITY 4. NbS are economically viable | 4.1 The direct and indirect benefits and costs associated with the NbS, who pays and who benefits, are identified and documented | 1 | 1 | 1 | 0 | 1 | 4 | 45% |
| | 4.2 A cost-effectiveness study is provided to support the choice of NbS including the likely impact of any relevant regulations and subsidies | 0 | 1 | 0 | 0 | 0 | 1 | |
| | 4.3 The effectiveness of an NbS design is justified against available alternative solutions, taking into account any associated externalities | 0 | 0 | 0 | 1 | 0 | 1 | |
| | 4.4 NbS design considers a portfolio of resourcing options such as market-based, public sector, voluntary commitments and actions to support regulatory compliance | 1 | 1 | 0 | 1 | 0 | 3 | |
| INCLUSIVE GOVERNANCE 5. NbS are based on inclusive, transparent and empowering governance processes | 5.1 A defined and fully agreed upon feedback and grievance resolution mechanism is available to all stakeholders before an NbS intervention can be initiated | 1 | 1 | 1 | 1 | 0 | 4 | 52% |
| | 5.2 Participation is based on mutual respect and equality, regardless of gender, age or social status, and upholds the right of Indigenous Peoples to Free Prior and Informed Consent (FPIC) | 1 | 1 | 1 | 0 | 0 | 3 | |
| | 5.3 Stakeholders who are directly and indirectly affected by the NbS have been identified and involved in all processes of the NbS intervention | 1 | 0 | 1 | 1 | 0 | 3 | |
| | 5.4 Decision-making processes document and respond to rights and interests of all participating and affected stakeholders | 0 | 1 | 0 | 1 | 0 | 2 | |
| | 5.5. Where the scale of the NbS extends beyond jurisdictional boundaries, mechanisms are established to enable joint decision-making among the stakeholders in those jurisdictions affected by the NbS | 0 | 1 | 0 | 0 | 0 | 1 | |

| Issue + Criterion | Indicator | Grenoble | Malta | Tirana | Jerusalem | Marseille Stormwater | N° of answered indicators | Issue relevance |
|---|---|-----------|-----------|-----------|-----------|----------------------|---------------------------|-----------------|
| BALANCE TRADE-OFFS 6. NbS equitably balances trade-offs between achievement of their primary goal(s) and the continued provision of multiple benefits | 6.1 The potential costs and benefits of associated trade-offs of the NbS intervention are explicitly acknowledged and inform safeguards and any appropriate corrective actions | 1 | 0 | 0 | 1 | 1 | 3 | 33% |
| | 6.2 The rights, usage of and access to land and resources, along with the responsibilities of different stakeholders are acknowledged and respected | 0 | 1 | 0 | 1 | 0 | 2 | |
| | 6.3 Established safeguards are periodically reviewed to ensure that mutually agreed trade-offs limits are respected and do not destabilise the entire NbS | 0 | 0 | 0 | 0 | 0 | 0 | |
| ADAPTIVE MANAGEMENT 7. NbS are managed adaptively, based on evidence | 7.1 A NbS strategy is established and used as a basis for regular monitoring and evaluation of the intervention | 1 | 1 | 1 | 1 | 1 | 5 | 47% |
| | 7.2 A monitoring and evaluation plan is developed and implemented throughout the intervention lifecycle | 1 | 0 | 0 | 1 | 0 | 2 | |
| | 7.3 A framework for iterative learning that enables adaptive management is applied throughout the intervention lifecycle | 0 | 0 | 0 | 0 | 0 | 0 | |
| MAINSTREAMING 8. NbS are sustainable and mainstreamed within an appropriate jurisdictional context | 8.1 NbS design, implementation and lessons learnt are shared for triggering transformative change | 1 | 1 | 1 | 1 | 0 | 4 | 67% |
| | 8.2 NbS inform and enhance facilitating policy and regulation frameworks to support its uptake and mainstreaming | 1 | 0 | 1 | 0 | 0 | 2 | |
| | 8.3 Where relevant, NbS contribute to national and global targets for human wellbeing, climate change, biodiversity and human rights, including the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) | 1 | 1 | 1 | 1 | 0 | 4 | |
| | TOTAL | 19 | 16 | 16 | 19 | 10 | | |
| | % OF INDICATORS ANSWERED | 68 | 57 | 57 | 68 | 36 | | |



© TANYA KEISHA | DREAMSTIME.COM

Table 2.3



Type 3: Coastal resilience in a context of rising sea levels

Status: **FINALISED** / **ON-GOING** / **INCEPTION**

| Issue + Criterion | Indicator | Naples | Alicante | Málaga Senda | N° of answered indicators | Issue relevance |
|---|--|--------|----------|--------------|---------------------------|-----------------|
| SOCIETAL CHALLENGES 1. NbS effectively address societal challenges | 1.1 The most pressing societal challenges for rights holders and beneficiaries are prioritised | 1 | 1 | 1 | 3 | 67% |
| | 1.2 The societal challenges addressed are clearly understood and documented | 1 | 1 | 1 | 3 | |
| | 1.3 Human wellbeing outcomes arising from the NbS are identified, benchmarked and periodically assessed | 0 | 1 | 1 | 2 | |
| DESIGN AT SCALE 2. Design of NbS is informed by scale | 2.1 Design of NbS recognises and responds to the interactions between the economy, society and ecosystems | 1 | 1 | 1 | 3 | 75% |
| | 2.2 Design of NbS integrated with other complementary interventions and seeks synergies across sectors | 1 | 1 | 1 | 3 | |
| | 2.3 Design of NbS incorporates risk identification and risk management beyond the intervention site | 1 | 1 | 1 | 3 | |
| BIODIVERSITY NET-GAIN 3. NbS result in net gain to biodiversity and ecosystem integrity | 3.1 NbS actions directly respond to evidence-based assessment of the current state of the ecosystem and prevailing drivers of degradation and loss | 1 | 1 | 1 | 3 | 38% |
| | 3.1 NbS actions directly respond to evidence-based assessment of the current state of the ecosystem and prevailing drivers of degradation and loss | 0 | 1 | 0 | 1 | |
| | 3.1 NbS actions directly respond to evidence-based assessment of the current state of the ecosystem and prevailing drivers of degradation and loss | 1 | 0 | 0 | 1 | |
| | 3.1 NbS actions directly respond to evidence-based assessment of the current state of the ecosystem and prevailing drivers of degradation and loss | 0 | 0 | 1 | 1 | |
| ECONOMIC FEASIBILITY 4. NbS are economically viable | 4.1 The direct and indirect benefits and costs associated with the NbS, who pays and who benefits, are identified and documented | 1 | 1 | 0 | 2 | 44% |
| | 4.2 A cost-effectiveness study is provided to support the choice of NbS including the likely impact of any relevant regulations and subsidies | 0 | 1 | 0 | 1 | |
| | 4.3 The effectiveness of an NbS design is justified against available alternative solutions, taking into account any associated externalities | 1 | 1 | 0 | 2 | |
| | 4.4 NbS design considers a portfolio of resourcing options such as market-based, public sector, voluntary commitments and actions to support regulatory compliance | 1 | 1 | 0 | 2 | |
| INCLUSIVE GOVERNANCE 5. NbS are based on inclusive, transparent and empowering governance processes | 5.1 A defined and fully agreed upon feedback and grievance resolution mechanism is available to all stakeholders before an NbS intervention can be initiated | 1 | 1 | 0 | 2 | 30% |
| | 5.2 Participation is based on mutual respect and equality, regardless of gender, age or social status, and upholds the right of Indigenous Peoples to Free Prior and Informed Consent (FPIC) | 0 | 0 | 0 | 0 | |
| | 5.3 Stakeholders who are directly and indirectly affected by the NbS have been identified and involved in all processes of the NbS intervention | 1 | 1 | 0 | 2 | |
| | 5.4 Decision-making processes document and respond to rights and interests of all participating and affected stakeholders | 0 | 1 | 0 | 1 | |
| | 5.5. Where the scale of the NbS extends beyond jurisdictional boundaries, mechanisms are established to enable joint decision-making among the stakeholders in those jurisdictions affected by the NbS | 0 | 1 | 0 | 1 | |
| BALANCE TRADE-OFFS 6. NbS equitably balances trade-offs between achievement of their primary goal(s) and the continued provision of multiple benefits | 6.1 The potential costs and benefits of associated trade-offs of the NbS intervention are explicitly acknowledged and inform safeguards and any appropriate corrective actions | 1 | 1 | 0 | 2 | 33% |
| | 6.2 The rights, usage of and access to land and resources, along with the responsibilities of different stakeholders are acknowledged and respected | 1 | 1 | 0 | 2 | |
| | 6.3 Established safeguards are periodically reviewed to ensure that mutually agreed trade-offs limits are respected and do not destabilise the entire NbS | 0 | 0 | 0 | 0 | |

| Issue + Criterion | Indicator | Naples | Alicante | Málaga Senda | N° of answered indicators | Issue relevance |
|--|---|-----------|-----------|--------------|---------------------------|-----------------|
| ADAPTIVE MANAGEMENT 7. NbS are managed adaptively, based on evidence | 7.1 A NbS strategy is established and used as a basis for regular monitoring and evaluation of the intervention | 1 | 1 | 0 | 2 | 25% |
| | 7.2 A monitoring and evaluation plan is developed and implemented throughout the intervention lifecycle | 1 | 0 | 0 | 1 | |
| | 7.3 A framework for iterative learning that enables adaptive management is applied throughout the intervention lifecycle | 0 | 0 | 0 | 0 | |
| MAINSTREAMING 8. NbS are sustainable and mainstreamed within an appropriate jurisdictional context | 8.1 NbS design, implementation and lessons learnt are shared for triggering transformative change | 0 | 1 | 0 | 1 | 42% |
| | 8.2 NbS inform and enhance facilitating policy and regulation frameworks to support its uptake and mainstreaming | 1 | 1 | 0 | 2 | |
| | 8.3 Where relevant, NbS contribute to national and global targets for human wellbeing, climate change, biodiversity and human rights, including the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) | 1 | 1 | 0 | 2 | |
| TOTAL | | 18 | 22 | 8 | | |
| % OF INDICATORS ANSWERED | | 64 | 79 | 29 | | |



© IMAGE SOURCE: <http://www.mgmerospaisajistas.com/parque-del-mar>

Table 2.4



Type 4:
Mature
projects

Status: FINALISED / ON-GOING / INCEPTION

| Issue + Criterion | Indicator | Ljubljana | Vitoria-Gasteiz | Barcelona | N° of answered indicators | Issue relevance |
|---|--|-----------|-----------------|-----------|---------------------------|-----------------|
| SOCIETAL CHALLENGES 1. NbS effectively address societal challenges | 1.1 The most pressing societal challenges for rights holders and beneficiaries are prioritised | 1 | 1 | 1 | 3 | 100% |
| | 1.2 The societal challenges addressed are clearly understood and documented | 1 | 1 | 1 | 3 | |
| | 1.3 Human wellbeing outcomes arising from the NbS are identified, benchmarked and periodically assessed | 1 | 1 | 1 | 3 | |
| DESIGN AT SCALE 2. Design of NbS is informed by scale | 2.1 Design of NbS recognises and responds to the interactions between the economy, society and ecosystems | 1 | 1 | 1 | 3 | 100% |
| | 2.2 Design of NbS integrated with other complementary interventions and seeks synergies across sectors | 1 | 1 | 1 | 3 | |
| | 2.3 Design of NbS incorporates risk identification and risk management beyond the intervention site | 1 | 1 | 1 | 3 | |
| BIODIVERSITY NET-GAIN 3. NbS result in net gain to biodiversity and ecosystem integrity | 3.1 NbS actions directly respond to evidence-based assessment of the current state of the ecosystem and prevailing drivers of degradation and loss | 1 | 1 | 1 | 3 | 100% |
| | 3.1 NbS actions directly respond to evidence-based assessment of the current state of the ecosystem and prevailing drivers of degradation and loss | 1 | 1 | 1 | 3 | |
| | 3.1 NbS actions directly respond to evidence-based assessment of the current state of the ecosystem and prevailing drivers of degradation and loss | 1 | 1 | 1 | 3 | |
| | 3.1 NbS actions directly respond to evidence-based assessment of the current state of the ecosystem and prevailing drivers of degradation and loss | 1 | 1 | 1 | 3 | |
| ECONOMIC FEASIBILITY 4. NbS are economically viable | 4.1 The direct and indirect benefits and costs associated with the NbS, who pays and who benefits, are identified and documented | 1 | 1 | 1 | 3 | 58% |
| | 4.2 A cost-effectiveness study is provided to support the choice of NbS including the likely impact of any relevant regulations and subsidies | 1 | 1 | 0 | 2 | |
| | 4.3 The effectiveness of an NbS design is justified against available alternative solutions, taking into account any associated externalities | 0 | 1 | 1 | 2 | |
| | 4.4 NbS design considers a portfolio of resourcing options such as market-based, public sector, voluntary commitments and actions to support regulatory compliance | 0 | 0 | 0 | 0 | |
| INCLUSIVE GOVERNANCE 5. NbS are based on inclusive, transparent and empowering governance processes | 5.1 A defined and fully agreed upon feedback and grievance resolution mechanism is available to all stakeholders before an NbS intervention can be initiated | 1 | 1 | 1 | 3 | 87% |
| | 5.2 Participation is based on mutual respect and equality, regardless of gender, age or social status, and upholds the right of Indigenous Peoples to Free Prior and Informed Consent (FPIC) | 0 | 1 | 1 | 2 | |
| | 5.3 Stakeholders who are directly and indirectly affected by the NbS have been identified and involved in all processes of the NbS intervention | 1 | 1 | 1 | 3 | |
| | 5.4 Decision-making processes document and respond to rights and interests of all participating and affected stakeholders | 1 | 1 | 1 | 3 | |
| | 5.5. Where the scale of the NbS extends beyond jurisdictional boundaries, mechanisms are established to enable joint decision-making among the stakeholders in those jurisdictions affected by the NbS | 0 | 1 | 1 | 2 | |

| Issue + Criterion | Indicator | Ljubljana | Vitoria-Gasteiz | Barcelona | N° of answered indicators | Issue relevance |
|---|---|-----------|-----------------|-----------|---------------------------|-----------------|
| BALANCE TRADE-OFFS 6. NbS equitably balances trade-offs between achievement of their primary goal(s) and the continued provision of multiple benefits | 6.1 The potential costs and benefits of associated trade-offs of the NbS intervention are explicitly acknowledged and inform safeguards and any appropriate corrective actions | 0 | 1 | 0 | 1 | 33% |
| | 6.2 The rights, usage of and access to land and resources, along with the responsibilities of different stakeholders are acknowledged and respected | 1 | 1 | 0 | 2 | |
| | 6.3 Established safeguards are periodically reviewed to ensure that mutually agreed trade-offs limits are respected and do not destabilise the entire NbS | 0 | 0 | 0 | 0 | |
| ADAPTIVE MANAGEMENT 7. NbS are managed adaptively, based on evidence | 7.1 A NbS strategy is established and used as a basis for regular monitoring and evaluation of the intervention | 1 | 1 | 1 | 3 | 78% |
| | 7.2 A monitoring and evaluation plan is developed and implemented throughout the intervention lifecycle | 1 | 1 | 1 | 3 | |
| | 7.3 A framework for iterative learning that enables adaptive management is applied throughout the intervention lifecycle | 0 | 0 | 1 | 1 | |
| MAINSTREAMING 8. NbS are sustainable and mainstreamed within an appropriate jurisdictional context | 8.1 NbS design, implementation and lessons learnt are shared for triggering transformative change | 1 | 1 | 1 | 3 | 100% |
| | 8.2 NbS inform and enhance facilitating policy and regulation frameworks to support its uptake and mainstreaming | 1 | 1 | 1 | 3 | |
| | 8.3 Where relevant, NbS contribute to national and global targets for human wellbeing, climate change, biodiversity and human rights, including the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) | 1 | 1 | 1 | 3 | |
| | TOTAL | 21 | 25 | 23 | | |
| | % OF INDICATORS ANSWERED | 75 | 89 | 82 | | |

These practices Type 4 have been developed over a long period of time, often with several complementary approaches and with separate phases of action over time, allowing them to be refined, identifying gaps and complementing visions. As a result, they therefore have the highest ratings in almost all categories, except for Adaptive Management where newer urban practices show better results and in the Trade-Offs analysis, they: where perform the worst. This issue is related to the fact that the mature practices

analysed have a markedly urban character (albeit contextualised as a green infrastructure) and the question of trade-offs was a very new element that was not raised in its conception. Taking into consideration this aspect, these practices are not included in the summary presented in the following Table 3 since their degree of implementation don't allow for a comparative framework in relation to the other analysed categories.



Summary of practices contribution to the criteria of the Standard by type of practice analysed, considering Type 1, 2, and 3

Table 3

| Criterion | Maximum | Type | Minimum | Type |
|-----------------------|---------|--|---------|--|
| SOCIETAL CHALLENGES | 100% | Type 1 URBAN REGENERATION | 67% | Type 3 COASTAL RESILIENCE |
| DESIGN AT SCALE | 90% | Type 1 URBAN REGENERATION | 75% | Type 3 COASTAL RESILIENCE |
| BIODIVERSITY NET-GAIN | 79% | Type 1 URBAN REGENERATION | 38% | Type 3 COASTAL RESILIENCE |
| ECONOMIC FEASIBILITY | 46% | Type 1 URBAN REGENERATION | 44% | Type 3 COASTAL RESILIENCE |
| INCLUSIVE GOVERNANCE | 71% | Type 1 URBAN REGENERATION | 30% | Type 3 COASTAL RESILIENCE |
| BALANCE TRADE-OFFS | 33% | Type 2 CLIMATE CHANGE AND WATER RESILIENCE Type 3 COASTAL RESILIENCE | 19% | Type 2 CLIMATE CHANGE AND WATER RESILIENCE |
| ADAPTIVE MANAGEMENT | 52% | Type 1 URBAN REGENERATION | 25% | Type 1 URBAN REGENERATION |
| MAINSTREAMING | 76% | Type 1 URBAN REGENERATION | 42% | Type 1 URBAN REGENERATION |

According to the analysis shown developed in section 5.3, **Type 1** Urban regeneration projects are those that seem to cover all societal challenges. Urban regeneration is *per se* a comprehensive approach that must attend to the requirements and needs of multiple agents in all environmental and socioeconomic dimensions.

On the other hand, **Type 3** Coastal projects perform poorly on all criteria. All projects of this type are strongly biased towards a specific driver, especially economic improvement or biodiversity conservation, and are also dependent on spatial scale, affecting broad areas beyond municipal boundaries. They generally show top-down governance and low inclusive participation levels.

All projects, regardless of the type they belong to, show that implemented NbS contribute positively to “societal challenges” and meet the “design at scale” requirements.

In the case of the criterion 1 “Society challenges”, the concept is so broad in its formulation that it is very complex to find a project that not addresses at least two of them. Compared to the issue of biodiversity (criterion 3), the Standard has little to say about other challenges that may be especially

relevant (such as climate change or social and economic improvement).

The assessment reveals that “Balance trade-offs” and “Economic feasibility” are the criteria where a real gap exists for all projects, at least based on the information available for the analysis. It was very challenging to find quality information about the analysis of trade-offs of the NbS deployed, or comparative analyses of green solutions versus more traditional ones in economic terms. Where such analyses exist, they are done from a markedly traditional perspective without addressing the benefits of NbS with respect to more traditional solutions, such as their effects on climate change, improvements in environmental conditions and contributions to health and well-being (including cohesion and social justice).

It should be noted that identifying this gap in practice is justifiable given the state of the art since there is no general reference framework for addressing this issue at a European level (it is one of the objectives of the European Commission in the short term). Moreover, the balance of trade-offs is another of the big questions that is not adequately addressed. Identifying these gaps is of great value for designing future projects, as a lesson learned.

5.4 On the review of the Criteria considered in the Standard

Societal challenges

The purpose of this Criterion is to ensure that the NbS is designed as a response to one or more societal challenge) that have been identified as a priority by those who are or will be directly affected by them. All stakeholders, especially rights holders and beneficiaries of the NbS, must be involved in the decision-making process used for identifying the priority challenge or challenges (Criterion 5).

This first criterion of the Standard is very straightforward in its statement, although it embraces a lot of information and incorporates multidimensional themes and approaches under a single variable. Since it addresses so many issues as a single variable, the results of this criterion are challenging to assess and interpret.

The indicators used for its evaluation seem to be biased towards human health and well-being. This is positive in the sense that these challenges are definitely less well advanced and addressed by NbS at present, alongside socio-economic development. However, this emphasis reduces the potential relative importance of other issues such as climate change (beyond its impact on human health and well-being).

For indicator 1.3, there is a potential risk of overlap with the indicators on monitoring solutions (under Criterion 7). The concept of benchmarking is definitely a very relevant approach to use in the co-design and NbS prioritisation process, and therefore it is closely related to Criterion 7 and also Criteria 1 and 2.

Results

All the projects analysed aim at responding to two or more of the suggested societal challenges. This first criterion is one of the elements used for defining the types, by interpreting how each project contributes to meeting these societal challenges.

Two aspects of the projects were evaluated:

- Their multifunctionality, one of the elements that most enriches the projects, and their ability to bring together different themes and topics and respond to different societal challenges;
- Their contribution to a single or a limited number of challenges, where the NbS intervention was designed ad hoc to cope with a specific issue and it has proven effective.

Design at scale

The purpose of this Criterion is to encourage NbS designs that recognise the complexity and uncertainty that occur in living dynamic land/seascapes. Scale applies not only to the biophysical or geographic perspective but also to the influence of economic systems, policy frameworks and the importance of cultural perspectives. NbS design will be informed by what stakeholders know about the interactions between different aspects of a land/seascape using a three-scale framework that considers the parts within the land/seascape, the land/seascape itself and the wider environment around the land/seascape.

This Criterion refers to the ability of the project to generate an impact beyond the immediate boundaries of the intervention, and therefore it takes account of factors such as:

- Participatory system assessment;
- Natural and cultural contexts responding to the complex interaction between ecological, social and political systems;
- Long-term maintenance.

The spatial and temporal scales have a very important and significant role in the ecosystem approach and adaptive management, particularly where biodiversity loss and ecosystem malfunction become evident to local stakeholders, i.e. at spatial scales greater than individual pieces of land or water and at temporal scales longer than a few years.

Results

The analysis of the projects shows possible gaps:

- Analysis of the potential for upscaling or downscaling the NbS. This is different from the assessment of the transferability of the NbS implementation experience to future interventions, which is assessed under Criterion 8. The upscaling/downscaling analysis relates to the question of how the NbS design fits into the overall Green Infrastructure / NbS Strategy at city level or conversely how the NbS design and implementation could affect instruments at strategic level.
- Analysis of the scale of the intervention: site/urban acupuncture level; district/urban level; municipal/local level; regional level. This seems to be included in the description of the Criterion but is not addressed by the indicators used. The scale determines the project objectives, the stakeholders to be involved and the potential transferability of lessons learned, amongst other things.



© TARIYA SAKMANGKORN | DREAMTIME.COM

Biodiversity net-gain

NbS are derived as goods and services from ecosystems, and therefore strongly depend on the health of an ecosystem. Biodiversity loss and ecosystem change can have significant impacts on the functioning and integrity of the system. Therefore, NbS design and implementation must avoid undermining the integrity of the system and, instead, proactively seek to enhance the functionality and connectivity of the ecosystem. Doing so can also ensure the long-term resilience and durability of the NbS.

Biodiversity is understood as a fundamental asset for NbS in tackling societal challenges. Such solutions bring more – and more diverse – nature and natural features and processes into cities and regions. The idea underlying NbS is that the ecological performance of diverse ecosystems and their local adaptation (through the genetic variation that evolves under varying climate conditions) must be considered when searching for sustainable solutions to tackle societal challenges.

As highlighted in the statements made at the United Nations' Climate Action Summit in September 2019, it is increasingly recognised that biodiversity is also a major asset for innovating and developing solutions to many of the challenges our society faces. NbS can help contribute to the conservation and sustainable use of biodiversity, to reach the goals of the UN SDGs, the Paris Agreement, the Sendai Framework on Disaster Risk Reduction, and Biodiversity Strategies at all levels.

Results

The analysis shows that Biodiversity is of high relative importance compared to the other Criteria evaluated and also to other societal challenges.

This fact may generate imbalances in the assessment of the projects, since those with a biodiversity objective as well as those on a regional scale or with a peri-urban approach are more likely to address this variable than more urban or urban acupuncture projects.

The occurrence of alien species and the importance of encouraging endemic and/or protected species seem to be missing in the evaluation.

Economic feasibility

The return on investment, the efficiency and effectiveness of the intervention, and equity in the distribution of benefits and costs are key determinants of success for an NbS. This Criterion requires that sufficient consideration is given to the economic viability of the intervention, both at the design stage and through monitoring the implementation. For NbS to be sustainable, there must be strong consideration of the economic aspects as, most likely, long-term gains must be balanced against short-term costs, with short-term actions developed within the context of long-term (over generations) goals and plans. If the economic feasibility is not adequately addressed, NbS run the risk of being short-term projects, where, after closing, the solution and benefits provided cease to exist, potentially leaving the landscape and communities worse off than before. Innovative and evidence-based tools for the valuation of nature, along with ideas for NbS contributions to markets and jobs, encourage creative (blended) financing of NbS, thereby increasing the likelihood of their long-term success.

The indicators used to evaluate economic feasibility refer to:

- The identification of the direct and indirect benefits and costs associated with the NbS, who pays and who benefits. This would cover benefits to the local economy arising from the NbS projects, in terms of generating jobs and stimulating economic activity, property betterment and quality of life. It can be challenging to measure benefits in economic terms since they are not necessarily economic in nature but in value; for example, to quantify the benefits of the demonstration projects in reducing and attenuating urban run-off, one potential indicator is the avoided cost of treating run-off water entering the sewerage system. Similarly, co-benefits include measures under other Criteria that can be converted and taken into account when weighing the overall cost-effectiveness of the NbS.
- The effectiveness of the NbS design justified against available alternative solutions, taking into account any associated externalities. This refers to the benchmarking exercise of comparing the effectiveness of the NbS versus for instance more “traditional” hard or engineering alternatives.
- A cost-effectiveness study to support the choice of NbS, including the likely impact of any relevant regulations and subsidies. The results of the effectiveness assessment can be combined with several measures of costs in order to evaluate the project’s cost-effectiveness. Under this category, we therefore consider a series of cost-related indicators. In particular, both the project’s one-off costs (e.g. costs related to construction of the NbS and land acquisition) and its recurring or maintenance costs, and an assessment of the savings made compared to the costs of alternative (non-NbS) solutions.
- Consideration of a portfolio of resourcing options such as market-based, public sector, voluntary commitments and actions to support regulatory compliance.

Results

Despite being one of the most important aspects of successful NbS implementation, economic feasibility remains one of the challenges in the analysis, as it is less advanced and less well covered in the assessment of the projects analysed, regardless of their nature and type. This reveals a need for effective science–policy interfacing in order to foster cost-effective NbS. For example, there is a general lack of:

- Monetised evaluation of the benefits of the NbS, taking into account the benefits that they provide compared with traditional solutions or grey interventions in relation to increasing resilience against climate change, improving environmental conditions and contributing to health and well-being;
- Studies on the economic evaluation of their effectiveness against climate change, particularly comparing the NbS with traditional grey solutions;
- Related issues, such as the use of non-traditional modes and sources of finance, and the way in which private sector involvement can contribute to the development of newer business models, whose existence and success could be evaluated by part of the Standard.

Inclusive governance

This criterion requires that NbS acknowledge, involve and respond to the concerns of a variety of stakeholders, especially rights holders. Good governance arrangements are proven to not only reduce an intervention's sustainability risks, but also to enhance its social 'licence to operate'. Conversely, inadequate governance provision for otherwise well-intended actions can adversely affect the legitimacy of benefit- and cost-sharing arrangements. As a minimum, NbS must adhere to and align with the prevailing legal and regulatory provisions, being clear on where legal responsibilities and liabilities lie. However, as often is the case with natural resources, basic compliance will need to be complemented with ancillary mechanisms that actively engage and empower local communities and other stakeholders.

This Criterion assesses the engagement of a wide range of stakeholders in all phases of NbS development and delivery, in an inclusive, timely, open and comprehensive manner that is culturally appropriate and embraces equity and gender identity issues.

It covers the extent to which the governance structures and processes implemented in the analysed projects were conducive to achieving the objectives set and meeting societal challenges, were rights based, reflected a plurality of views and ensured equity.

However, it should also place issues such as civil society participation (e.g. citizen science) and co-production of knowledge with stakeholders more centre-stage. Furthermore, it should promote effective communication on biodiversity issues to improve awareness of the multiple benefits of biodiversity.

Results

To a certain extent all practices considered stakeholders engagement as a core element for the delivery of their NbS initiatives, strategies or projects. There are three levels that it would be interesting to evaluate, representing different degrees of development of inclusive governance:

- Identify and involve all potential stakeholders (including citizens, technical experts and the private sector);
- Analyse whether decisions are made jointly, or whether participation is only advisory, i.e. the difference between a top-down and a bottom-up approach;
- Determine if there is a process of citizen empowerment, either through the use of citizen observatories or through the involvement of vulnerable groups or those at risk of social exclusion. In short, has there been any specific initiative to involve agents who may be under-represented or who, although key to the project, may be at risk of not participating in it in areas promoting social justification? Gender identity and the integration of social groups are not considered.



© IMAGE SOURCE: <https://avismelias.org/repasam-doule-la-gle-tous-mouse-lakoy-xorus-atomitropolitik-parlo-pay/ou-mel/>

Balance trade-offs

Trade-offs in land and natural resource management are inevitable. Ecosystems provide a wealth of different benefits and not everyone values each of them in the same way. While trade-offs cannot be avoided, they can be effectively and equitably managed. This Criterion requires that NbS proponents acknowledge these trade-offs and follow a fair, transparent and inclusive process to balance and manage them over both time and geographic space. This involves a credible assessment, full disclosure and agreement among the most affected stakeholders on how the trade-offs should be addressed. Fair and transparent negotiation of trade-offs and compensation among potentially affected parties for any damages or trade-offs to local opportunities and livelihoods provides the basis for successful long-term NbS outcomes. Critically, it is important to recognise that trade-offs have social and ecological limits beyond which point certain values or benefits can be lost in perpetuity. This means that safeguards will be necessary to ensure, inter alia, that the integrity of ecosystems and the long-term stabilising properties of ecosystem services are not exceeded.

This Criterion seeks to evaluate the extent to which the NbS intervention identifies current and future benefits and trade-offs with the aim of ensuring that an ecosystem is not changed for the sake of an ecosystem service or resource. In addition, it assesses whether the project includes a procedure for the fair and transparent negotiation of trade-offs and compensation for loss of local opportunities.

Results

Along with economic feasibility, this is the least considered or addressed criterion within the projects analysed, except on very specific and focused matters.

It is a very difficult criterion to evaluate. It is necessary to interpret the information produced by the Environmental Impact Assessment or similar procedures.

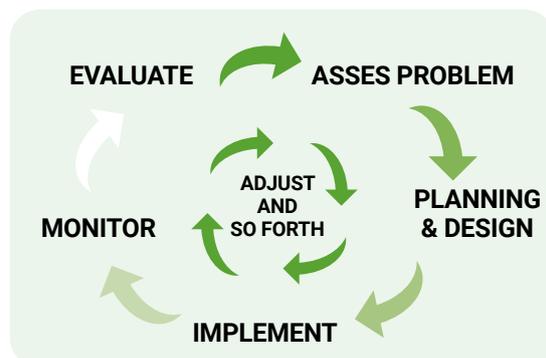
Adaptive management

This Criterion requires that NbS implementation plans include provisions to enable adaptive management as a response to uncertainty and as an option to effectively harness ecosystem resilience. A degree of uncertainty is inherent when managing most ecosystems due to their complex, dynamic and self-organising nature. This also means that ecosystems have greater resilience which confers a wider range of options to respond to unanticipated social, economic or climate events. The foundation of adaptive management is the evidence-base provided by regular monitoring and evaluation, drawing on scientific understanding as well as indigenous, traditional and local knowledge. By proactively adopting an adaptive management approach, the NbS can continue to be relevant through the lifecycle of the intervention and the risk of redundancy and stranded investments minimised.

According to the Standard, this Criterion assesses the extent to which adaptive management is catered for in NbS deployment, based on continuous monitoring and evaluation, so as to be able to take account of uncertainty, ecosystem complexity and changes over time. Adaptiveness also needs to be anchored in the institutions and organisations that govern the NbS.

Ecosystem processes and functions are complex and variable with a high level of uncertainty, which increases due to their interaction with social systems. Therefore, ecosystem management must involve the adaptation of methodologies and solutions, based on learning about how systems are managed and also on evidence and monitoring in a context of uncertainty.

The adaptive management process is often presented as a cycle with a number of essential steps:



Some of the differentiating characteristics of adaptive management are:

- acknowledgement of uncertainty about what policy or solution is 'best' for the particular management issue;
- thoughtful selection of the policies or solutions to be applied (the assessment and design stages of the cycle);
- careful implementation of a plan of action designed to reveal the critical knowledge that is currently lacking;
- monitoring of key response indicators;
- analysis of the management outcomes in consideration of the original objectives;
- incorporation of the results into future decisions.

Results

This is by far the least developed criterion addressed in the projects analysed, regardless of their type, showing that there is still a long way to go with regard to the regular operationalisation of adaptive management within government bodies. Similarly, there is a need for flexibility in policy making and implementation. Long-term, inflexible decisions are likely to be inadequate or even destructive.

This transformation toward adaptive management will need a cross-sectoral approach to ensure policy coherence and effectiveness, as well as innovative governance approaches that allow the adaptive process to be operational (see Figure 6).

Most of the projects analysed incorporate a monitoring and evaluation system that helps to track the progress of NbS interventions over time, although from reading the available material it is not possible to grasp whether the monitoring and evaluation results are used in an adaptive management approach.

Mainstreaming

This Criterion requires that NbS interventions are designed and managed with a view to long-term sustainability and that they take account of, work with and align with sectoral, national and other policy frameworks. There are various approaches to mainstreaming NbS; however, all rely on strategic communications and outreach. Audiences to consider include individuals (e.g. the public, academics), institutions (e.g. national government, start-ups, businesses, and organisations) and global networks (e.g. Sustainable Development Goals, Paris Agreement).

In this Criterion, the challenge refers to the NbS intervention being integrated or affecting and contributing to, and being aligned with programmes and policies already in place at local, regional and state levels.

Results

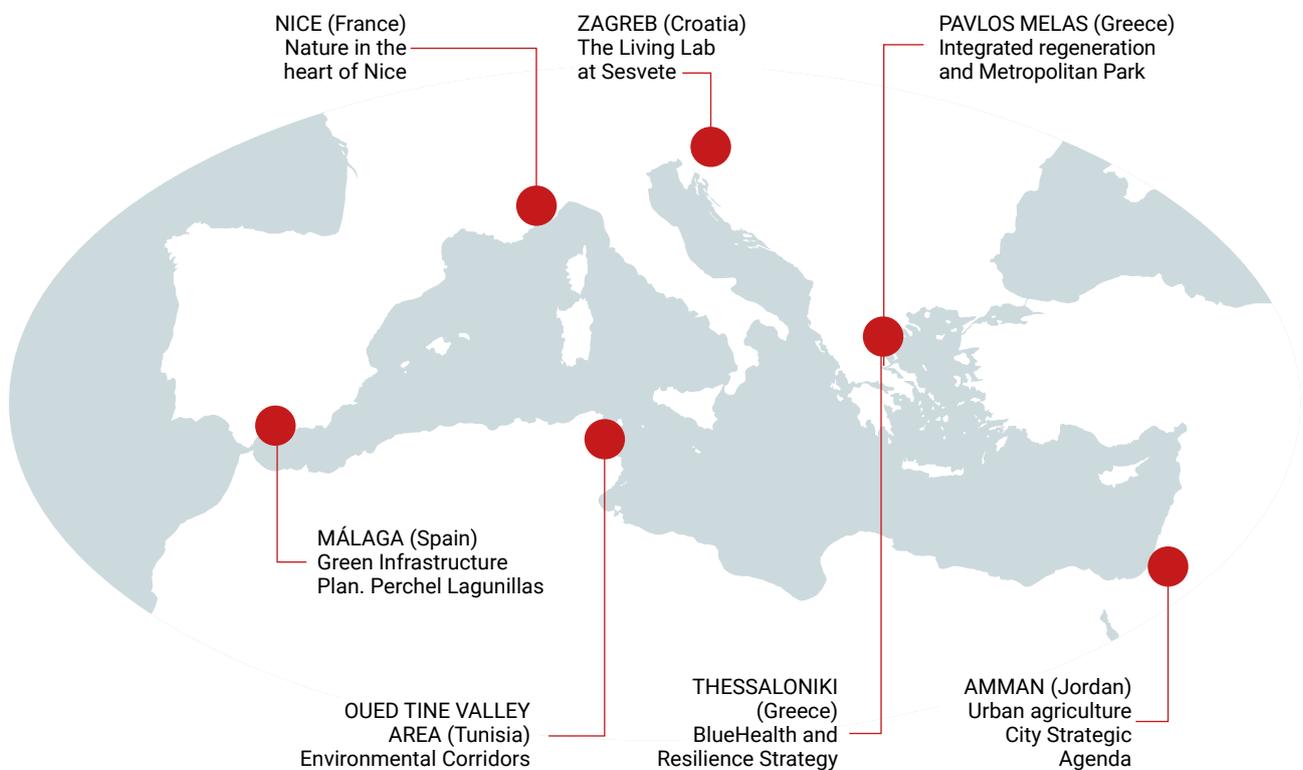
A very large range of policy instruments is available to cities to promote and assist in the implementation of NbS; of these, regulatory instruments are usually the most direct and directly powerful means of fostering NbS.

Perhaps the only question to comment on relates to the UNDRIP (United Nations Declaration on the Rights of Indigenous Peoples) criteria, which are at least partially complied with in all of these projects. At this point, therefore, it is not clear whether the evaluation focuses on knowing if there is an express reference to them or whether it is about knowing if there is one or more that the project refers to.



TYPE 1

Urban regeneration in a global change context





Amman (Jordan) Urban agriculture City Strategic Agenda



Urban agriculture (UA) was historically widely practised in urban areas in Jordan and the Levant. However, increased urbanisation and densification has reduced the availability of open space in the domestic and public realms for urban agriculture.

Urban agriculture has been growing in various parts of the world. Increased awareness of the importance of health issues, organic food and clean living, of bringing greenery into the city and of cutting emissions, as well as the development of new technologies, are making UA more feasible and welcome on the individual, institutional and commercial levels.

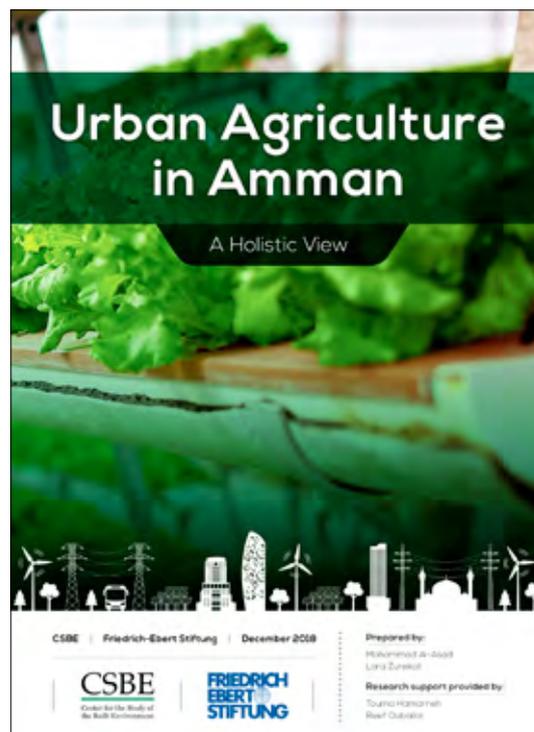
Jordan offers an example where governments and communities have successfully addressed urbanisation, food security and urban poverty through an approach that focuses on UA. Jordan's total population is 6 million and the city of Amman, the capital of the Kingdom, is the main urban area with a population of 2.2 million.

Amman has been a pioneer in the Middle East and North Africa (MENA) region in recognising the importance of urban agriculture for the environment as well as for people's health and food security, since it brings greenery into the city together with all the benefits associated with that. The Greater Amman Municipality (GAM) has been supporting urban agriculture and food security programmes using urban land, including rooftops, schools, home gardens and vacant plots between buildings.

The case of Amman includes two major actions that could serve as examples of best practice for other cities:

1. Institutionalising urban agriculture as a first step towards its recognition as a major component of urban settings.

The GAM conducted an exploratory study on UA within a regional programme implemented by the Environment and Sustainable Development Unit (ESDU) of the American University of Beirut in collaboration with the GAM. Urban agriculture in Amman¹¹ by the Centre for the Study of the Built Environment (CSBE) was carried out in association with the Friedrich Ebert Stiftung (FES)¹².



Urban Agriculture in Amman. A Holistic View. 2018.
<http://library.fes.de/pdf-files/bueros/amman/15779.pdf>

¹¹ Urban Agriculture in Amman. A Holistic View. 2018. <http://library.fes.de/pdf-files/bueros/amman/15779.pdf>

¹² https://www.researchgate.net/publication/271853079_Redefining_a_sustainable_role_for_urban_agriculture_in_the_Middle_East_and_North_Africa_Urban_Agricultures_in_the_Mediterranean

2. Establishing a dedicated group of stakeholders and setting a City Strategic Agenda (CSA) to support the sustainable development of urban agriculture in Amman

The ESDU, together with the RUAF Foundation – Global partnership on Urban Agriculture and Food Systems¹³, have promoted multi-stakeholder action planning and policy formulation (MPAP) on urban agriculture and food security, where national and local authorities cooperate with citizens, farmers and civic organisations and private sector companies in the preparation, implementation and evaluation of related policies and action plans.

Based on the exploratory studies on urban agriculture and stakeholder identification, in 2009, the Greater Amman Municipality took the initiative to establish a multi-stakeholder forum (MSF) and a specialised Urban Agriculture Bureau and since then has committed human and financial resources to implement the City Strategic Agenda (CSA) to support the sustainable development of urban agriculture and its institutionalisation.

Through its Urban Agriculture Bureau and MSF, Amman has partnered with several international organisations to encourage sustainable urban food production.

Pilot projects that have been carried out include:

- More than 300 productive green roofs and 4,000 school and home gardens;
- A land bank to connect landowners with existing and potential producers: the city established a land bank for urban agriculture after mapping vacant land areas available in the city region;
- New land-use guidelines requiring 15% of each plot to be used for greening or agriculture;
- Local women's cooperative to improve the production, processing and marketing of selected crops such as green leafy vegetables;
- Training and technical assistance on access to markets for sustainable urban farmers;
- Promotion of organic and healthy food production and value adding (e.g. washing, packaging, labelling);
- Promotion of rainwater harvesting, wastewater recycling and more efficient water use in agriculture;
- Boosting urban and peri-urban forestation (with productive street/park trees and use of treated wastewater);
- Special seal to distinguish and market local urban agriculture products.

Images of the roof garden at the vocational training center in the Gaza Refugee Camp in Jerash. (Photo credit: Greening the Camps)



¹³ <https://ruaf.org/>

The MPAP and MSF experience in Amman has proven effective in finding solutions that meet the varied needs of community stakeholders. This approach has raised the levels of awareness and understanding of the UA concept. Consequently, UA has increasingly become integrated in the development strategy of the city and cooperation has been enhanced among institutions and the various public authorities, especially through the forum and working groups responsible for developing projects on the key issues identified in

the CSA. Furthermore, the MSF is now serving as a key interlocutor for major donors.

UA has been recognised as a stepping stone for building an asset base and for investment in other activities related to agriculture, such as larger projects and businesses, but also as a key instrument for development, a source of economic growth and employment, a tool for food security and natural resources management and an instrument for poverty reduction.



© IMAGE SOURCE: <http://library/ies.de/pdf-files/bueros/amman/15779.pdf>

Documents

Arab models of urban agriculture

<http://gupap.org/en/arab-models-of-urban-agriculture/>

Redefining a sustainable role for urban agriculture in the Middle East and North Africa. Urban Agricultures in the Mediterranean. 2011

https://www.researchgate.net/publication/271853079_Redefining_a_sustainable_role_for_urban_agriculture_in_the_Middle_East_and_North_Africa_Urban_Agricultures_in_the_Mediterranean

A sustainable urban food system in Amman

http://medurbantools.com/portfolio_page/a-sustainable-urban-food-system-in-amman/

http://old.iclei.org/fileadmin/PUBLICATIONS/Case_Stories/Urban_NEXUS/26_Urban_NEXUS_Case_Story_Amman_ICLEI-GIZ_2014.pdf

Amman Clean Development Plan, Urban Agriculture magazine 25, p. 42.

<https://ruaf.org/assets/2019/11/Urban-Agriculture-Magazine-no.-25-RUAF-10-years.pdf>

Amman Resilience Strategy

http://www.100resilientcities.org/wp-content/uploads/2017/07/170515-100RC-Amman_English-FINAL_Ir.pdf

Urban Agriculture in Jordan: Opportunities, Challenges, and Accomplishments, Amman Design Week 2019 (3 November 2019)

<https://www.youtube.com/watch?v=4kJRScF2c4g>

ISSUES ADDRESSED
Societal challenges

Climate change / Food security / Water security /
Disaster risk / Human health / Economic and social development



CRITERIA

1. NbS effectively address societal challenges

| INDICATORS | DESCRIPTION |
|--|---|
| <p>1.1 The most pressing societal challenges for rights holders and beneficiaries are prioritised</p> | <p>The following benefits of urban agriculture in Amman are explicitly recognised:</p> <ul style="list-style-type: none"> - Reduction of emissions and climate change mitigation; - Access to clean food (health); - Bringing communities together, creating stronger social bonds and helping increase well-being in terms of stress relief; - Raising awareness regarding environmental concerns: densely populated city with little access to public green spaces, which are located in the urban periphery; - Economic benefits: for individual households and at a commercial level (markets, hotels, etc.). The financial rewards of engaging in urban agriculture on a household scale are very low. The value of urban agriculture accordingly lies elsewhere: in greening the city and bringing nature into it; in moderating the climate; in establishing social bonds between those who engage in it; in its therapeutic value as a relaxing activity that involves caring for living entities; in obtaining fresh and healthy vegetables. These benefits are of course more difficult to quantify than amounts of produce, their cost and their market value, but are no less important. <p>Key challenges facing urban agriculture in Amman:</p> <ul style="list-style-type: none"> - Limited availability of space; - Limited availability of water; - Social and cultural hindrances: lack of community engagement and lack of the cultural practice of vegetable gardening; - Technical constraints due to the intrinsic climatological characteristics of the region with very high insolation and drying winds, which require more advanced technical solutions; - Urban agriculture at the household level still has a very long way to go in Jordan. As things stand, the levels of knowledge, interest and dedication in households remain weak. It will take years of concerted effort to increase the uptake of this activity. Although training and pilot projects offered by community centres can be of help if administered properly, the best hope for spreading UA is through schools, where learning how to grow food could become part of the curriculum or an extracurricular activity. Of course, personnel who are dedicated to these activities over the long term are essential for any of them to succeed. |
| <p>1.2 The societal challenges addressed are clearly understood and documented</p> | <p>Exploratory studies on urban agriculture have been undertaken.</p> |
| <p>1.3 Human well-being outcomes arising from the NbS are identified, benchmarked and periodically assessed</p> | <p>Human well-being outcomes are explicitly recognised. There is no information available about periodical monitoring, though.</p> |

| ISSUES ADDRESSED Design at scale City-wide / District / Urban acupuncture | |
|---|--|
| CRITERIA 2. Design of NbS is informed by scale | |
| INDICATORS | DESCRIPTION |
| 2.1 Design of NbS recognises and responds to the interactions between the economy, society and ecosystems | There are numerous examples of initiatives and activities relating to urban agriculture that are taking place: – Some are individual initiatives, such as green roofs and water harvesting; – Others are commercial initiatives, such as The Green Hub geodesic greenhouse on the roof of the Landmark Hotel, which operates as a living laboratory; – Community-based markets. |
| 2.2 Design of NbS is integrated with other complementary interventions and seeks synergies across sectors | This is recognised in the city strategy. There is no evidence of any analysis being undertaken, though. |
| 2.3 Design of NbS incorporates risk identification and risk management beyond the intervention site | No evidence found during the evaluation. |
| ISSUES ADDRESSED Biodiversity net-gain | |
| CRITERIA 3. NbS result in net gain to biodiversity and ecosystem integrity | |
| INDICATORS | DESCRIPTION |
| 3.1 NbS actions directly respond to evidence-based assessment of the current state of the ecosystem and prevailing drivers of degradation and loss | One of the key actions in Goal A – Manage and fulfil climate change commitments of the Amman Resilience Strategy ¹⁴ is to deliver the Green Amman 2020 initiative. This action includes documenting and classifying existing green areas, increasing per capita green space, delivering city greening projects, increasing urban and rooftop agriculture, enhancing partnerships and raising awareness about green initiatives. This is an ongoing activity and no information is available or accessible. |
| 3.2 Clear and measurable biodiversity conservation outcomes are identified, benchmarked and periodically assessed | No evidence found during the evaluation. |
| 3.3 Monitoring includes periodic assessments of unintended adverse consequences for nature arising from the NbS | No evidence found during the evaluation. |
| 3.4 Opportunities to enhance ecosystem integrity and connectivity are identified and incorporated into the NbS strategy | No evidence found during the evaluation. |

¹⁴ http://www.100resilientcities.org/wp-content/uploads/2017/07/170515-100RC-Amman_English-FINAL_Jr.pdf

| ISSUES ADDRESSED Economic feasibility | |
|---|---|
| CRITERIA 4. NbS are economically viable | |
| INDICATORS | DESCRIPTION |
| 4.1 The direct and indirect benefits and costs associated with the NbS, who pays and who benefits, are identified and documented | Related to private investment and community based or cooperative projects, but no information is available. The fact that large private-sector companies are willing to support and enable the various activities connected to urban agriculture through their Corporate Social Responsibility (CSR) efforts is important. The Investbank has directed a good part of its CSR funds to agricultural activities and associated marketing, but this so far has not included direct support for urban agriculture activities. The support that Landmark Hotel has provided to The Green Hub is also a good example of how large commercial establishments may support urban agriculture activities, in this case for the benefit of all involved, including the hotel itself. |
| 4.2 A cost-effectiveness study is provided to support the choice of NbS including the likely impact of any relevant regulations and subsidies | No evidence found during the evaluation. |
| 4.3 The effectiveness of the NbS design is justified against available alternative solutions, taking into account any associated externalities | No evidence found during the evaluation. |
| 4.4 NbS design considers a portfolio of resourcing options such as market-based, public sector, voluntary commitments and actions to support regulatory compliance | No evidence found during the evaluation. |
| ISSUES ADDRESSED Inclusive governance | |
| CRITERIA 5. NbS are based on inclusive, transparent and empowering governance processes | |
| INDICATORS | DESCRIPTION |
| 5.1 A defined and fully agreed upon feedback and grievance resolution mechanism is available to all stakeholders before an NbS intervention can be initiated | Establishing a dedicated group of stakeholders and setting a City Strategic Agenda (CSA) to support the sustainable development of urban agriculture in Amman are key aspects of this project. |
| 5.2 Participation is based on mutual respect and equality, regardless of gender, age or social status, and upholds the right of Indigenous Peoples to Free Prior and Informed Consent (FPIC) | Special action is being dedicated to a local women's cooperative to improve the production, processing and marketing of selected crops, such as green leafy vegetables. This reinforces the idea of being not only inclusive but also sensitive to vulnerable groups. |
| 5.3 Stakeholders who are directly and indirectly affected by the NbS have been identified and involved in all processes of the NbS intervention | To boost engagement in urban agriculture activities, schools have been identified as the best place to start. A particular effort has been made in education and awareness raising amongst young people, particularly in two schools – Amman National School and King's Academy private school – where students have shown interest and enthusiasm in the process. |
| 5.4 Decision-making processes document and respond to the rights and interests of all participating and affected stakeholders | No information available or accessible in English. |
| 5.5 Where the scale of the NbS extends beyond jurisdictional boundaries, mechanisms are established to enable joint decision making by the stakeholders in those jurisdictions affected by the NbS | No evidence found during the evaluation. |

| ISSUES ADDRESSED Balance trade-offs | |
|---|--|
| CRITERIA 6. NbS equitably balance trade-offs between achievement of their primary goal(s) and the continued provision of multiple benefits | |
| INDICATORS | DESCRIPTION |
| 6.1 The potential costs and benefits of associated trade-offs of the NbS intervention are explicitly acknowledged and inform safeguards and any appropriate corrective actions | No evidence found during the evaluation. |
| 6.2 The rights to, usage of and access to land and resources, along with the responsibilities of different stakeholders are acknowledged and respected | No evidence found during the evaluation. |
| 6.3 Established safeguards are periodically reviewed to ensure that mutually agreed trade-off limits are respected and do not destabilise the entire NbS | No evidence found during the evaluation. |
| ISSUES ADDRESSED Adaptive management | |
| CRITERIA 7. NbS are managed adaptively, based on evidence | |
| INDICATORS | DESCRIPTION |
| 7.1 An NbS strategy is established and used as a basis for regular monitoring and evaluation of the intervention | No evidence found during the evaluation. |
| 7.2 A monitoring and evaluation plan is developed and implemented throughout the intervention lifecycle | No evidence found during the evaluation. |
| 7.3 A framework for iterative learning that enables adaptive management is applied throughout the intervention lifecycle | No evidence found during the evaluation. |



© IMAGE SOURCE: <http://library.fes.de/pdf-files/bueros/ammn/15779.pdf>

ISSUES ADDRESSED
Mainstreaming

CRITERIA

8. NbS are sustainable and mainstreamed within an appropriate jurisdictional context

| INDICATORS | DESCRIPTION |
|--|---|
| <p>8.1 NbS design, implementation and lessons learnt are shared to trigger transformative change</p> | <p>Formalisation of the City Strategic Agenda on UA The joint planning work in the MSF resulted in a City Strategic Agenda on Urban Agriculture, which then was forwarded to the municipal council or one of the council committees for discussion and approval, so that it could be incorporated in the municipal policies and budget. Adoption of the Strategic Agenda also led to the creation of a UA unit with the municipal structure.</p> |
| <p>8.2 NbS inform and enhance facilitating policy and regulation frameworks to support their uptake and mainstreaming</p> | <p>In Amman, urban agriculture land use is included in land use planning, with 15% of new development permits to be given out for green and urban agriculture spaces. Agricultural lending institutions have recognised urban farmers as beneficiaries, allowing them new opportunities to access small loans. The Agricultural Extension Department of the Ministry of Agriculture provides urban and peri-urban producers with training and in-kind support services. Following intervention by the Amman Institute¹⁵, urban agriculture has been included as a major component of greening and re-zoning initiatives.</p> |
| <p>8.3 Where relevant, NbS contribute to national and global targets for human well-being, climate change, biodiversity and human rights, including the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP)</p> | <p>Multi-stakeholder policy influencing local urban food initiatives. Developments in Amman showed that the transition towards a more local food-producing system can be developed in a more top-down process. Several ministries, key institutions and NGOs took part in the Amman MSF. UA was institutionalised in the Bureau of Urban Agriculture of the City of Amman, first as part of the Department of Agriculture, but later directly under the Mayor's Office. The MSF meets irregularly, but the Mayor's Office provides support for business development and city greening¹⁶. The Urban Agriculture strategy contributes to Goal A of the Amman Resilience Strategy, which sets out the vision for a resilient Amman.</p> |



© IMAGE SOURCE: <http://library.ies.de/pdf-files/buenos/amman/15779.pdf>

¹⁵ See "Urban Agriculture in the Arab Region" <http://www.afedmag.com/english/ArticlesDetails.aspx?id=109>

¹⁶ Urban Agriculture Magazine RUAF 31 - Inclusive Use of Urban Space. https://www.researchgate.net/publication/309379997_Urban_Agriculture_Magazine_RUAF_31_-_Inclusive_Use_of_Urban_Space



Málaga (Spain)

Green Infrastructure Plan

Perchel Lagunillas (2017–2023)



The Perchel Lagunillas Sustainable and Integrated Urban Development Strategy (eDUSI) for 2017–2023 is one of the most important initiatives in Málaga city in recent years. With a budget of EUR 12.5 million, it promotes a series of interrelated urban sustainability operations for the city, emphasising the configuration of a compact, complex and interconnected city with Mediterranean characteristics, which is respectful of the environment. NbS play a critical role in this initiative, which aims to demonstrate how NbS work under real conditions, provide evidence for their environmental and social benefits, and improve the quality of life for its citizens, while becoming a benchmark smart city for Europe.

Málaga is located on the southern Mediterranean coast of Spain. The city is a world-famous tourist destination as well as a cultural and technological hub. In January 2016, the European Commission rated Málaga the ninth best European city for quality of life. Even so, the city faces significant challenges. The challenges to be addressed through the introduction of NbS for inclusive urban regeneration in Málaga are:

- Degraded public spaces and built environment in certain areas with low population density, urban voids and perceived insecurity. There is also a lack of green areas in the city centre and adjacent neighbourhoods due to its historic urban morphology, which directly affects pollution levels and the active lifestyle of citizens (increasing overweight and obesity to a rate of 60.8% in the city). The lack of green areas has also led to poor storm water management in the city, where the intensity of flooding episodes is progressively increasing.
- Socio-economic vulnerability, with a high unemployment rate (36%), low levels of education (30% school drop-outs), low levels of family income (20% lower than the Spanish average), significant levels of social exclusion and a high risk of poverty, especially among women, children (34.25%) and elderly people (29.16%).



Estrategia de Desarrollo Urbano Sostenible e Integrado.
"PERCHEL LAGUNILLAS" 2017-2023

Governance and policy framework

The main document describing the NbS strategies is "Agenda 21: urban agenda in an integrated sustainable strategy 2020–2050", a long-term strategy that includes strategic aspects of land use and city architecture, management of natural resources, social cohesion, economic development and city government. As a specific plan, the city's Green Infrastructure Guide is setting up a network of green corridors through the city, connecting the green areas inside the city with the natural environments around it and fostering the population's growing interest in nature-related leisure activities. The City Council has also developed its Urban GIS Indicator

of new economic activities, thus reducing unemployment. Green areas will be increased and maintained throughout their lifespan, thereby improving environmental conditions, avoiding the degradation of public spaces and providing leisure areas, while reducing residents' social and health problems. All ReGREENeration actions are intended to be co-designed in dialogue with residents, supported by IMMERSITE (co-creation tool + immersive technology), raising their sense of belonging while driving regeneration and well-being for the community.



© IMAGE SOURCE: <https://edusi.malaga.eu/es/sala-de-prensa/galeria-de-fotos/#.YRozFcbtbUI>

Overview of specific actions

District connectivity enhancement through the creation of green and blue corridors and meeting places, addressing Challenges 2 and 3 (degradation of public spaces and poor connectivity among districts, deterring the active mobility of residents):

- Planting rows of trees along the corridors;
- Creating green islands using vetiver, an innovative plant species with high CO₂ fixation, water purification and infiltration capacity, which also acts as an acoustic and wind barrier in pedestrian environments;
- Incorporating a Sustainable Urban Drainage System (SUDS), a combination of an innovative paving/filtering material with green surfaces, which allows for rainwater management: collecting, purifying and reusing run-off water to maintain the NbS. This hydric network will reduce water overflow in the street, thus increasing the resilience of the district during flooding events, and it will include sensors to measure environmental conditions along the corridors.
- Installing an innovative irrigation system which obtains its water from the air through air-drying processes. The water is separated from the air through nano-pulverisation of alcohols in an endothermic process, using solar energy to produce the heat needed for the reaction. Finally, the separated water vapour is condensed to provide pure water for irrigation, which will be stored in reservoir modules of 1,000 litres capacity each.

Documents

Abstract:

Estrategia de Desarrollo Urbano Sostenible e Integrado. "PERCHEL LAGUNILLAS" 2017-2023

http://edusi.malaga.eu/opencms/export/sites/feder/.content/galerias/documentos/EDUSI-FOLLETO_VF.pdf

<http://edusi.malaga.eu/es/programacion/proyecto/>

<https://edusi.malaga.eu/es/sala-de-prensa/galeria-de-fotos/#.YRozFcbtbUI>

Proyecto EDUSI "Perchel - Lagunillas" (2015): <https://edusi.malaga.eu/es/programacion/proyecto/#!tab1>

| ISSUES ADDRESSED Societal challenges Climate change / Food security / Water security / Disaster risk / Human health / Economic and social development and improvement | |
|--|---|
|  | |
| CRITERIA 1. NbS effectively address societal challenges | |
| INDICATORS | DESCRIPTION |
| 1.1 The most pressing societal challenges for rights holders and beneficiaries are prioritised | Mainly three societal challenges have been prioritised: social cohesion (high level of vulnerability and social exclusion, with low levels of education), urban ecosystem (degradation of public spaces, green spaces and community facilities and lack of infrastructure, which deters the active mobility of residents) and connectivity (poor connectivity with surrounding districts, with a lack of pedestrian and green infrastructure to encourage active mobility of residents). The last two challenges are aligned with climate change in terms of their co-benefits: biodiversity and environmental quality, which in this sense are also related to human health. Finally, the development of new economic activities to reduce unemployment is another goal. |
| 1.2 The societal challenges addressed are clearly understood and documented | Three societal challenges are addressed: Challenge 1: High level of vulnerability and social exclusion, with low levels of education. Furthermore, the project area is located right next to the revitalised historic centre of the city but lacks economic activity, as shown by its high rates of unemployment (especially among young people, with more than 32% out of work); it has a high proportion of elderly residents on low incomes, and a high percentage of one-person households (47%, more than double the Málaga average). Challenge 2: Degradation of public spaces, green spaces and community facilities and lack of infrastructure, which deters the active mobility of residents. Furthermore, the building stock is degraded too, with poor levels of energy efficiency (more than 53% of the registered Technical Building Inspections [ITE] are rated inadequate). Challenge 3: Poor connectivity with surrounding districts, with a lack of pedestrian and green infrastructures to encourage the active mobility of residents. The urban structure exacerbates the problem, as the area is divided in two by the river Guadalmedina, and it is adjacent to the Gibralfaro hill. |
| 1.3 Human well-being outcomes arising from the NbS are identified, benchmarked and periodically assessed | Human well-being outcomes arising from the NbS are identified as mainly linked to social cohesion. Additionally, the improvement of green areas and connectivity can also contribute to this goal; nevertheless, the direct link to NbS is not described in detail. |



© IMAGE SOURCE: <https://edai.malaga.eu/es/baite-de-prensa/galeria-de-fotos/#YRoZFbttU>

| ISSUES ADDRESSED Design at scale City-wide / District / Urban acupuncture | |
|---|--|
| CRITERIA 2. Design of NbS is informed by scale | |
| INDICATORS | DESCRIPTION |
| 2.1 Design of NbS recognises and responds to the interactions between the economy, society and ecosystems | In terms of spatial scale, one of the project goals is improving the district's connectivity by using green and blue corridors as NbS. |
| 2.2 Design of NbS is integrated with other complementary interventions and seeks synergies across sectors | No evidence found during the evaluation. |
| 2.3 Design of NbS incorporates risk identification and risk management beyond the intervention site | Risk management considerations are detailed for the green infrastructure but not for the NbS design. It is important to mention that this risk only involves the management variables and does not include the climate change risks Economic and financial risk: due to the difficulty of securing investment and credit; Development risks: delays in procurement and execution of the works, spatial restrictions, etc.; Coordination risk: difficulties in administrative processes, changes in governance, lack of resources and difficulties in the decision-making process. A specific risk assessment is developed for each type of risk to evaluate the different lines of action. Probability (5 levels) in combination with severity (4 levels) are combined in the matrix to categorise 5 levels of risk. |
| ISSUES ADDRESSED Biodiversity net-gain | |
| CRITERIA 3. NbS result in net gain to biodiversity and ecosystem integrity | |
| INDICATORS | DESCRIPTION |
| 3.1 NbS actions directly respond to evidence-based assessment of the current state of the ecosystem and prevailing drivers of degradation and loss | The urban ecosystem presented for the intervention is severely degraded in social terms but also lacks NbS and green areas. Therefore the actions mainly focus on urban morphology and characteristics analysis and the evaluation of social variables. The actions proposed to address this situation are not very specific: improving environmental conditions and resource efficiency, protecting the natural and cultural heritage (especially that with tourism interest) and urban regeneration as a driver to improve conditions. These general actions are put into practice in specific projects to improve public areas and environmental quality. |
| 3.2 Clear and measurable biodiversity conservation outcomes are identified, benchmarked and periodically assessed | The only indicators that have been identified are linked to green areas. |
| 3.3 Monitoring includes periodic assessments of unintended adverse consequences for nature arising from the NbS | No evidence found during the evaluation. |
| 3.4 Opportunities to enhance ecosystem integrity and connectivity are identified and incorporated into the NbS strategy | Some opportunities to enhance ecosystem integrity and connectivity are identified and incorporated into the strategy. These mainly relate to urban ecosystems not directly linked to NbS implementation. |

| ISSUES ADDRESSED Economic feasibility | |
|---|--|
| CRITERIA 4. NbS are economically viable | |
| INDICATORS | DESCRIPTION |
| 4.1 The direct and indirect benefits and costs associated with the NbS, who pays and who benefits, are identified and documented | No evidence found during the evaluation. |
| 4.2 A cost-effectiveness study is provided to support the choice of NbS including the likely impact of any relevant regulations and subsidies | No evidence found during the evaluation. |
| 4.3 The effectiveness of the NbS design is justified against available alternative solutions, taking into account any associated externalities | No evidence found during the evaluation. |
| 4.4 NbS design considers a portfolio of resourcing options such as market-based, public sector, voluntary commitments and actions to support regulatory compliance | Financial instruments are identified for the development of the strategy: funding options (including EU co-funding options) are key elements. To define a financial framework, different programmes and projects are considered and also several stakeholders are involved to facilitate cooperation and share resources: <i>City Department of Environmental Sustainability – Communications, District Council, and representatives of citizen participation, social rights, culture, tourism, business support, ICT, accessibility and urban mobility.</i> |
| ISSUES ADDRESSED Inclusive governance | |
| CRITERIA 5. NbS are based on inclusive, transparent and empowering governance processes | |
| INDICATORS | DESCRIPTION |
| 5.1 A defined and fully agreed upon feedback and grievance resolution mechanism is available to all stakeholders before an NbS intervention can be initiated | Action 1 of the strategy is related to facilitating the electronic administration of the municipality in order to help citizens participate in the decision-making process for more inclusive governance. There is a specific action devoted to this goal: ACTION 5: Citizen engagement and training programmes at the Green Infrastructure Experimental Centre (GIEC), focusing on Challenge 1 (vulnerability and social exclusion, with low levels of education). |
| 5.2 Participation is based on mutual respect and equality, regardless of gender, age or social status, and upholds the right of Indigenous Peoples to Free Prior and Informed Consent (FPIC) | It is explicitly mentioned that the participation is based on these criteria. |
| 5.3 Stakeholders who are directly and indirectly affected by the NbS have been identified and involved in all processes of the NbS intervention | This process is developed, detailing the participants (citizens with all age groups represented, and associations), methodology (meetings, questionnaires and interviews), combining face-to-face and remote approaches. |
| 5.4 Decision-making processes document and respond to the rights and interests of all participating and affected stakeholders | The strategy for urban development (eDUSI) is based on a participatory process to transform the city and its governance. The key element is the Assembly, which provides coordination and evaluation. Under the Assembly, workshops involving citizens and technical stakeholders go into the detail of specific discussions. |
| 5.5 Where the scale of the NbS extends beyond jurisdictional boundaries, mechanisms are established to enable joint decision making by the stakeholders in those jurisdictions affected by the NbS | No evidence found during the evaluation. |

| ISSUES ADDRESSED Balance trade-offs | |
|---|---|
| CRITERIA 6. NbS equitably balance trade-offs between achievement of their primary goal(s) and the continued provision of multiple benefits | |
| INDICATORS | DESCRIPTION |
| 6.1 The potential costs and benefits of associated trade-offs of the NbS intervention are explicitly acknowledged and inform safeguards and any appropriate corrective actions | No evidence found during the evaluation. |
| 6.2 The rights to, usage of and access to land and resources, along with the responsibilities of different stakeholders are acknowledged and respected | This variable is considered in terms of the administration's governance and department. |
| 6.3 Established safeguards are periodically reviewed to ensure that mutually agreed trade-off limits are respected and do not destabilise the entire NbS | No evidence found during the evaluation. |
| ISSUES ADDRESSED Adaptive management | |
| CRITERIA 7. NbS are managed adaptively, based on evidence | |
| INDICATORS | DESCRIPTION |
| 7.1 An NbS strategy is established and used as a basis for regular monitoring and evaluation of the intervention | No specific monitoring framework is defined in the strategy. Just a reference to the green area is made. The periodic key performance indicators that are mentioned are contextualised in Málaga's urban Agenda 21. |
| 7.2 A monitoring and evaluation plan is developed and implemented throughout the intervention lifecycle | No evidence found during the evaluation. |
| 7.3 A framework for iterative learning that enables adaptive management is applied throughout the intervention lifecycle | No evidence found during the evaluation. |
| ISSUES ADDRESSED Mainstreaming | |
| CRITERIA 8. NbS are sustainable and mainstreamed within an appropriate jurisdictional context | |
| INDICATORS | DESCRIPTION |
| 8.1 NbS design, implementation and lessons learnt are shared to trigger transformative change | No evidence in terms of NbS found during the evaluation. |
| 8.2 NbS inform and enhance facilitating policy and regulation frameworks to support their uptake and mainstreaming | No evidence in terms of NbS found during the evaluation. |
| 8.3 Where relevant, NbS contribute to national and global targets for human well-being, climate change, biodiversity and human rights, including the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) | No evidence found during the evaluation. |



Pavlos Melas (Greece) Integrated regeneration and Metropolitan Park



Pavlos Melas, named after a Greek hero, is located in the region of Thessaloniki in Central Macedonia. The city is characterised by a mix of urban and peri-urban settlements of multifaceted historical value, which make an important contribution to the city's historical-cultural identity.

In recent years there has been great political commitment to urban regeneration and development and considerable efforts have been made within the Long-term Strategic Action Plan for Thessaloniki.

In Pavlos Melas these efforts have involved incorporating ecology and urban planning into the design of green areas in the city, including new parks and ecosystems. These new environmental features of Pavlos Melas are not only designed with biodiversity enhancement in mind but also as a way to provide opportunities for businesses by creating jobs and economic welfare. This is a crucial element of this project since Pavlos Melas is among the 17 municipalities with the highest unemployment rates in Greece.

Among the different actions and sectoral work carried out in Pavlos Melas municipality, one project stands-out as a flagship Nature-based Solution – the transformation of a former military camp in the city centre into a Metropolitan Park. Largely abandoned since 2006, it is now an 'urban gap' contributing to the deprivation of the area.

To reverse the situation, the municipality has focused on strategic regeneration planning based on a variety of steps and procedures, including increased dialogue and cooperation with key stakeholders.

The area covers 332,104 m² and includes 63 buildings totalling 24,000 m². The Municipality is embarking on a multi-phase restoration of the park. Phase 1 will concentrate on the restoration of the park's green spaces, while the sustainable reuse of the many buildings is the focus of Phase 2.

The city's brownfield site will be turned into a biodiversity hotspot.

A five-year timeline has been established to achieve the final goal of creating an expanding and connected park network that contributes to creating a carbon neutral city, reducing the thermal stress and forest fire risk during summer. Advanced water management methods were included as a required complement to an intervention that has been created with the active participation of citizens in the various phases of the process. Green corridors and cycle paths will encourage more suitable mobility and improve air quality. This intervention provides a transition from brownfield sites and military camps to urban parks, helping to create an attractive city that incorporates new NbS, offering business opportunities and promoting green housing.





© IMAGE SOURCE: https://pavlosmelas.gr/mppm_2020/



© IMAGE SOURCE: <https://pavlosmelas.gr/epiasan-douleia-gia-tous-mouseiakoy-xorous-sto-mitropolitiko-parko-paylou-mela/>

Documents

Connecting Nature Partner – Municipality of Pavlos Melas <https://connectingnature.eu/pavlos-melas>

Pavlos Melas Municipality https://pavlosmelas.gr/mppm_2020/

<https://pavlosmelas.gr/epiasan-douleia-gia-tous-mouseiakoy-xorous-sto-mitropolitiko-parko-paylou-mela/>

| ISSUES ADDRESSED Societal challenges Climate change / Food security / Water security / Disaster risk / Human health / Economic and social development | |
|--|---|
|  | |
| CRITERIA 1. NbS effectively address societal challenges | |
| INDICATORS | DESCRIPTION |
| 1.1 The most pressing societal challenges for rights holders and beneficiaries are prioritised | In terms of the vision of the intervention, climate change and the project's environmental co-benefits (especially water management, air quality, thermal stress and biodiversity) are addressed. Disaster risk is also part of the approach, focusing on forest fires. Human health is targeted through the environmental co-benefits already mentioned and also by the creation of accessible and attractive walking and cycle paths. Finally, the project also focuses on promoting the local economy. |
| 1.2 The societal challenges addressed are clearly understood and documented | The information on the vision is clear for the specified timeline, and the plan that was presented in 2019 – “Environmental upgrade and performance in common use of the MPPM (Metropolitan Pavlos Melas Park)” – reveals the details of the documented intervention and their link to the social challenges, as follows: Climate change , through water management (improvements to water supply, sewerage and irrigation infrastructure), biodiversity (planting of approximately 3,600 new trees and 3,800 new shrubs) and thermal stress (including the new plantings (especially the trees) and the development of pergolas); Disaster risk : reducing the risk of forest fires (land improvement, felling of dry and dangerous trees, and maintenance by cleaning up existing greenery are some of the actions that can contribute to the management of this risk); Human health : park improvement will contribute to health and well-being since the intervention includes several environmental upgrade works; Economic and social development : a key part of the intervention, including demolition of buildings, demarcation of the area, improved access with entrances and exits for pedestrians and car parks, temporary security measures for listed buildings, drawing and determination of main routes, construction of three refreshment bars, park equipment with outdoor living rooms, pergolas, playgrounds, etc. and configuration of sports facilities, general improvement of basic infrastructure: sewerage, electricity. |
| 1.3 Human well-being outcomes arising from the NbS are identified, benchmarked and periodically assessed | Human health is addressed as one of the key societal challenges, since the project analysed includes several environmental upgrade works. However, no evidence was found about benchmarking and periodical monitoring during these evaluations. |



© IMAGE SOURCE: <https://pavlosmelas.gr/repisan-doule-gie-tous-mousenakoyss-xorouss-to-mitropolikio-parko-polyourmeia/>

| ISSUES ADDRESSED Design at scale City-wide / District / Urban acupuncture | |
|---|--|
| CRITERIA 2. Design of NbS is informed by scale | |
| INDICATORS | DESCRIPTION |
| 2.1 Design of NbS recognises and responds to the interactions between the economy, society and ecosystems | The intervention addresses objectives that contribute to the overall interaction between the economy, society and ecosystems. One of the notable elements is the way the intervention addresses cultural heritage, contributing to the improvement of the sense of belonging, which step by step is being built on the former camp of Pavlos Melas (which was a concentration camp, but has also been linked to the settlement of refugees in 1914–1919 and to firefighters from the rest of Thessaloniki after the great fire of 1917), and procedures that will turn it into a Metropolitan Park, a supra-local space of urban green but also a unique Place of Memory. The park is conceptualised as a place that connects culture with history, memory and the natural environment. And there are plans to hold events that contribute to the economic and cultural development of the city. |
| 2.2 Design of NbS is integrated with other complementary interventions and seeks synergies across sectors | Yes, the metropolitan park is understood in the context of a wider Long-term Strategic Action Plan for Thessaloniki. |
| 2.3 Design of NbS incorporates risk identification and risk management beyond the intervention site | The design incorporates wildfire risk identification. |
| ISSUES ADDRESSED Biodiversity net-gain | |
| CRITERIA 3. NbS result in net gain to biodiversity and ecosystem integrity | |
| INDICATORS | DESCRIPTION |
| 3.1 NbS actions directly respond to evidence-based assessment of the current state of the ecosystem and prevailing drivers of degradation and loss | Yes, it is detailed in the technical report and tender budget of the project under the title: Environmental upgrade and performance in sharing Pavlos Mela metropolitan park. |
| 3.2 Clear and measurable biodiversity conservation outcomes are identified, benchmarked and periodically assessed | Although no evidence was found during the evaluation about specific benchmarking exercises or periodic monitoring assessments of biodiversity, a detailed, analytical calculation of the new vegetation has been submitted to the Department of Environment, Recycling and Green Spaces. |
| 3.3 Monitoring includes periodic assessments of unintended adverse consequences for nature arising from the NbS | Although no evidence was found during the evaluation about specific benchmarking exercises or periodic monitoring assessments of biodiversity, a detailed, analytical calculation of the new vegetation has been submitted to the Department of Environment, Recycling and Green Spaces. |
| 3.4 Opportunities to enhance ecosystem integrity and connectivity are identified and incorporated into the NbS strategy | Yes, it is detailed in the technical report and tender budget of the project under the title: Environmental upgrade and performance in sharing Pavlos Melas Metropolitan Park. |

| ISSUES ADDRESSED Economic feasibility | |
|---|---|
| CRITERIA 4. NbS are economically viable | |
| INDICATORS | DESCRIPTION |
| 4.1 The direct and indirect benefits and costs associated with the NbS, who pays and who benefits, are identified and documented | An economic feasibility assessment is being developed by the Directorate of Planning, Urban Development and Financing programmes: Economic Sustainability Study, Long-term Strategic Action Plan, THESSALONIKI. This study of the economic viability of public development of the investment in the Metropolitan Park of Pavlos Melas was drafted in order to support decision making for further evaluation and specialisation of its strategic planning investment. |
| 4.2 A cost-effectiveness study is provided to support the choice of NbS including the likely impact of any relevant regulations and subsidies | Yes, see above. |
| 4.3 The effectiveness of the NbS design is justified against available alternative solutions, taking into account any associated externalities | Yes, see above. Investment costs – operating costs are analysed for different proposed scenarios. |
| 4.4 NbS design considers a portfolio of resourcing options such as market-based, public sector, voluntary commitments and actions to support regulatory compliance | Yes, see above. |
| ISSUES ADDRESSED Inclusive governance | |
| CRITERIA 5. NbS are based on inclusive, transparent and empowering governance processes | |
| INDICATORS | DESCRIPTION |
| 5.1 A defined and fully agreed upon feedback and grievance resolution mechanism is available to all stakeholders before an NbS intervention can be initiated | No evidence found during the evaluation. |
| 5.2 Participation is based on mutual respect and equality, regardless of gender, age or social status, and upholds the right of Indigenous Peoples to Free Prior and Informed Consent (FPIC) | No evidence found during the evaluation. |
| 5.3 Stakeholders who are directly and indirectly affected by the NbS have been identified and involved in all processes of the NbS intervention | With the support of the OSMOS platform (for the locally based economy), some workshops were organised to involve key city actors. A wide range of stakeholders, such as heads of urban development and financial programmes, urban planning, environment, operational services and maintenance departments, municipal councillors, business consultants, economists, architects, engineers and community builders provided information, facts, personal opinions and experience on issues related to the urban strategy of the city and the status and prospects of its nature-based solutions (NbS). |
| 5.4 Decision-making processes document and respond to the rights and interests of all participating and affected stakeholders | No evidence found during the evaluation. |
| 5.5 Where the scale of the NbS extends beyond jurisdictional boundaries, mechanisms are established to enable joint decision making by the stakeholders in those jurisdictions affected by the NbS | No evidence found during the evaluation. |

| ISSUES ADDRESSED Balance trade-offs | |
|---|--|
| CRITERIA 6. NbS equitably balance trade-offs between achievement of their primary goal(s) and the continued provision of multiple benefits | |
| INDICATORS | DESCRIPTION |
| 6.1 The potential costs and benefits of associated trade-offs of the NbS intervention are explicitly acknowledged and inform safeguards and any appropriate corrective actions | No evidence found during the evaluation. |
| 6.2 The rights to, usage of and access to land and resources, along with the responsibilities of different stakeholders are acknowledged and respected | No evidence found during the evaluation. |
| 6.3 Established safeguards are periodically reviewed to ensure that mutually agreed trade-off limits are respected and do not destabilise the entire NbS | No evidence found during the evaluation. |
| ISSUES ADDRESSED Adaptive management | |
| CRITERIA 7. NbS are managed adaptively, based on evidence | |
| INDICATORS | DESCRIPTION |
| 7.1 An NbS strategy is established and used as a basis for regular monitoring and evaluation of the intervention | No evidence found during the evaluation. |
| 7.2 A monitoring and evaluation plan is developed and implemented throughout the intervention lifecycle | No evidence found during the evaluation. |
| 7.3 A framework for iterative learning that enables adaptive management is applied throughout the intervention lifecycle | No evidence found during the evaluation. |
| ISSUES ADDRESSED Mainstreaming | |
| CRITERIA 8. NbS are sustainable and mainstreamed within an appropriate jurisdictional context | |
| INDICATORS | DESCRIPTION |
| 8.1 NbS design, implementation and lessons learnt are shared to trigger transformative change | The intervention not only incorporates the lessons learnt from previous projects (Prodomos Nikiforidis and Bernard Cuoro) but also makes use of this knowledge in a future project called: "Integration of Urban Agriculture in Public Areas. The Case of the Ex-military Camp 'Karatassiou' in Thessaloniki." |
| 8.2 NbS inform and enhance facilitating policy and regulation frameworks to support their uptake and mainstreaming | Despite the fact that the lessons learnt are being applied in several projects, it must be mentioned there are no references demonstrating their use in a structured way or their incorporation in local policies or strategies related to NbS or green infrastructure. |
| 8.3 Where relevant, NbS contribute to national and global targets for human well-being, climate change, biodiversity and human rights, including the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) | The project lies within the Long-term Strategic Action Plan for THESSALONIKI. In this context it contributes to compliance with the UN Sustainability Goals and the EU (and Global) Biodiversity Strategy policy goals. The project is mainstreamed into the Spatial and Urban planning (formal) instruments. |



Thessaloniki (Greece) BlueHealth and resilience strategy



BlueHealth Thessaloniki [BHT]

This research project is exploring the health and well-being impacts of an urban blue environment in Thessaloniki, Greece. A significant part of the Thessaloniki Waterfront has recently been renovated and opportunities exist for encouraging people to interact with the blue environment. This study will assess how individuals' health and well-being is affected by spending time during the working day at the city waterfront. They will be compared with a second group who have normal working days with no time to visit the waterfront.

Workshop: Thessaloniki recently hosted a workshop to find out how the waterfront improves people's lives. This workshop was part of the BlueHealth international research investigation to identify changes that could impact health and well-being in coastal cities across Europe. The workshop, organised (on 7 November 2019) in partnership with the Aristotle University of Thessaloniki, invited local stakeholders from public health, local government, urban planning and the Thessaloniki Water Service. Together the group identified six major factors that would impact health, well-being and blue space in the city. The factors likely to impact BlueHealth in Thessaloniki are:

- Climate change
- Migration
- Technology aimed at healthier urban living
- More recreational use of blue spaces
- Healthier urban living in EU policies and strategies
- Changes in labour conditions.

Thessaloniki Resilience Strategy [TRS-30]:

(2017: Horizon 2030) Resilience is built on hope, which gives us confidence and strength to act. This Resilience Strategy builds on what the people of the city have already achieved and who they are whilst addressing their present and future challenges. It does so by creating structures and processes that will ensure the city's progress and development. The Resilience Strategy of Thessaloniki is a roadmap which will help the city to co- create a more dynamic, inclusive and sustainable city. Becoming a truly resilient city requires significant investment in terms of both time and resources. It requires hard work from everyone who lives and works in the city. The Strategy document reflects the values of the city and provides a roadmap to guide the evolution of activities that will help its citizens to work together to build resilience for decades to come.

Rediscover the city's relationship with the sea:

Integrate the economic and urban development of Thermaikos Bay by investing in the cultural and natural capital of the Bay for improved city life, restoring the ecosystem, monitoring environmental resilience, and designing a new governance system for managing these activities.



© IMAGE SOURCE: <https://bluehealth2020.eu/news/thessaloniki-workshop/>



© IMAGE SOURCE: <https://bluehealth2020.eu/resources/future-bluehealth-thessaloniki/>

Documents

BlueHealth is a pan-European research initiative investigating the links between environment, climate and health. The programme is specifically focused on understanding how water-based environments in towns and cities can affect health and well-being. It brings together experts from nine institutions and is funded by the European Union's Horizon 2020 programme. <https://bluehealth2020.eu/>

Blue Spaces, Thessaloniki project <https://bluehealth2020.eu/projects/thessaloniki/>

BlueHealth in Thessaloniki workshop (7 NOVEMBER 2019) <https://bluehealth2020.eu/news/thessaloniki-workshop/>

| ISSUES ADDRESSED Societal challenges Climate change / Food security / Water security (Biodiversity, Ecosystem) / Disaster risk / Human health / Economic and social development | |
|--|---|
|  | |
| CRITERIA 1. NbS effectively address societal challenges | |
| INDICATORS | DESCRIPTION |
| 1.1 The most pressing societal challenges for rights holders and beneficiaries are prioritised | How the initiative addresses societal challenges is shown in the vision and the values of the Resilience Strategy (TRS-30), interconnecting City Values with Goals and Objectives towards a holistic resilience approach: Vision: an inspiring city that ensures the well-being of its people and nurtures its human talent, while strengthening its urban economy and respecting its natural resources. Values: social cohesion, local identity and heritage, environmental management, multi-stakeholder engagement, technology adaptation, health and well-being, youth empowerment, and economic prosperity. |
| 1.2 The societal challenges addressed are clearly understood and documented | The societal challenges addressed are understood and documented, but there is no in-depth information available in that respect. |
| 1.3 Human well-being outcomes arising from the NbS are identified, benchmarked and periodically assessed | Yes, this is the main objective of BlueHealth Thessaloniki, as it is assessing how individuals' health and well-being is affected by spending time during the working day at the city waterfront. Nevertheless, it seems that these outcomes are not benchmarked or periodically assessed. Also, a workshop was held on 7 November 2019 to help Thessaloniki advise decision makers on how to maximise opportunities in the city and prepare it for protecting the environment, health and well-being in the future. |
| ISSUES ADDRESSED Design at scale City-wide / District / Urban acupuncture | |
| CRITERIA 2. Design of NbS is informed by scale | |
| INDICATORS | DESCRIPTION |
| 2.1 Design of NbS recognises and responds to the interactions between the economy, society and ecosystems | No explicit reference to this is presented in the project, but as the design was guided by TRS-30, it should be true based on the TRS-30 vision: in particular, it is mentioned that it will be a dynamic coastal city that will guarantee the well-being of its people and will nurture its human talent, while strengthening its urban economy and respecting its natural resources. |
| 2.2 Design of NbS is integrated with other complementary interventions and seeks synergies across sectors | Synergies are identified at a policy level: The Government Continuity Plan and Risk Information System, the Thessaloniki Youth Resilience Challenge and the Action Plan on Refugee Integration, adopting a public space co-creation policy, Open Schools for the neighbourhoods and the Investment Framework for Thermaikos Bay. In this sense a cross-municipal collaboration has also begun, aiming to build resilience at the metropolitan level as a vehicle for development with the support of the World Bank and the Ministry of the Economy, Development and Tourism. |
| 2.3 Design of NbS incorporates risk identification and risk management beyond the intervention site | It is included in the TRS-30 "Local risk reduction and risk management systems", as an objective of Goal 3: to Build a dynamic urban economy and responsive city through effective and network governance. Thessaloniki is exposed to extreme conditions such as earthquakes, flooding, forest fires, snow and heat waves. These events interrupt city services and business continuity. It is essential to be prepared for these events and incorporate disaster resilience into long-term planning through risk management. This will enhance internal coordination and continuity planning in relation to emergency response and strengthen multi-stakeholder collaboration. |

| ISSUES ADDRESSED Biodiversity net-gain | |
|---|--|
| CRITERIA 3. NbS result in net gain to biodiversity and ecosystem integrity | |
| INDICATORS | DESCRIPTION |
| 3.1 NbS actions directly respond to evidence-based assessment of the current state of the ecosystem and prevailing drivers of degradation and loss | No explicit information is available about the NbS included in the renovation of Thessaloniki waterfront. However, in the TRS-30, one of the objectives of Goal 4 about rediscovering the city's relationship with the sea is Environmental Resilience Monitoring, since Thermaikos Bay has a fragile ecosystem and the monitoring is part of the intervention. |
| 3.2 Clear and measurable biodiversity conservation outcomes are identified, benchmarked and periodically assessed | No information is available about the NbS included in the renovation of Thessaloniki's waterfront. Nevertheless, the second action of Goal 4 of TRS-30 is Develop environmental monitoring tools, but it is more concerned with pollutants and informing decisions about restoring the ecosystem. These tools will also help to predict and monitor the impacts of future infrastructure interventions. The challenge that arises from the use of the above indicators is the availability of the specific data sets in order to have a measurable evaluation. |
| 3.3 Monitoring includes periodic assessments of unintended adverse consequences for nature arising from the NbS | No evidence found during the evaluation. |
| 3.4 Opportunities to enhance ecosystem integrity and connectivity are identified and incorporated into the NbS strategy | No evidence found during the evaluation. |
| ISSUES ADDRESSED Economic feasibility | |
| CRITERIA 4. NbS are economically viable | |
| INDICATORS | DESCRIPTION |
| 4.1 The direct and indirect benefits and costs associated with the NbS, who pays and who benefits, are identified and documented | No evidence found during the evaluation. |
| 4.2 A cost-effectiveness study is provided to support the choice of NbS including the likely impact of any relevant regulations and subsidies | No evidence found during the evaluation. |
| 4.3 The effectiveness of the NbS design is justified against available alternative solutions, taking into account any associated externalities | No evidence found during the evaluation. |
| 4.4 NbS design considers a portfolio of resourcing options such as market-based, public sector, voluntary commitments and actions to support regulatory compliance | No evidence found during the evaluation. |

ISSUES ADDRESSED
Inclusive governance

CRITERIA

5. NbS are based on inclusive, transparent and empowering governance processes

| INDICATORS | DESCRIPTION |
|--|---|
| <p>5.1 A defined and fully agreed upon feedback and grievance resolution mechanism is available to all stakeholders before an NbS intervention can be initiated</p> | <p>TRS-30 is based on the 100 Resilient Cities (100RC) methodology, which provided an innovative model for the local authority to develop a holistic city strategy in collaboration with adjacent municipalities, local academic institutions, the non-profit sector, private stakeholders, and citizens and communities of the city.</p> <p>There are specific references to how citizens shaped the strategy: building trust amongst stakeholders by assessing perceptions of resilience across the city; by initiating dialogue including broad engagement and participation through various thematic working group meetings, workshops and mini-labs focusing on developing new ideas; and finally by activating the network and beginning resilience-in-action through mini-labs focusing on the implementation of solutions.</p> <p>One of the more relevant examples of this approach is the workshop held on 7 November 2019 in partnership with the Aristotle University of Thessaloniki, which invited local stakeholders from public health, local government, urban planning and the Thessaloniki Water Service. Together the group identified six major factors that impact health, well-being and blue space in the city.</p> |
| <p>5.2 Participation is based on mutual respect and equality, regardless of gender, age or social status, and upholds the right of Indigenous Peoples to Free Prior and Informed Consent (FPIC)</p> | <p>TRS-30 is based on the robust participation and collaboration of more than 40 organisations and 2,000 citizens from across the city. There is also a special focus on the youth of the city. Over the last year, new partnerships have been formed, new solutions and ideas developed, and existing and ongoing innovation in the city highlighted. Rigorous academic research has been aligned with grass-roots initiatives. City policies have been combined and supported by best practice from other cities to develop new objectives, programmes and actions. The approach is mainly focused on residents, office workers, older people and schoolchildren in the centre of Thessaloniki. Participants have been recruited through the popular "AUTH on Sundays" campaign, and from environmental groups in the area. The interest received from the public exceeded expectations and 45 volunteers were enrolled in the study.</p> |
| <p>5.3 Stakeholders who are directly and indirectly affected by the NbS have been identified and involved in all processes of the NbS intervention</p> | <p>More than 40 organisations and 2,000 citizens from across the city have been identified and take part in the actions mentioned for indicator 5.2.</p> |
| <p>5.4 Decision-making processes document and respond to the rights and interests of all participating and affected stakeholders</p> | <p>No information available or accessible in English.</p> |
| <p>5.5 Where the scale of the NbS extends beyond jurisdictional boundaries, mechanisms are established to enable joint decision making by the stakeholders in those jurisdictions affected by the NbS</p> | <p>No evidence found during the evaluation.</p> |

| ISSUES ADDRESSED Balance trade-offs | |
|---|--|
| CRITERIA 6. NbS equitably balance trade-offs between achievement of their primary goal(s) and the continued provision of multiple benefits | |
| INDICATORS | DESCRIPTION |
| 6.1 The potential costs and benefits of associated trade-offs of the NbS intervention are explicitly acknowledged and inform safeguards and any appropriate corrective actions | No evidence found during the evaluation. |
| 6.2 The rights to, usage of and access to land and resources, along with the responsibilities of different stakeholders are acknowledged and respected | No evidence found during the evaluation. |
| 6.3 Established safeguards are periodically reviewed to ensure that mutually agreed trade-off limits are respected and do not destabilise the entire NbS | No evidence found during the evaluation. |
| ISSUES ADDRESSED Adaptive management | |
| CRITERIA 7. NbS are managed adaptively, based on evidence | |
| INDICATORS | DESCRIPTION |
| 7.1 An NbS strategy is established and used as a basis for regular monitoring and evaluation of the intervention | The impact of the intervention will be evaluated using an adaptation of BlueHealth Survey and SoftGIS. The quality of the environment will be assessed using BlueSpace Survey, questionnaire data and environmental monitoring data. In addition, a more conceptual point of view will be formed of the Thessaloniki Resilience Strategy, providing the framework necessary to contextualise any action regarding NbS in the city. |
| 7.2 A monitoring and evaluation plan is developed and implemented throughout the intervention lifecycle | The Resilience Strategy (TRS-30) also includes a set of actions to improve the way data is aggregated, managed and shared. This will further facilitate the monitoring of the strategy by all relevant stakeholders. In this sense the whole intervention lifecycle is considered. |
| 7.3 A framework for iterative learning that enables adaptive management is applied throughout the intervention lifecycle | No evidence found during the evaluation. |



ISSUES ADDRESSED
Mainstreaming

CRITERIA

8. NbS are sustainable and mainstreamed within an appropriate jurisdictional context

| INDICATORS | DESCRIPTION |
|---|---|
| 8.1 NbS design, implementation and lessons learnt are shared to trigger transformative change | The leadership of Thessaloniki and the 100RC network are providing relevant contributions to NbS strategies in Europe and the Middle East. In this respect, important lessons from member cities have been learnt and incorporated in an exchange with these other cities facing similar situations. Partners have also collaborated to develop new approaches to addressing urban migration by elevating the city as a key social policy facilitator. The Strategy reflects this kind of coordination and innovative thinking, which requires true resilience. |
| 8.2 NbS inform and enhance facilitating policy and regulation frameworks to support their uptake and mainstreaming | No evidence found during the evaluation. |
| 8.3 Where relevant, NbS contribute to national and global targets for human well-being, climate change, biodiversity and human rights, including the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) | No evidence found during the evaluation. |



© EVGENIY FESENKO | DREAMSTIME.COM



Oued Tine Valley Area (Tunisia)

Environmental corridors

An example of a micro-project



In Tunisia, the Association Les Amis de Capte Tunisie (LACT), with its headquarters in Bizerte, supports local farmers in developing good environmental and agronomic practices in their reforestation and agricultural transition initiatives, as part of its PPI-OSCAN programme (Small Initiatives Programme for Civil Society Organisations in North Africa).

The Association Les Amis de Capte Tunisie's main missions are to contribute to:

- the fight against climate change;
- the development of solidarity with and among farmers;
- the improvement of the ecosystem and biodiversity, and improvement of the resilience of Tunisian agro-systems.

Amongst the initiatives carried out by the association, there is one which is worth analysing in line with the third key aim of the association and this is the project called: Environmental corridors in the Oued Tine valley, located in the governorates of Bizerte and Manouba in north-eastern Tunisia.

The project started in March 2019 and had a duration of 24 months.

- Total budget allocated: EUR 51,444 / TND 164,620.
- PPI-OSCAN: EUR 26,440 (52%).
- Co-financers: EUR 25,004 (48%).

General purpose and specific objectives of the project:

Rural communities economically dependent on the agricultural sector are the first to experience the effects of climate change, which are accentuated by poor agricultural practices (monoculture, deforestation, excessive ploughing, etc.). This is why the association, in collaboration with partner farmers and regional institutions, wishes to contribute to improving the resilience of farms to climate change, and to the restoration of agro-ecosystems.

Environmental corridors maintain and restore the flow of species vital both for the survival



© IMAGE SOURCE: https://explorer.land/x/project/corridors_oued_tine

of agro-ecosystems and for the maintenance of animal and plant biodiversity. The project promotes the use of environmental corridors to increase connectivity between habitats, allowing species to move and reproduce and contribute to the sustainability of agro-systems widely represented in the project area. Thanks to these environmental corridors, the association is helping to restore the ecosystem and preserve local biodiversity in the Oued Tine area.

Located 100 kilometres north-west of the capital, Tunis, the intervention area straddles parts of two governorates, Bizerte and Manouba. Edkhila is the most important village in the intervention area, located approximately 25 km from the town of Mateur (Governorate of Bizerte) and 20 km from Tébouba (Governorate of Manouba). The Association Les Amis de Capte Tunisie, which is based in Bizerte, 70 km from the intervention area, has chosen to act in the Oued Tine area because it has already initiated partnerships with farmers in the area, in particular through planting agroforestry trees. As it already has a presence in the region, like its partner the ATAE, the association wishes to continue supporting its partner farmers in their reforestation and agricultural transition efforts. While most of the intervention area is accessible by car and close to public transport, some farmers live far from roads, and some roads are impassable during the winter season.

The bioclimatic zone is upper semi-arid (average annual rainfall of 450 mm). The relief is made up of contrasting physical features crossed by a hydrographic network from west to east, the main collector of which is the Medjerda river.

The intervention zone is characterised by 2 distinct eco-zones: the plain, crossed by the Oued Tine with hydromorphic soils with high levels of salinity, and the hillsides, subject to wind and water erosion with limestone soils. The main



Informational meeting

income-generating activity is agriculture. The creation of a dam upstream has led to changes in one of the few wetlands in the region. Wetlands are hotspots of biodiversity in Tunisia.

This special, fragile landscape is experiencing constant deterioration in the state of conservation of its natural forests, soils, waters and environmental resources.

The intervention area (approximately 55 km²) covers 3 villages (Edkhila-36.86257, 9.70926, Gosset el Bey-36.913208, 9.721850, and Sidi Abdelbasset-36.894804, 9.658484) in the governorate of Manouba (in the Tébouba delegation), on the border with the governorate of Bizerte (in the delegation of Mateur). The local community immediately concerned consists of around 200 people: 20 farmers and their families (80 dependants), 10 young people working as forest workers and moving towards complementary income-generating activities, and 60–90 pupils in two primary schools in the villages concerned (where efforts are made to raise awareness and to include them in the project).

The project's objectives

- Improve the population's perception of the importance of biodiversity and its state of degradation;
- Facilitate the adoption of good environmental and agronomic practices by farmers and their families;
- Contribute to the resilience of farms and agro-systems by increasing the availability of new resources and improving the sustainability of cropping systems through agroforestry systems;
- Raise awareness among the younger generation by distributing an educational game;
- Increase beneficial interactions between farmers and stakeholders;
- Test a collaborative tool for monitoring and measuring the benefits rendered;
- Conserve natural resources such as water.

The project prioritises several actions and techniques that help in the reforestation of the land:

- Planting threatened and endangered trees such as the carob (*Ceratonia siliqua*);
- Establishing orchards (with olive and carob trees) and mixed hedges;
- Arborising water and soil conservation works;
- Creating an environmental club with the pupils of Gousset El Bey primary school;
- Mulching cardboard waste, installing irrigation pots.

The skills training, mapping workshops and creation of educational materials planned by the project are a prerequisite for the reintroduction of native species of trees and shrubs in new agroforestry systems, as they are more resilient and better adapted to climate change. The association aims to help in the sustainable creation of environmental corridors around the Oued Tine together with its local, institutional and associative partners from civil society. These corridors will promote the biodiversity of the fauna and flora of this currently endangered area and will provide additional income for farmers. The population affected by the project is approximately 200 people.

Sustainable alternatives for irrigation through agroforestry



Documents

Collectif d'Acteurs pour la Plantation et la Transition Environnementale <https://capte.io/projets/>

Agroforesterie en Tunisie <https://capte.io/agroforesterie-tunisie-bonnes-pratiques/>

https://explorer.land/x/project/corridors_oued_tine

PPI-OSCAN Programme des petites initiatives pour les Organisations de la Société civile d'Afrique du Nord
<http://www.ppioscan.org/>

| ISSUES ADDRESSED Societal challenges Climate change / Food security / Water security / Disaster risk / Human health / Economic and social development | |
|--|---|
|  | |
| CRITERIA 1. NbS effectively address societal challenges | |
| INDICATORS | DESCRIPTION |
| 1.1 The most pressing societal challenges for rights holders and beneficiaries are prioritised | The project addresses the following societal challenges: Climate change Biodiversity Economic and social development. |
| 1.2 The societal challenges addressed are clearly understood and documented | Yes, the project describes the main challenges of the area. It is a rural inland area, with the majority of the population working in the agricultural sector. Rural populations face increasing precariousness of income linked to various factors: soil degradation, pollution and salinisation of water and soil, decline of biodiversity, lack of grazable areas, etc. These threats to the ecosystems are associated with significant climate change (including longer heat waves and decreasing rainfall). The natural resources present and already identified from non-wood forest products are: lentisk, prickly pear, honey, zgougou, rush, etc. The project describes the problems it seeks to solve and the needs it seeks to satisfy: These problems are essentially ecological and agronomic, and the solutions must correspond to the requirements of the farmers concerned, such as increasing family income by reintroducing fruit, forest or fodder tree plantations; making better use of marginal soils with well-adapted plants that tolerate biotic and abiotic stress; and improving their knowledge of the environment, its fragility and its economic potential. |
| 1.3 Human well-being outcomes arising from the NbS are identified, benchmarked and periodically assessed | The CAPTE database analyses social and economic aspects and assesses the living conditions of the local community in order to identify indicators and evaluate the impact of the project at this level. The local nurseries activity plan provides for the purchase of plants grown on site by community nurseries and by LACT in the second wave of planting, so it will create an extra income for farmers. |
| ISSUES ADDRESSED Design at scale City-wide / District / Urban acupuncture | |
| CRITERIA 2. Design of NbS is informed by scale | |
| INDICATORS | DESCRIPTION |
| 2.1 Design of NbS recognises and responds to the interactions between the economy, society and ecosystems | Yes, the project is an excellent example of micro-projects with scalability potential and a huge impact. |
| 2.2 Design of NbS is integrated with other complementary interventions and seeks synergies across sectors | Yes, project partners have a presence in the area already, and are working on the same subject: The National Institute for Rural, Water and Forest Engineering (INRGREF) is carrying out a value chain development project around lentisk production, targeting rural women in the village of Edkhila. The local INRGREF representative has agreed in principle to pool training resources for rural women deployed in the project area. GIZ carried out a project to improve yields in the irrigated area near Chouigi. A partnership agreement has been signed with the Bizerte Regional Commission for Agricultural Development (CRDA) for it to participate in some tree planting events in the mountains (on the national tree day) and it will help the project with technical support for training sessions. Other activities taking place in the area that are run by Les Amis de Capte are: – Bizerte lake: participating in the integrated depollution of Bizerte lagoon by planting extensive orchards of carob trees and prickly pears in particular (sequential agroforestry), wind erosion hedges and wadi afforestation. – Dougga ruins: planting mixed orchards of almond, olive, carob and fodder hedges (tree alfalfa, Leucaena and mulberry trees) as conservation agriculture. |

| INDICATORS | DESCRIPTION |
|---|--|
| 2.3 Design of NbS incorporates risk identification and risk management beyond the intervention site | Yes, the project is an excellent example of micro-projects with scalability potential and a huge impact. |
| ISSUES ADDRESSED Biodiversity net-gain | |
| CRITERIA 3. NbS result in net gain to biodiversity and ecosystem integrity | |
| INDICATORS | DESCRIPTION |
| 3.1 NbS actions directly respond to evidence-based assessment of the current state of the ecosystem and prevailing drivers of degradation and loss | <p>Training activities are very much oriented towards local agro-forestry management, which in turn contributes to biodiversity conservation and enhancement:</p> <ul style="list-style-type: none"> - Training in the "discovery and identification of NWFP (non-wood forest product) species generating income and indicators of biodiversity", organised in situ comprising a field trip in the morning and an afternoon of discussion and feedback. - Training in the "sustainable management of forest and agroforestry resources", studying NWFPs present in the area (lentisk, prickly pears, rush, tamarisk etc.); - Training in the "transformation of local resources", focusing on species identified by local people, jointly organised with partner associations with proven experience; - Training in "good practice for planting agroforestry trees", technical training in successfully planting trees in this context; - Training in the "use and management of the monitoring platform", training for stakeholders to adopt the platform; - Training in the sustainable management of a nursery of native species. |
| 3.2 Clear and measurable biodiversity conservation outcomes are identified, benchmarked and periodically assessed | Indicators for local biodiversity evaluation have been defined. The project provides for three field surveys: the first before planting in order to collect data about the system to be achieved and to determine the involvement of beneficiaries, the second in the middle of the project to measure the degree of satisfaction and to assess the progress of the project and the changes made, and the last to assess the degree of perception of climate change by farmers and measure the impact of the project. After each survey, the data are analysed and conclusions are drawn, and that allows decision making to be adapted to the goals to be achieved. |
| 3.3 Monitoring includes periodic assessments of unintended adverse consequences for nature arising from the NbS | Three sets of monitoring surveys have been set up (see point 3.2. above). |
| 3.4 Opportunities to enhance ecosystem integrity and connectivity are identified and incorporated into the NbS strategy | Ecosystem connectivity through ecological corridors for the enhancement of biodiversity is definitely at the core of this project. |

Days of exchange and capitalization



© IMAGE SOURCE: https://explorer.land/x/project/corridors_oued.tine

ISSUES ADDRESSED
Economic feasibility

CRITERIA

4. NbS are economically viable

| INDICATORS | DESCRIPTION |
|---|--|
| 4.1 The direct and indirect benefits and costs associated with the NbS, who pays and who benefits, are identified and documented | By planting trees and establishing agroforestry systems, the association, with the participation of the local population, will contribute to improving the resilience of farms to climate change and the restoration of agroecosystems. The establishment of hedges and thickets can reduce erosion (because bare land can lose between 11 and 86 tonnes of soil / ha / year) and limit bad agricultural practices, increasing the profitability and sustainability of farms. The training and awareness-raising work will enable the local population to better identify the existing forest species in the region, to enhance their value and process them, which will generate additional sources of income. The establishment of communal plantation sites, the installation of mini-nurseries and the monitoring and evaluation of the plantations will generate work for young people in the region. |
| 4.2 A cost-effectiveness study is provided to support the choice of NbS including the likely impact of any relevant regulations and subsidies | No evidence found during the evaluation. |
| 4.3 The effectiveness of the NbS design is justified against available alternative solutions, taking into account any associated externalities | No evidence found during the evaluation. However, it is worth mentioning that this project allows the association to propose solutions for farmers to adapt to the effects of climate change. These solutions are the result of collective work between association members and the local communities. They also depend on the support of institutions and of experts in the identification and mapping of indigenous forest species in the region, and the study of economic and agronomic challenges and opportunities for the identification of species to plant. These interactions will improve the technical skills of the association, especially in terms of the choice of species according to the various parameters involved. As part of a questionnaire given to the local communities, the initial state of perceptions, knowledge of the environment and training needs will be noted, then awareness workshops will assess the improvement in local people's knowledge of topics related to the conservation of biodiversity and the proper management of ecosystem services. To conclude, the association and its partners will improve their skills in terms of: i) project management, ii) surveying and mapping, iii) educational and fun games, iv) monitoring and management of plantations, and v) evaluation of ecosystem services. |
| 4.4 NbS design considers a portfolio of resourcing options such as market-based, public sector, voluntary commitments and actions to support regulatory compliance | There is a specific mechanism in place. The local community has formalised its involvement in the project as evidenced by the number of existing partnerships and the number of agreements signed. The people concerned will be consulted during the mapping process. An association for the promotion of apiculture has been created by the local community within the project: thanks to CAPTE's contact with the youth of the region, making them aware of environmental responsibility and local development, these young people have been influenced and have decided to take action. Their bee-keeping group will be a partner in the association's future projects and it will ensure that the impacts of these projects will be sustainable. It will validate the feedback from these surveys and the proposed training plan. The steering and monitoring-evaluation committee will include representatives from the community. Direct and indirect beneficiaries will participate in the implementation of activities and training. The activities and training will take place mainly locally. Finally, LACT provided support for an end-of-study project by a student from the agricultural school in Mateur entitled "The role of crop associations in an agroforestry context: a strategy to improve soil fertility". This student was from the region and he was properly supervised and accompanied in the field to take the soil samples. Two partnership agreements were signed by two farmers in the project area at the beginning of the project, but currently the association has 17 partnership agreements for the planting work and they are aiming for 30 partnership agreements by the end of the project. |

ISSUES ADDRESSED
Inclusive governance

CRITERIA

5. NbS are based on inclusive, transparent and empowering governance processes

| INDICATORS | DESCRIPTION |
|--|---|
| <p>5.1 A defined and fully agreed upon feedback and grievance resolution mechanism is available to all stakeholders before an NbS intervention can be initiated</p> | <p>Yes, regarding community involvement, the results of the diagnostic survey of the local communities define training needs. A training plan is then approved by the steering committee. Part of the training will be carried out jointly with partners (Tunisian Association for Environmental Agriculture [ATAE], INRGREF and the local association called The Golden Bee). A gender-sensitive attendance list and an evaluation questionnaire will be offered to participants. Training awareness cooperation: the association organised several meetings with its partners, institutions and volunteers. The association also participates in the activities of the ATAE, which disseminates good practice in environmental farming (e.g. mixture cropping (plantation de méteil), carob value chain), raising awareness among more than 50 people. International solidarity workcamps: the association organised more than a dozen international solidarity workcamps for tree planting involving around 20 volunteers.</p> |
| <p>5.2 Participation is based on mutual respect and equality, regardless of gender, age or social status, and upholds the right of Indigenous Peoples to Free Prior and Informed Consent (FPIC)</p> | <p>In the project the following organisations participate as technical partners: ATAE, with which a multi-year agreement has been signed; INRGREF, project aimed at rural women for the development of the value chain in Edkhila (agreement in principle on cooperation). The following were financial partners at the beginning of project: –SAS Capte (technical and financial support: 13%); –Bizerte CRDA (technical support: 2%); –The General Directorate of Forests (DGF) (technical support: 2%); –INGREF (technical support for training: 2%); –ATAE (expertise and logistics: 2%); –The local communities (technical and logistical support: 2%). Two other financial partners joined later: –The Swiss Embassy in Tunisia, providing additional funding for the pot irrigation project. –The Tunisian company Sotipapier, as part of its “Sotipapier is committed” CSR programme.</p> |
| <p>5.3 Stakeholders who are directly and indirectly affected by the NbS have been identified and involved in all processes of the NbS intervention</p> | <p>Direct beneficiaries of the project: –30 farmers; –Families of partner farmers (80 people); –Young people moving towards additional income-generating activities (10 young people); –Two primary or secondary schools in the villages concerned (between 60 and 90 pupils). Indirect beneficiaries of the project: –Agricultural workers required for planting sites (approx. 10 people); –Families of school students (approx. 30 families); –Rural women involved in the lentisk value chain in Edkhila (approx. 10 women); –People reached by communication actions (approx. 50 people); –Local educational institutions that can disseminate the educational game (2 institutions).</p> |
| <p>5.4 Decision-making processes document and respond to the rights and interests of all participating and affected stakeholders</p> | <p>Yes</p> |
| <p>5.5 Where the scale of the NbS extends beyond jurisdictional boundaries, mechanisms are established to enable joint decision making by the stakeholders in those jurisdictions affected by the NbS</p> | <p>Environmental corridors in Oued Tine valley are located between the governorates of Bizerte and Manouba in north-eastern Tunisia. A steering committee has been established, made up of experts, partners and representatives of the beneficiary population in both governorates, to ensure the technical quality of the actions implemented; this committee has already met twice to discuss the progress of the projects and the gaps to be filled and to share the proposals concerning the next activities.</p> |

| ISSUES ADDRESSED Balance trade-offs | |
|---|---|
| CRITERIA 6. NbS equitably balance trade-offs between achievement of their primary goal(s) and the continued provision of multiple benefits | |
| INDICATORS | DESCRIPTION |
| 6.1 The potential costs and benefits of associated trade-offs of the NbS intervention are explicitly acknowledged and inform safeguards and any appropriate corrective actions | The potentially negative consequences of the project have been identified and documented. For example, tree planting on nomadic grazing areas can generate tensions between different sets of farmers due to the temporary protection of the areas where the trees will be introduced. The diagnostic survey of the local communities and the role of the monitoring and evaluation committee will make it possible to avoid this problem by inviting stakeholders to decide whether the proposals to be presented are realistic and by validating the proposed mapping. |
| 6.2 The rights to, usage of and access to land and resources, along with the responsibilities of different stakeholders are acknowledged and respected | Yes, the agreements signed by the beneficiary farmers are very clear about this issue. |
| 6.3 Established safeguards are periodically reviewed to ensure that mutually agreed trade-off limits are respected and do not destabilise the entire NbS | No evidence found during the evaluation. |
| ISSUES ADDRESSED Adaptive management | |
| CRITERIA 7. NbS are managed adaptively, based on evidence | |
| INDICATORS | DESCRIPTION |
| 7.1 An NbS strategy is established and used as a basis for regular monitoring and evaluation of the intervention | The steering committee that has been established, made up of experts, partners and representatives of the beneficiaries, will ensure the technical quality of the implemented actions. It will meet four times during the course of the project and will deliver an advisory opinion. A monitoring-evaluation committee made up of the association, farmers and technical partners will meet every two months during the project period and will assess the progress of the implementation of activities, in particular the nursery, and if necessary make decisions to ensure the objectives are achieved. All of the partners will have access to the plantation monitoring tool to monitor the plantations. Three half-yearly technical and financial reports will be provided, and 1 final report will be sent to the PPI-OSCAN national coordinator within 6 months of the end of the project. Quantified and verifiable results to be achieved at the end of the project: –1 map produced, validated and distributed to partners; –The local community (approx. 200 people) is aware and trained; –30 collaboration agreements for tree planting will be formalised; –About ten native and other species will be introduced; –1 tool for monitoring and measuring the benefits of the plantations will be tested and shared; –1 steering committee and 1 monitoring and evaluation committee will be set up. |
| 7.2 A monitoring and evaluation plan is developed and implemented throughout the intervention lifecycle | Monitoring and evaluation has been specified and constitutes one of the key elements of the project. The steering committee will monitor and evaluate the actions carried out within the framework of its semi-annual meetings. It will be kept informed of the progress of activities by the monitoring and evaluation committee on a bi-monthly basis. |

| INDICATORS | DESCRIPTION |
|--|---|
| <p>7.3 A framework for iterative learning that enables adaptive management is applied throughout the intervention lifecycle</p> | <p>This project allows the association to propose solutions for farmers to adapt to the effects of climate change. These solutions are the result of collective work between association members and the local communities. They also depend on the support of institutions and of experts in the identification and mapping of indigenous forest species in the region, and the study of economic and agronomic challenges and opportunities for the identification of species to plant. These interactions will improve the technical skills of the association, especially in terms of the choice of species according to the various parameters involved.</p> <p>As part of a questionnaire given to the local communities, the initial state of perceptions, knowledge of the environment and training needs will be noted, then awareness workshops will assess the improvement in local people's knowledge of topics related to the conservation of biodiversity and the proper management of ecosystem services.</p> <p>To conclude, the association and its partners will improve their skills in terms of: i) project management, ii) surveying and mapping, iii) education, iv) monitoring and management of plantations, and v) evaluation of ecosystem services.</p> |
| <p>ISSUES ADDRESSED Mainstreaming</p> | |
| <p>CRITERIA 8. NbS are sustainable and mainstreamed within an appropriate jurisdictional context</p> | |
| INDICATORS | DESCRIPTION |
| <p>8.1 NbS design, implementation and lessons learnt are shared to trigger transformative change</p> | <p>The Association Amis de Capte Tunisie, supported by SAS Capte, expect this project to create momentum in the region and allow new plantations to be created with neighbouring farmers wishing to change their farming methods. The development of a plantation monitoring tool will allow the association and farmers to perfect the introduction of agroforestry systems. Strengthening local people's skills in the management of nurseries and irrigation equipment will help to empower the population. Knowledge of the land, the diversity of current projects and the multiplicity of partnerships created contribute to the replicability of this type of project.</p> <p>Finally, to guarantee the sustainability of the project, LACT have been selected to implement Corridors version 2, which aims to continue planting as far as the Ichkeul wetland, this time introducing exchanges between young people from both shores of the Mediterranean about biodiversity and the protection of migratory birds.</p> |
| <p>8.2 NbS inform and enhance facilitating policy and regulation frameworks to support their uptake and mainstreaming</p> | <p>No evidence found during the evaluation.</p> |
| <p>8.3 Where relevant, NbS contribute to national and global targets for human well-being, climate change, biodiversity and human rights, including the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP)</p> | <p>Finally, the project is in line with Tunisia's international commitments in terms of the implementation of prevention and mitigation measures in the face of climate change, as stated in the Tunisian INDC submitted at the COP 21 in Paris. The carbon footprint of agriculture will be improved by using farming methods that generate less emissions; such as optimising the diets of domestic animals, promoting organic farming or conservation farming methods, as well as energy recovery from animal waste.</p> <p>The project is also part of the work of other programmes being implemented in the region, such as the local plan for adaptation to climate change in Bizerte.</p> |



Zagreb (Croatia)

The Living Lab at Sesvete

NbS for post-industrial urban regeneration



Croatia's capital Zagreb is the country's largest and economically most significant city. With a population of 790,000 inhabitants and located along the Sava river and below Medvednica mountain and its nature park, Zagreb has rich natural features.

The Living Lab at Sesvete is one of the demonstration projects being developed as part of the EU's Horizon 2020 research initiative proGReg – Productive Green Infrastructure for Post-industrial Urban Regeneration. The proGReg project focuses on developing and testing new Nature-based Solution (NbS)-oriented economies shared between public authorities, civil society and industry/SMEs.

The Living Lab lies within Sesvete district in the east of Zagreb in the foothills of Medvednica mountain. With its 70,000 inhabitants, Sesvete has the youngest population in Croatia, and a strong community and entrepreneurial spirit. Located on various key European traffic routes, Sesvete has an industrial past and present, with a particularly active automotive and construction industry. Distinctive, tall silo buildings form part of Sesvete's skyline and industrial heritage. In particular, the site of the former meat-processing factory, Sljeme, is the core of the Living Lab, with green plans in place for the silo buildings themselves and the surrounding areas.

A number of NbS will be implemented and tested in the living lab:

Community-based urban farms and gardens

Post-industrial areas often lack green spaces for public use. Turning unused urban land into productive community gardens can have a positive impact on locals, contributing to improved mental and physical health through exposure to nature and healthy sources of food and a community feeling. The Sesvete 'City Garden' will initially have around 100 units (and can be extended to new

areas at a later stage). The garden will enable locals to grow traditional vegetables, herbs and flowers. This is one of 12 'City Gardens' created in Zagreb since 2013. A nursery at the park entrance will serve as an educational centre for local schools. Food production will be organic, and the water pumps will run on solar power.

Aquaponics

Aquaponics is the combination of raising fish (aquaculture) in tanks together with soilless cultivation of plants (hydroponics) in a symbiotic environment, whereby the fish wastewater provides the nutrients needed to feed the plants. Aquaponics is ideal for promoting local food production in areas with contaminated or poor quality soil. Similarly to NbS food produced locally by locals can lead to healthier diets and contribute to community-building. Additionally, the aquaponics systems will create green job opportunities. This project intends to implement low-cost but stable aquaponics systems, which are easy to operate. Supported with technology from Dortmund and expertise from the University of Zagreb's Faculty of Agriculture, Zagreb will also test the potential of an aquaponics system on a 100 m² former industrial site.

Green walls and roofs

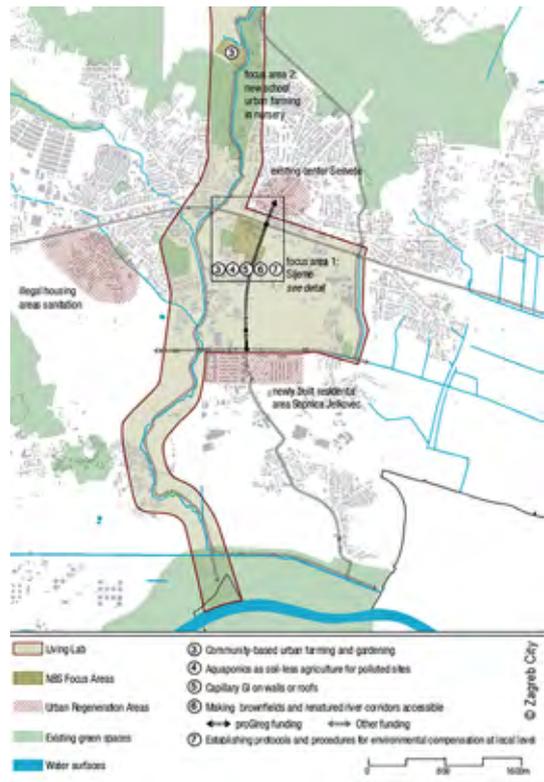
Green roofs and vertical gardens improve a building's insulation, reduce stormwater runoff, capture CO₂, filter pollutants, and increase biodiversity. This all leads to reduced energy consumption and increased urban resilience. Available technology is advanced, but the challenge is to increase uptake by integrating it into local urban policies. The former Sljeme meat-processing factory is to be fully revamped into a business innovation centre with a 700 m² green roof (150 m² of solar panels) and 300 m² of green walls. There is also potential to replicate this on other factory buildings at the same site.

Accessible green corridors

Needed for transporting goods, rivers were a common feature of early industrialisation. Nowadays in post-industrial cities, they are often left derelict and inaccessible for locals. Green corridors will connect the Living Lab to the Sava river, the ecosystems of the forest in the North with the river in the South, and the different parts of Sesvete that are being redeveloped. A cycle path will also connect the urban gardens to the neighbourhood of Novi Jelkovec (11,000 inhabitants).

Local environmental compensation processes

Several measures to compensate for the environment are available. However, embedding them into mainstream policies and urban planning procedures requires more effort, by establishing the evidence-base for NbS and unlocking funds for example via adaptation funds, taxes or public-private partnerships. Zagreb will monitor and evaluate the environmental and social benefits of the proGReg NbS implemented and, if successful, integrate NbS into planning procedures and policy development at local level.



Green Corridors in Zagreb

Documents

Project Website: <https://progireg.eu/zagreb/>

Planning and implementing nature-based solutions:

ProGReg - Methodology on spatial analysis in front-runner and follower cities: https://progireg.eu/fileadmin/user_upload/Deliverables/D2.1_proGReg_Methodology_Spatial_Analysis_URBASOFIA_2019-05-02.pdf

ProGReg - Spatial Analysis in Front Runner and Follower Cities: https://progireg.eu/fileadmin/user_upload/Deliverables/D2.2_proGReg_SpatialAnalysis_URBASOFIA_20200116.pdf

ProGReg - Co-designing Nature-based Solutions in Living Labs (workshop round 1): https://progireg.eu/fileadmin/user_upload/Deliverables/D2.3_Report_on_WS_round_1_in_FRC_proGReg_ICLEI_2019-04-30.pdf

ProGReg - Co-designing Nature-based Solutions in Living Labs (workshop round 2): https://progireg.eu/fileadmin/user_upload/Deliverables/D2.4_Report_on_WS_round_2_in_FRC_proGReg_ICLEI_2019-10-01.pdf

ProGReg - Co-designing Nature-based Solutions in Living Labs (workshop round 2) - Final report on co-design workshops in Frontrunner Cities: https://progireg.eu/fileadmin/user_upload/Deliverables/D2.5_Report_on_final_WS_round_in_FRC_proGReg_ICLEI_2020-01-31.pdf

Monitoring and assessment plan: https://progireg.eu/fileadmin/user_upload/Deliverables/D4.1_proGReg_CNR_2019-12-23.pdf

Data Management Plan: https://progireg.eu/fileadmin/user_upload/Deliverables/D4.2_DMP_proGReg_CNR_2019-03-29.pdf

Protocols of Measurements: https://progireg.eu/fileadmin/user_upload/Deliverables/D4.3_proGReg_CNR_2019-12-23.pdf

Spreading awareness of Nature-based Solutions:

– Kick-off conference (D6.1): This report provides an overview of the programme and contents of the proGReg kick-off conference in Dortmund, 25-26 September 2018. [DOWNLOAD](#)

– Website (D6.2): A report on the key features, intentions and plans for future development of the proGReg website. [DOWNLOAD](#)

– Project corporate design (D6.3): This document presents the proGReg corporate design and provides guidance on consistent use of design elements. [DOWNLOAD](#)

– Communication and dissemination (D6.12): This plan describes the framework and procedures to be used for effective communication and dissemination work within proGReg. [DOWNLOAD](#)

| ISSUES ADDRESSED Societal challenges Climate change / Food security / Water security / Human health / Economic and social development | |
|--|--|
|  | |
| CRITERIA 1. NbS effectively address societal challenges | |
| INDICATORS | DESCRIPTION |
| 1.1 The most pressing societal challenges for rights holders and beneficiaries are prioritised | Yes, the combined research gathered gave the participants a great insight into the needs, challenges and visions of the people of Sesvete. Most societal challenges are covered by the NbS interventions in the living lab: Climate change / Food security / Water security / Human health / Economic and social development. |
| 1.2 The societal challenges addressed are clearly understood and documented | Yes, before planning and designing nature-based solutions, it is essential to understand their local context. The living lab has developed a spatial analysis of the regeneration area, following the proGReg methodology and guidelines. The spatial analysis covers the topics of socio-cultural inclusiveness, human health and well-being, ecological and environmental restoration and the economic and labour market situation. This spatial analysis constitutes a good baseline for undertaking an impact assessment of the NbS interventions (See section on Adaptive Management) |
| 1.3 Human well-being outcomes arising from the NbS are identified, benchmarked and periodically assessed | Yes, increasing human health and well-being is at the core of the proGReg project (see task 4.2 – Increased human health and well-being of WP4). In the Living Lab at Sesvete, human health will be monitored using surveys. Besides, indicators for human health and well-being from the EU's EKLIPSE Expert Working Group (EWG) impact evaluation framework will be used to assess the benefits of each NbS for this particular challenge. Human health and well-being indicators: Health: <ul style="list-style-type: none"> – 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 Well-being: <ul style="list-style-type: none"> – Access to green space (% dwellings within 300 m radius) /City / Living Lab – Green space per capita /City / Living Lab – Safety: number of reported crimes /City – Time spent on leisure activities (for people aged 25–64) - if available /City – Exercise hours per week /City – Modal split during working days /City – Access to services, amenities, infrastructure, Leisure services and amenities /Living Lab. |

Therapeutic garden opening held for disabled users



© IMAGE SOURCE: <https://progreg.eu/zagreb/>

ISSUES ADDRESSED**Design at scale**

City-wide / District / Urban acupuncture

CRITERIA**2. Design of NbS is informed by scale**

| INDICATORS | DESCRIPTION |
|---|--|
| <p>2.1 Design of NbS recognises and responds to the interactions between the economy, society and ecosystems</p> | <p>Yes, the living lab will implement a variety of nature-based solutions that will create productive green infrastructure that not only helps improve living conditions and reduce vulnerability to climate change, but also provides measurable economic benefits to citizens and entrepreneurs in post-industrial urban districts.</p> <p>And more importantly, all NbS are being co-created with local stakeholders and citizens to guarantee that they respond to local needs and expectations.</p> <p>Key topics of interest for NbS implementation:</p> <ul style="list-style-type: none"> - Urban development; - Green infrastructure; - Regeneration; - Participation, social inclusion; - Other connected topics of interest. |
| <p>2.2 Design of NbS is integrated with other complementary interventions and seeks synergies across sectors</p> | <p>Yes, as shown below:</p> <p>Regional level:</p> <ul style="list-style-type: none"> - Contextualisation: strategic objectives of the identified plans to which proGReg initiatives correspond; - Provisions of regional plans (i.e. landscape plans) which affect the implementation of the project (Living Lab implementation) or condition the Urban Plans of proGReg Follower Cities (FC) through specific constraints or opportunities (i.e. linking of NbS implemented within a higher-level, regional Green Infrastructure 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). <p>Local level:</p> <ul style="list-style-type: none"> - Contextualisation: provisions of masterplan and sectoral plans and strategies on the key topics of interest for NbS implementation; - Contextualisation: local policies for NbS implementation, for participation, community involvement, social inclusion; - Constraints: provisions of normative plans, specifically for the Living Lab and/or regeneration areas; - Opportunities: policies, instruments and facilities useful for NbS implementation. <p>Other city investments/actions:</p> <ul style="list-style-type: none"> - Synergies: other actions which are already foreseen for the development and/or 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 capitalisation or cross-fertilisation. |
| <p>2.3 Design of NbS incorporates risk identification and risk management beyond the intervention site</p> | <p>No evidence found during the evaluation.</p> |

| ISSUES ADDRESSED Biodiversity net-gain | |
|---|--|
| CRITERIA 3. NbS result in net gain to biodiversity and ecosystem integrity | |
| INDICATORS | DESCRIPTION |
| 3.1 NbS actions directly respond to evidence-based assessment of the current state of the ecosystem and prevailing drivers of degradation and loss | Yes, before planning and designing NbS a spatial analysis is undertaken covering the topics of socio-cultural inclusiveness, human health and well-being, ecological and environmental restoration, and the economic and labour market situation. This is particularly relevant for the Pilot on Green corridors that will connect the Living Lab to the Sava river, the ecosystems of the forest in the north with the river in the south, and the different parts of Sesvete being redeveloped. |
| 3.2 Clear and measurable biodiversity conservation outcomes are identified, benchmarked and periodically assessed | Yes, measurable biodiversity conservation outcomes are identified, particularly those related to ecological and environmental restoration and their benefits. The indicators used for ecological and environmental benefits assessment are those identified by the EKLIPSE EWG framework challenge to which they belong. |
| 3.3 Monitoring includes periodic assessments of unintended adverse consequences for nature arising from the NbS | There is no information available about how to contemplate the unintended adverse consequences of the NbS |
| 3.4 Opportunities to enhance ecosystem integrity and connectivity are identified and incorporated into the NbS strategy | Definitely one of the key aspects of the Living Lab is increasing the connectivity of green spaces through ecological corridors while improving accessibility from urban regeneration areas. |

Mass tree-planting activity



© IMAGE SOURCE: <https://progreg.eu/zagreb/>

ISSUES ADDRESSED
Economic feasibility

CRITERIA

4. NbS are economically viable

| INDICATORS | DESCRIPTION |
|--|--|
| <p>4.1 The direct and indirect benefits and costs associated with the NbS, who pays and who benefits, are identified and documented</p> | <p>Economic benefits of the NbS are evaluated through indicators for economics and the labour market, specifying the EKLIPSE EWG framework challenge to which they belong. Some of the indicators are:</p> <ul style="list-style-type: none"> – Labour cost of the construction/implementation of the NbS; – Cost of NbS implementation: discounting the labour costs mentioned above, with breakdown into costs of permits/licences, construction material and other equipment, land access, machinery rental, usage fees, taxes, etc.; – New jobs created post-implementation: Number of FTEs created after implementation (i.e. for the long-term maintenance of the NbS). <p>However, beyond that what is really interesting is that economic innovation is one key aspect of the project. Therefore, market-ready business models for productive Green Infrastructure are explored, where the direct and indirect benefits and costs associated with the NbS, who pays and who benefits will be evaluated.</p> |
| <p>4.2 A cost-effectiveness study is provided to support the choice of NbS including the likely impact of any relevant regulations and subsidies</p> | <p>The project has the objective of demonstrating the integration of NbS into business models that are economically self-sustaining and provide multiple benefits for the economic, ecological and social regeneration of deprived urban areas suffering from the consequences of deindustrialisation.</p> <ul style="list-style-type: none"> – Direct economic and labour impacts of the implemented NbS: The direct economic impact of the NbS is mainly that of implementation and maintenance. As suggested by EKLIPSE EWG, a cost-effectiveness assessment of the performance of the measures against their costs (both in terms of implementation and long-term maintenance) is necessary. Essentially, a cost-benefit analysis will be conducted for each NbS comparing all direct and indirect costs and benefits identified, as described below. The direct economic and labour impact (both costs and benefits) will only be evaluated after implementation of the NbS. – Indirect impacts of the implemented NbS: The indirect impacts of the actions implemented cross-cut thematically and hence are to a certain extent more complex to assess than the direct economic impacts explained above. Indirect effects will be analysed by merging information from different sources and tools and seeking to focus on the sub-themes that were also outlined in Challenge 10 of the EKLIPSE EWG impact evaluation framework 1.0. Spatial data will always provide the baseline and the general trends against which to compare any changes detected through the different proGReg assessment tools. |
| <p>4.3 The effectiveness of the NbS design is justified against available alternative solutions, taking into account any associated externalities</p> | <p>Yes. To describe benefit assessment, the EWG also recommended using specific indicators, which could easily and effectively describe the benefits and simultaneously provide efficient tools for comparing different NbS. The data collected as previously described and by following the Monitoring and Assessment Plan (D4.11), after having been stored in the proGReg platform (see D4.24), will then be analysed by the WP4 partners according to their Task responsibility. For each of the abovementioned domains, data analysis will quantify the benefits in terms of specific indicators, calculated on the basis of the experimental data obtained. These indicators will be the final output of the proGReg project and will be also used to compare the effectiveness of both the implemented NbS types and the developed monitoring protocols with those tested within the sister projects belonging, together with proGReg, to EC Task Force 2 "NbS Impact Evaluation Framework 2.0".</p> |
| <p>4.4 NbS design considers a portfolio of resourcing options such as market-based, public sector, voluntary commitments and actions to support regulatory compliance</p> | <p>Nature-based solutions business models have not been developed, Nevertheless, the aim is to demonstrate how some NbS can develop into replicable, partly or fully self-sustaining businesses, so that proGReg continues to provide sustainable benefits to society, also beyond the project. To do so, it is necessary to identify and understand possible bottlenecks for NbS when entering the market. Based on information from key proGReg stakeholders gained via questionnaires, as well as information from cities external to the project, proGReg will create a series of reports dedicated to the technological and non-technological barriers to NbS implementation, both within the project and beyond. A business model catalogue will present the economic and societal benefits of NbS and how they can be transformed into partly or fully self-sustaining businesses.</p> |

| ISSUES ADDRESSED Inclusive governance | |
|---|--|
| CRITERIA 5. NbS are based on inclusive, transparent and empowering governance processes | |
| INDICATORS | DESCRIPTION |
| 5.1 A defined and fully agreed upon feedback and grievance resolution mechanism is available to all stakeholders before an NbS intervention can be initiated | <p>The co-design process is the framework for the development of the intervention involving the proGReg Project :</p> <p>We formulated six co-design principles to guide planning and decision-making processes in the Living Lab towards co-design. These were presented to the workshop participants in the form of a poster including short descriptions of the principles and a checklist consisting of questions which helps assess whether they are considered in processes. These principles are: (1) be open and inclusive, (2) be diverse, (3) share goals and vision, (4) think long term, (5) be experimental and reflective, and (6) be flexible. Based on discussions in the workshop, an additional one was added, namely (7) be transparent.</p> <p>One element to highlight as an example of this process is the use of three rounds of co-design workshops developed during the launch of the project (2018–2019). Three rounds of workshops were held in the front-runner cities to establish the co-design process and bring together relevant stakeholders to engage them in the local co-design process. The proGReg team will use the experiences of co-designing from the project to create co-design guidelines for implementing NbS in cities.</p> |
| 5.2 Participation is based on mutual respect and equality, regardless of gender, age or social status, and upholds the right of Indigenous Peoples to Free Prior and Informed Consent (FPIC) | <p>Yes, the co-design process brings together relevant stakeholders to engage them in the local co-design process.</p> <p>Social innovation is at the core of the project – through locally rooted processes of co-design, co-creation and co-implementation of green infrastructure solutions together with the local communities in the living lab areas, which will be integrated into participatory urban regeneration plans.</p> <p>Explicitly recognised: Gender equity</p> <p>When communicating about proGReg, partners should use gender-sensitive language and imagery in line with the European Institute for Gender Equality's Toolkit on gender sensitive communication. Below are the key principles and some examples from the Toolkit on inclusive communications:</p> <ul style="list-style-type: none"> – Recognise and challenge stereotypes: e.g. make sure that the images you choose to use in communication materials do not reinforce gender stereotypes. Include a wide mix of people in different environments. – Be inclusive and avoid omission and making others invisible: e.g. do not use 'man' or 'he' to refer to the experiences of all people. – Be respectful and avoid trivialisation and subordination: e.g. ensure that your language actively promotes gender equality by use of the term Ms, which does not denote marital status. <p>Zagreb: As this "City Gardens" project flourished, increasing numbers of people from vulnerable and disadvantaged backgrounds showed an interest. Thus, the City Council and a local NGO came up with a plan for a new kind of garden equipped for people with psychological and physical disabilities. Therapeutic gardens are specially designed gardens with the aim of strengthening motor, sensory, cognitive, affective, nutritional, emotional and social potential. Gardens have been used for health and well-being around the world for hundreds of years, but this type of specifically designed garden would be a first for the Croatian capital.</p> |
| 5.3 Stakeholders who are directly and indirectly affected by the NbS have been identified and involved in all processes of the NbS intervention | <p>Yes. Involving a broad range of citizens and local organisations in the design of the proGReg Living Labs is essential to the project's success; those who live and work in the area know best what they need, so working with them throughout the project ensures more inclusive and effective results. To support the Zagreb team in this process, experts on co-design from project partner ICLEI attended the meeting to guide the planning. Key activities included participants sharing their visions for Sesvete in 2030, in-depth stakeholder mapping of the area and presentations of co-design principles and methodologies. Partners also presented their initial co-design ideas, which included launching an architectural competition in the area, offering a 'Walk around Sljeme' for students, a museum exhibition on the meat industry and history of Sljeme, and introductions to aquaponics, urban farming and the concept of an inclusive 'therapy garden', which uses horticultural therapy to integrate minorities and people with disabilities.</p> |

| INDICATORS | DESCRIPTION |
|--|--|
| <p>5.4 Decision-making processes document and respond to the rights and interests of all participating and affected stakeholders</p> | <p>Yes. Participating local partners included the local NGO ZIPs, the Zagreb University of Applied Sciences, the company KomforKlima (experts in aquaponics) and the City of Zagreb, including the Office for Strategic Planning and Development and the Department for Urban and Spatial Planning. Representatives from key stakeholders, such as ISKRA (an NGO working with disabled people), the local music school (targeted as a potential user of the revived factory buildings) and the local museum, also attended.</p> <p>Zagreb: Landscape democracy is about understanding the human as well as the physical elements of a neighbourhood; vegetation, mountains, rivers, buildings, streets, people and even the hidden power structures within a community all play a role in shaping a space and its identity. This was the key concept of the Landscape and Democracy workshop session, which took place within the Le:Notre Landscape Forum held in Zagreb during the week of 9–13 April 2019. The session focused on Sesvete, the proGReg Living Lab and post-industrial area in the east of the city.</p> <p>Participants in the landscape and democracy session included landscape architects, architects, local activists and sociologists from proGReg’s partners local NGO Zelene I Plave Sesvete and the Architecture Faculty of the University of Zagreb, and the hosts, Le:Notre Institute. The combined research gathered gave the participants a great insight into the needs, challenges and visions of the people of Sesvete. It also encouraged them to embed the concept of landscape democracy into future urban planning. “We should all have equal access to landscape and an equal voice in how landscape is used, valued and maintained,” said Marijo Spajić of proGReg partner Zelene I Plave Sesvete.</p> |
| <p>5.5 Where the scale of the NbS extends beyond jurisdictional boundaries, mechanisms are established to enable joint decision making by the stakeholders in those jurisdictions affected by the NbS</p> | <p>No evidence found during the evaluation.</p> |
| <p>ISSUES ADDRESSED Balance trade-offs</p> | |
| <p>CRITERIA 6. NbS equitably balance trade-offs between achievement of their primary goal(s) and the continued provision of multiple benefits</p> | |
| INDICATORS | DESCRIPTION |
| <p>6.1 The potential costs and benefits of associated trade-offs of the NbS intervention are explicitly acknowledged and inform safeguards and any appropriate corrective actions</p> | <p>No evidence found during the evaluation.</p> |
| <p>6.2 The rights to, usage of and access to land and resources, along with the responsibilities of different stakeholders are acknowledged and respected</p> | <p>It is assumed that this is the case as the Living Lab is part of a project financed by the EU, which must guarantee that access to land and resources is available in order to deliver the projects.</p> |
| <p>6.3 Established safeguards are periodically reviewed to ensure that mutually agreed trade-off limits are respected and do not destabilise the entire NbS</p> | <p>No evidence found during the evaluation.</p> |

| ISSUES ADDRESSED Adaptive management | |
|---|--|
| CRITERIA 7. NbS are managed adaptively, based on evidence | |
| INDICATORS | DESCRIPTION |
| 7.1 An NbS strategy is established and used as a basis for regular monitoring and evaluation of the intervention | Yes, a diagnosis of the urban regeneration area, based on spatial analysis, constitutes the baseline for the NbS strategy in the Living Lab and the monitoring and assessment plan. |
| 7.2 A monitoring and evaluation plan is developed and implemented throughout the intervention lifecycle | Yes, a Monitoring and Assessment Plan will be developed for the Living Lab: This document describes the procedure and indicators to be used to monitor and assess the benefits of the NbS to be implemented. This plan is configured as a collaborative action involving local authorities, the civic sector, SMEs and research institutes, with the aim of providing a significant and comprehensive evaluation of NbS. |
| 7.3 A framework for iterative learning that enables adaptive management is applied throughout the intervention lifecycle | The monitoring and assessment plan has the ultimate aim of being translated into informed policies and targeted interventions aimed at promoting healthy, equitable, sustainable and economically thriving urban environments. |
| ISSUES ADDRESSED Mainstreaming | |
| CRITERIA 8. NbS are sustainable and mainstreamed within an appropriate jurisdictional context | |
| INDICATORS | DESCRIPTION |
| 8.1 NbS design, implementation and lessons learnt are shared to trigger transformative change | Yes, see D6.4 Communication and Dissemination: The main objective of the proGReg communication and dissemination work is to efficiently and effectively communicate and disseminate the project results to maximise their impact. More specifically the objectives are to: 1) Update the communication and dissemination plan annually; 2) Communicate research between and among partners; 3) Create global awareness on nature-based solutions (NbS) as a paradigm change and source of new business opportunities; 4) Promote networking of the front-runner cities (FRC) as 'coaching cities' with follower cities (FC); 5) Exploit and promote the adoption of recommendations and lessons learnt; 6) Disseminate proGReg scientific publications; and 7) Monitor and coordinate partners' participation in dissemination events. |
| 8.2 NbS inform and enhance facilitating policy and regulation frameworks to support their uptake and mainstreaming | Zagreb will monitor and evaluate the environmental and social benefits of the proGReg NbS implemented and, if successful, integrate NbS into planning procedures and policy development at local level. |
| 8.3 Where relevant, NbS contribute to national and global targets for human well-being, climate change, biodiversity and human rights, including the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) | No evidence found during the evaluation. |



Nice (France)

Nature in the heart of Nice

La nature au coeur de Nice



The metropolitan area of Nice Côte d'Azur (MNCA) is a biodiversity hotspot, with high levels of endemism, 59 natural zones of ecological interest for fauna and flora (ZNIEFFs), a national park, 34% of its area classified under Natura 2000, 4 prefectural habitat protection orders (APPBs), amongst other features. In order to take into account its challenges in the context of development projects, MNCA is drawing up a new plan for reclaiming nature and biodiversity by setting up a nature and biodiversity monitoring centre, applying the “Territory committed to nature” approach and strengthening its partnerships to increase the synergy of actors.



© IMAGE SOURCE: <http://www.nice.fr/fr/actualites/la-nature-au-coeur-de-nice/>
mainType=article&depart=1001

The objectives and fields of action are:

- To stop biodiversity loss and make the territory more functional for species by maintaining or restoring ecological continuities;
- To renature the territory, primarily through “nature and permeable cities”, so that the inhabitants and the territory enjoy the beneficial effects of nature,
- To bring stakeholders together to optimise local action;
- To improve knowledge by creating a metropolitan atlas of biodiversity based on the national “Municipal biodiversity atlas” approach;
- To preserve movement corridors for species and reservoirs of biodiversity as well as species by restoring land and water corridors (green and blue grid), preventing animal collisions and light pollution in connection with road infrastructure, enhancing Natura 2000 sites, and developing a sea plan and a species preservation strategy (a local ocellated lizard plan in particular);
- To prioritise renaturing by greening cities, restoring soils, incorporating nature and biodiversity in all projects and works, promoting ecological management, supporting collective vegetable gardens, and developing a bees and pollinators plan;
- To carry out training and awareness raising through participatory sciences, “Curious by nature” operations and the development of biodiversity expertise.

To do this, the MNCA has set up a unit comprising six biodiversity experts at the service of development and infrastructure project leaders, to carry out studies and provide technical expertise and advice on taking biodiversity into account from the design phase to site monitoring.

There are three main actions in the Plan:

- **Action 1, Planning in favour of biodiversity**, for the integration of green and blue infrastructure in urban planning in the metropolitan area. It takes into account ecological continuities: developing an ecological network and translating it into green and blue infrastructure in the urban plan, expertise and recommendations in development projects, and restoration operations (such as wildlife corridors).
- **Action 2, Local biodiversity management**. This includes a pilot operation for the temporary installation of biodiversity monitoring sensors in the town of Cagnes-sur-Mer to measure the impact on biodiversity of partially switching off public lighting from 11 p.m. to 5 a.m. Associated pilot operations concern: light pollution and biodiversity (a pilot test of installing amber LEDs favourable to bats, urban monitoring and biodiversity (development of bat sensors to evaluate the solutions implemented in the framework), and concept of a pilot eco-landscaped garden, among others.

- **Action 3, the project “Nature For City Life”** funded by the European Life programme incorporates NbS. In the search for solutions based on nature to develop, renovate and build (green roofs, wildlife corridors, etc.), “Nature and ecological continuities” working groups are planned, involving a variety of actors on the following themes: protection of valleys, buildings and avifauna, bats and land use planning (e.g. including nest boxes in the design of buildings).

This project also includes combating invasive alien species and promoting local plants (with production of a species guide and recommendations), together with marine biodiversity:

- Ongoing development of a Sea Plan and a Territorial Ecological Restoration Scheme (STERE), involving other aquatic environments:
- Study of aquatic environments and flood risk in the Tinée and Vésubie valleys;
- Natura 2000 inter-site partnerships at sea, development of ecological diving moorings and creation of underwater nurseries.



A global Nice plan to make the city centre greener. Six kilometres of green arteries will be born from the disappearance of the bus lanes thanks to the arrival of the tram. A project that should bring nature back to the heart of the streets. Nice is taking out the shovel and the soil this year to plant 10,296 trees. A thousand just to plant the bus lanes which will soon be transformed into paths for walking and cycling.

The project called “Nature in the heart of Nice” will last for several years. Six kilometres from east to west will be taken up by nature thanks to the arrival of tram line 2 at the port. The tracks will also be covered with grass and 2400 trees will cover the field. The cost of this project for the three axes has been estimated at 20 million euros. The development has started in 2019 and will go on until 2021.



Densifying the flowering:

Already crowned with four flowers by the label “villes et villages fleuris”, Nice aims at 60% more flowers. Hundreds of planters and structures will be installed throughout the city. Two parks will also be completely created, one in the Ray district, starting this year. The other along the Var, with the launch of the work at the beginning of 2020 to provide an area of 25 hectares to the west of the city. The Promenade des Anglais has not escaped the green wave, with 265 new trees and palms facing the sea. One can only hope that they will get rid of the weevil.

- 1,000 trees on the 3 green frames
- 2,400 trees planted on Tramway Line 2
- 385 trees in 28 city gardens
- 265 trees and palm trees on the Promenade des Anglais
- 52 fruit trees in 15 schools
- 150 trees on the banks of the Paillon
- 44 trees on avenue Borriglione, rue d'Angleterre and place Pierre Gautier
- 4,500 seedlings for the operation “1 child = 1 tree”.
- 1,500 saplings on the castle hill

Promoting citizen participation :

The people of Nice are at the heart of the approach to nature in the city through participatory flowering and the creation of shared gardens.

Documents

<http://www.nice.fr/fr/actualites/la-nature-au-coeur-de-nice/mairie?type=articles&parent=root>

| | |
|---|--|
| <p>ISSUES ADDRESSED Societal challenges Climate change / Water security / Disaster risk Human health / Economic and social development</p>  | |
| <p>CRITERIA 1. NbS effectively address societal challenges</p> | |
| INDICATORS | DESCRIPTION |
| 1.1 The most pressing societal challenges for rights holders and beneficiaries are prioritised | Yes, climate change especially is on the political agenda of the city, which has pioneered a model of sustainable development over the last 10 years that reconciles growth, jobs and respect for our planet. Nature and biodiversity are at the core of such a development model. |
| 1.2 The societal challenges addressed are clearly understood and documented | Yes, the Plan covers several societal challenges with biodiversity at its core. |
| 1.3 Human well-being outcomes arising from the NbS are identified, benchmarked and periodically assessed | To some extent yes. The MNCA has set up a nature and biodiversity monitoring centre that seeks to address human health and well-being. |
| <p>ISSUES ADDRESSED Design at scale City-wide</p> | |
| <p>CRITERIA 2. Design of NbS is informed by scale</p> | |
| INDICATORS | DESCRIPTION |
| 2.1 Design of NbS recognises and responds to the interactions between the economy, society and ecosystems | Yes, the plan is developed at the metropolitan scale with a strategic view. |
| 2.2 Design of NbS is integrated with other complementary interventions and seeks synergies across sectors | Yes, the plan seeks the complementarity of interventions, from biodiversity enhancement to city permeability so that the inhabitants and the territory can enjoy the beneficial effects of nature, by strengthening its partnerships to increase the synergy of actions and actors. |
| 2.3 Design of NbS incorporates risk identification and risk management beyond the intervention site | Yes, mainly from the perspective of flood risk management. |
| <p>ISSUES ADDRESSED Biodiversity net-gain</p> | |
| <p>CRITERIA 3. NbS result in net gain to biodiversity and ecosystem integrity</p> | |
| INDICATORS | DESCRIPTION |
| 3.1 NbS actions directly respond to evidence-based assessment of the current state of the ecosystem and prevailing drivers of degradation and loss | Yes, biodiversity is at the core of the Plan and the city has set up a nature and biodiversity monitoring centre. There are some pilot examples such as Pilot operation for the temporary installation of biodiversity monitoring sensors in the town of Cagnes-sur-Mer to measure the impact on biodiversity of partially switching off public lighting (11 p.m. to 5 a.m.). |
| 3.2 Clear and measurable biodiversity conservation outcomes are identified, benchmarked and periodically assessed | Yes, see above. |
| 3.3 Monitoring includes periodic assessments of unintended adverse consequences for nature arising from the NbS | Yes, citizen science and citizen engagement in monitoring schemes are used, as in "Curious by nature" operations and the development of biodiversity expertise. |

| INDICATORS | DESCRIPTION |
|--|--|
| <p>3.4 Opportunities to enhance ecosystem integrity and connectivity are identified and incorporated into the NbS strategy</p> | <p>Yes: Stopping biodiversity loss and making the territory more functional for species by maintaining or restoring ecological continuities; Preserving movement corridors for species and reservoirs of biodiversity, as well as conserving species: restoration of land and water corridors (green and blue grid), preventing animal collisions and light pollution in connection with road infrastructure, enhancing Natura 2000 sites, and developing a sea plan and a species preservation strategy (a local ocellated lizard plan in particular).</p> |
| <p>ISSUES ADDRESSED Economic feasibility</p> | |
| <p>CRITERIA 4. NbS are economically viable</p> | |
| INDICATORS | DESCRIPTION |
| <p>4.1 The direct and indirect benefits and costs associated with the NbS, who pays and who benefits, are identified and documented</p> | No evidence found. |
| <p>4.2 A cost-effectiveness study is provided to support the choice of NbS including the likely impact of any relevant regulations and subsidies</p> | No evidence found. |
| <p>4.3 The effectiveness of the NbS design is justified against available alternative solutions, taking into account any associated externalities</p> | No evidence found. |
| <p>4.4 NbS design considers a portfolio of resourcing options such as market-based, public sector, voluntary commitments and actions to support regulatory compliance</p> | No evidence found. |
| <p>ISSUES ADDRESSED Inclusive governance</p> | |
| <p>CRITERIA 5. NbS are based on inclusive, transparent and empowering governance processes</p> | |
| INDICATORS | DESCRIPTION |
| <p>5.1 A defined and fully agreed upon feedback and grievance resolution mechanism is available to all stakeholders before an NbS intervention can be initiated</p> | <p>The MNCA is committed to maintaining and developing environmental education actions within the framework of the Plan to reclaim nature and biodiversity, adopted on 8 November 2018, particularly axis 4, namely, "a communication to optimise the involvement of actors in favor of nature and biodiversity." In the European Nature for City Life programme and activities of the Natura 2000 sites, the MNCA "commits to maintaining and developing environmental education actions:</p> <ul style="list-style-type: none"> – by raising awareness and training stakeholders, elected officials and residents, through: <ul style="list-style-type: none"> • Workshops for elected officials and technicians, the goal of which is to create a common culture around nature in the city and its role in the fight against climate change through work on the introduction and/or protection of urban green spaces in development projects; • Workshops for residents, users and residents of neighbourhoods affected by a development project to make them aware of the role of nature in the city in the fight against climate change and to collect their expectations regarding the presence of green spaces in development projects; – by raising awareness among the general public and schools, through: <ul style="list-style-type: none"> • Workshops offered by the Maison de l'Environnement de Nice, as part of an environmental education and sustainable development programme; • Activities offered in the annual programme "Curious by nature", including organising guided tours and conferences, offered by the Environment Department of the MNCA, etc.); – by training the staff of the MNCA and the municipalities. |

| INDICATORS | DESCRIPTION |
|---|---|
| 5.2 Participation is based on mutual respect and equality, regardless of gender, age or social status, and upholds the right of Indigenous Peoples to Free Prior and Informed Consent (FPIC) | Yes, see above. |
| 5.3 Stakeholders who are directly and indirectly affected by the NbS have been identified and involved in all processes of the NbS intervention | Yes, see above. |
| 5.4 Decision-making processes document and respond to the rights and interests of all participating and affected stakeholders | Yes, by applying for the “Territory committed to nature” approach and by strengthening its partnerships to increase the synergy of actors. |
| 5.5 Where the scale of the NbS extends beyond jurisdictional boundaries, mechanisms are established to enable joint decision making by the stakeholders in those jurisdictions affected by the NbS | No evidence. |
| ISSUES ADDRESSED Balance trade-offs | |
| CRITERIA 6. NbS equitably balance trade-offs between achievement of their primary goal(s) and the continued provision of multiple benefits | |
| INDICATORS | DESCRIPTION |
| 6.1 The potential costs and benefits of associated trade-offs of the NbS intervention are explicitly acknowledged and inform safeguards and any appropriate corrective actions | No evidence. |
| 6.2 The rights to, usage of and access to land and resources, along with the responsibilities of different stakeholders are acknowledged and respected | No evidence. |
| 6.3 Established safeguards are periodically reviewed to ensure that mutually agreed trade-off limits are respected and do not destabilise the entire NbS | No evidence. |
| ISSUES ADDRESSED Adaptive management | |
| CRITERIA 7. NbS are managed adaptively, based on evidence | |
| INDICATORS | DESCRIPTION |
| 7.1 An NbS strategy is established and used as a basis for regular monitoring and evaluation of the intervention | Yes, a monitoring strategy covers various environmental and socio-economic aspects. The monitoring scheme includes installation of sensors. An example developed by the University of Aix–Marseille is the installation of six air quality / temperature / hygrometric sensors by Atmosud in 2019. |
| 7.2 A monitoring and evaluation plan is developed and implemented throughout the intervention lifecycle | The MNCA has set up a unit comprising six biodiversity experts at the service of development and infrastructure project leaders, to carry out studies and provide technical expertise and advice on taking biodiversity into account from the design phase to site monitoring. |
| 7.3 A framework for iterative learning that enables adaptive management is applied throughout the intervention lifecycle | No evidence found. |

ISSUES ADDRESSED
Mainstreaming

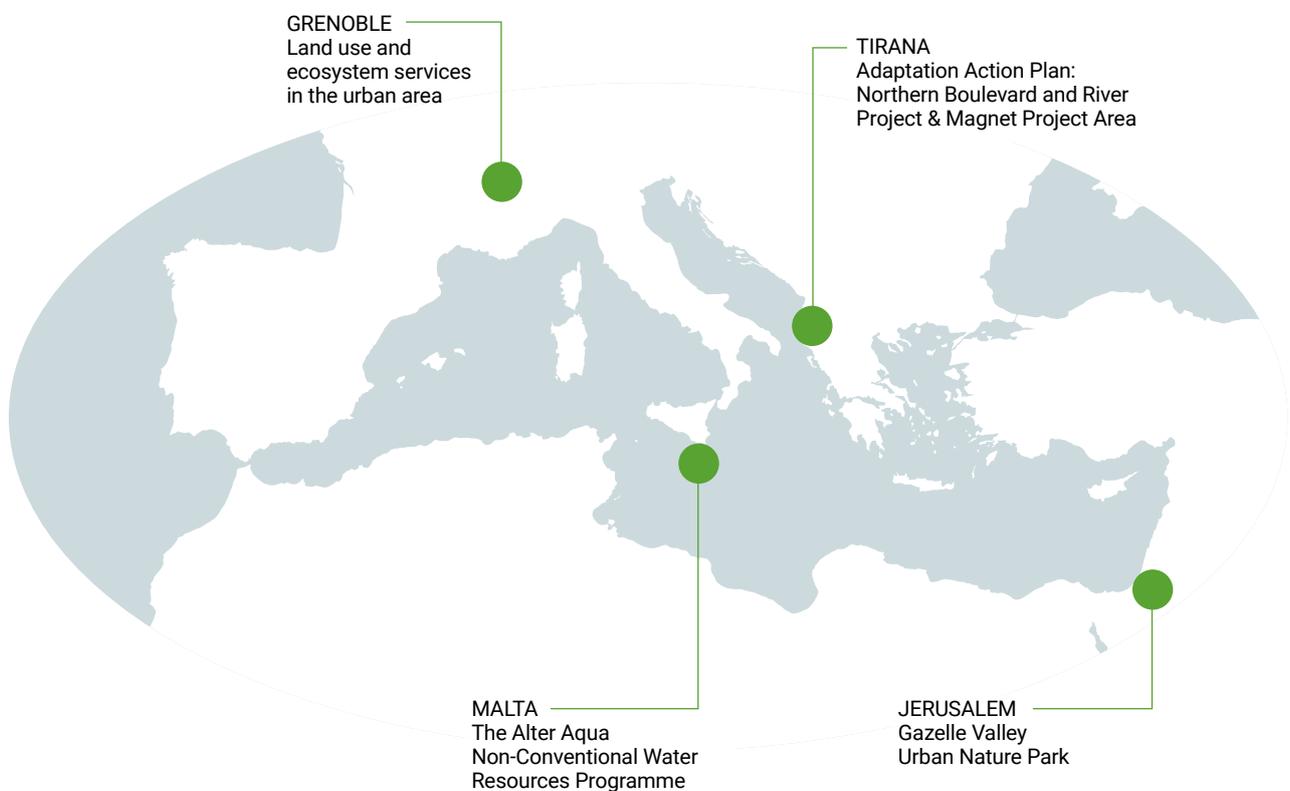
CRITERIA

8. NbS are sustainable and mainstreamed within an appropriate jurisdictional context

| INDICATORS | DESCRIPTION |
|---|---|
| 8.1 NbS design, implementation and lessons learnt are shared to trigger transformative change | Yes, incorporation of green and blue infrastructure into urban planning. |
| 8.2 NbS inform and enhance facilitating policy and regulation frameworks to support their uptake and mainstreaming | Yes, improvement of knowledge by creating a metropolitan atlas of biodiversity based in particular on the national "Municipal biodiversity atlas approach. Input to the Parc Naturel Régional des Préalpes d'Azur and Parc national du Mercantour. |
| 8.3 Where relevant, NbS contribute to national and global targets for human well-being, climate change, biodiversity and human rights, including the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) | Yes, NbS seem to contribute to local targets for climate change, biodiversity, and human well-being, but there is no detailed information on this subject, except for the intentions set out by Christian Estrosi (Mayor of Nice, President of the MNCA, Deputy President of the Région Sud Provence-Alpes-Côte d'Azur) in the introduction to the document "La Nature au coeur de Nice" [Nature in the heart of Nice]. |



TYPE 2
**NbS for climate change
and water resilience**





French Alps (France)

Land use and ecosystem services in the Grenoble urban area

OPERAs Project (2012–2017)



The French Alps exemplar aimed to analyse future land use trajectories and their effects on networks of biodiversity and ecosystem services for the Grenoble urban area. In particular, it aimed to:

1. Improve our understanding of mechanisms underpinning ecosystem services;
2. Analyse trade-offs and synergies between biodiversity, critical ecosystem services and territorial management; and
3. Facilitate the adoption of tools and concepts by stakeholders.

It supported the incorporation of the complexity of ecological functioning into debates on territorial planning and management.

Thinking in terms of ecosystem services and natural capital explicitly acknowledges our dependence on nature, and therefore the need for better protection and management of natural resources. As a result, these concepts have been adopted by policies, but the use of the concepts in practice is still in its infancy. The OPERAs project explored how and under what conditions these concepts could move beyond the academic domain towards practical implementation in support of sustainable ecosystem management.

The ESNET Project (FP7–2014–2017)



Aimed to analyse future land use trajectories and their effects on biodiversity and ecosystem services for the Grenoble urban area.

This dynamic motivated the Grenoble SCoT (territorial coherence plan) and underpinned critical issues for biodiversity and ecosystem services. As a project co-constructed with the multiple stakeholders involved in the management of the territory and its resources, ESNET built on their field knowledge, starting with the identification of the main issues linking the demand for ecosystem services with management and planning actions. These issues are structured by the need to reconcile ecological functioning and the uses and sharing of land and resources. The inherent complexity and multifunctionality of the territory mean that governance must be at the core of thinking on concerted management among all actors at the territorial scale.

The Connecting Nature Project – Horizon 2020 projects (2018–2021) *Bringing Cities to Life, Bringing Life into Cities*



<https://connectingnature.eu/>

Documents

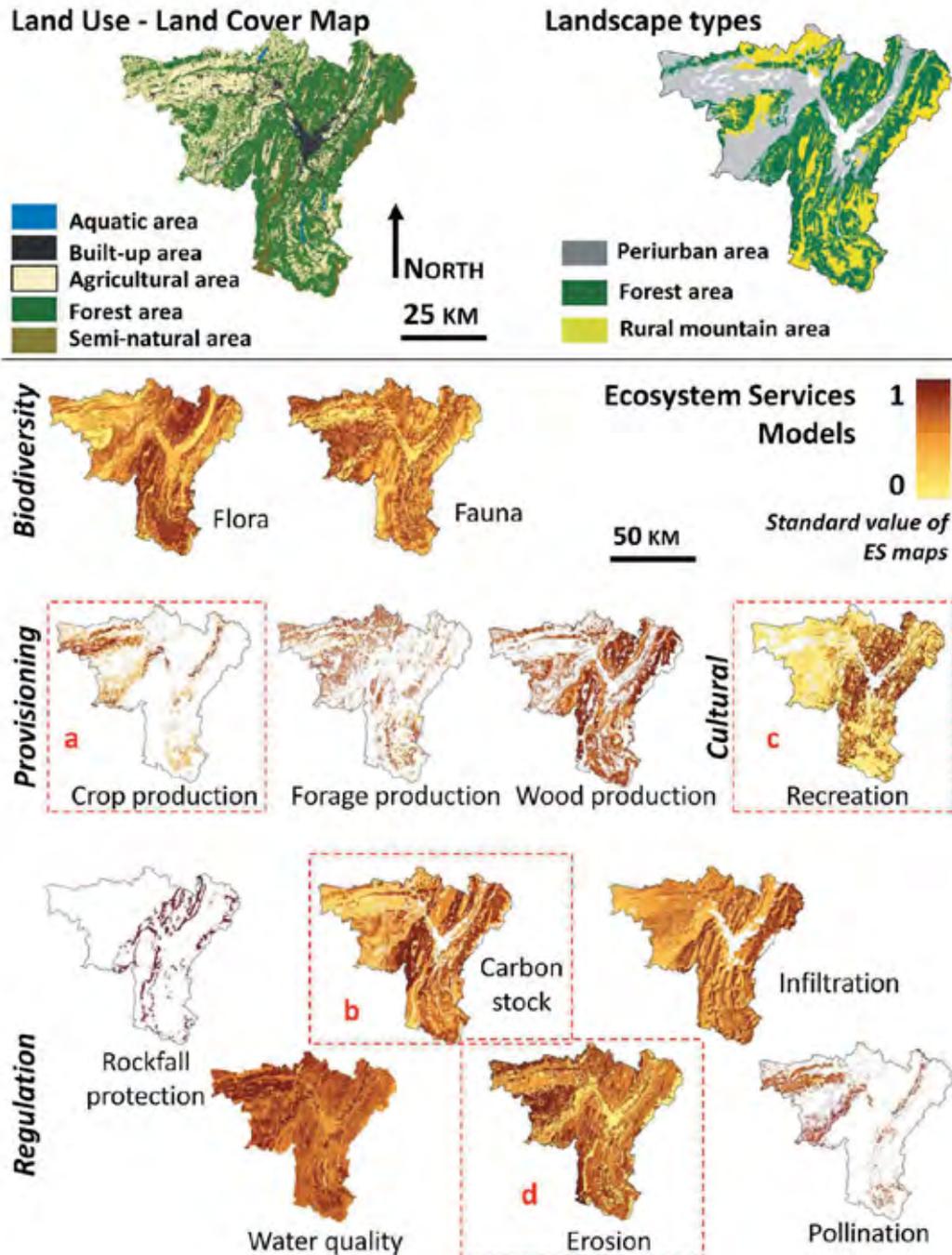
ESNET Project. Futur des réseaux de services écosystémiques dans la région urbaine de Grenoble (Future of ecosystem services networks in the Grenoble urban region): Consequences for the management of hydrosystems

Land use legacies: Land use and ecosystem service scenarios in the Grenoble urban area
<https://connectingnature.eu/oppla-case-study/17272>

Measuring ecosystem services: Guidance on developing ecosystem service indicators
https://www.unep-wcmc.org/system/dataset_file_fields/files/000/000/303/original/1850_ESI_Guidance_A4_WEB.pdf?1424707843

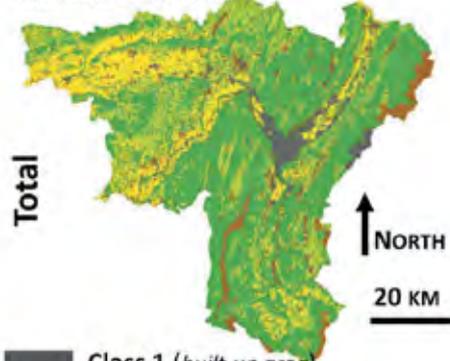
“This guidance report is underpinned by work carried out as part of the collaboration between the United Nations Environment Programme - World Conservation Monitoring Centre and the Council for Scientific and Industrial Research funded by SwedBio. The aim of the programme

was to enhance the development, use and uptake of indicators and approaches for assessing the consequences of changes in ecosystem services and their implications for society, human well-being and poverty alleviation, at national and local scale.”



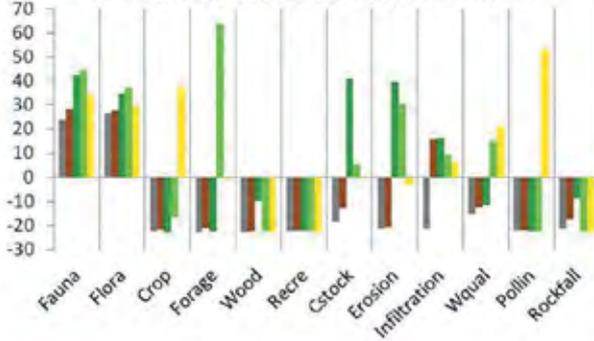
© IMAGE SOURCE: Mapping_ecosystem_services_bundles_in_a_heterogeneous.pdf

BUNDLE CLASS MAP



- Class 1 (built-up area)
- Class 2 (aquatic and seminatural area)

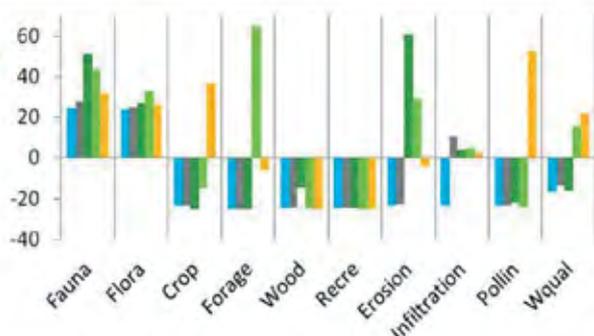
ES CONTRIBUTION TO BUNDLE CLASS



- Class 3 (forest area)
- Class 4 (grasslands)
- Class 5 (Crops)



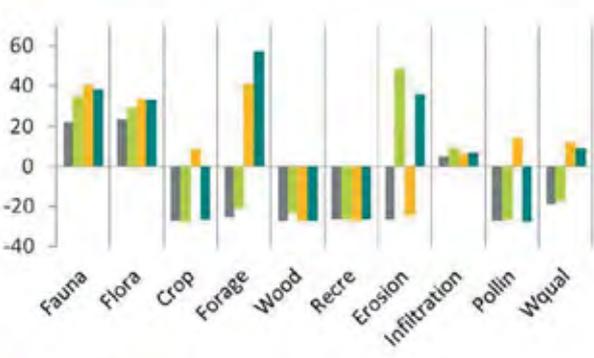
- Class 1 (aquatic and non use area)
- Class 2 (built-up area)
- Class 3 (forest and wooded area)



- Class 4 (long term grasslands)
- Class 5 (Crops)



- Class 1 (aquatic and built-up area)
- Class 2 (forest and wooded area)



- Class 3 (Crops and short term grasslands)
- Class 4 (permanent grasslands)

© IMAGE SOURCE: Mapping_ecosystem_services_bundles_in_a_heterogene.pdf

ISSUES ADDRESSED
Societal challenges

Human health / Economic and social development



CRITERIA

1. NbS effectively address societal challenges

| INDICATORS | DESCRIPTION |
|---|--|
| 1.1 The most pressing societal challenges for rights holders and beneficiaries are prioritised | The societal challenge most addressed is biodiversity and ecosystem services, which is considered the main driver of the intervention. Nevertheless, it is recognised that ecosystem services play an important role in supporting economic activity, development and general human well-being. Also, this project is perceived as crucial in facing the challenges of urbanisation in Grenoble to the detriment of agricultural areas, conservation of natural areas with high amenity and heritage value, and more generally dynamic economic development, as well as territorial inequalities. This framework aligned the project with human health and socio-economic development. |
| 1.2 The societal challenges addressed are clearly understood and documented | The societal challenges related to biodiversity and ecosystem services are clearly understood and documented; in fact they are specifically referenced in the modelling of land use and the biophysical modelling of ecosystem services. In terms of the biophysical modelling of ecosystem services, some relevant elements are included: prioritisation of ecosystem services and modelling methods: supply services, with a focus on timber production; regulation services, with a focus on the regulation of water quality (nitrogen); and cultural services, with a focus on recreational activities |
| 1.3 Human well-being outcomes arising from the NbS are identified, benchmarked and periodically assessed | Ecosystem services are vital to human survival and well-being, and the judicious management of the systems that produce these benefits is essential. Ecosystem service indicators are increasingly recognised as a key part of assessing whether such services are being managed appropriately and used sustainably. The ecosystem services approach highlights that the contribution of ecosystems to human well-being and activities is based on the use of resources and the functioning of interacting ecosystems. Going into detail, in this framework the human well-being outcomes are also analysed as cultural services, with a focus on recreational activities. Some references to the periodic assessment of this variable are reported, for instance in terms of the attractiveness of landscape. |

ISSUES ADDRESSED

Design at scale

City-wide / District / Urban acupuncture

CRITERIA

2. Design of NbS is informed by scale

| INDICATORS | DESCRIPTION |
|--|--|
| 2.1 Design of NbS recognises and responds to the interactions between the economy, society and ecosystems | The ecosystem services approach is the main driver. In this respect, these interactions are considered. |
| 2.2 Design of NbS is integrated with other complementary interventions and seeks synergies across sectors | The intervention is included in the SCoT for Grenoble (Le Schéma de Coherence Territoriale de la grande région de Grenoble). In addition, other concurrent projects have been identified that contribute to the same final goal. |
| 2.3 Design of NbS incorporates risk identification and risk management beyond the intervention site | In the risk analysis of the regulation services provided by ecosystems –specifically soil erosion control, protective forests and flood regulation– the prioritisation of ecosystem services and modelling methods are taken into account. |

| ISSUES ADDRESSED Biodiversity net-gain | |
|---|---|
| CRITERIA 3. NbS result in net gain to biodiversity and ecosystem integrity | |
| INDICATORS | DESCRIPTION |
| 3.1 NbS actions directly respond to evidence-based assessment of the current state of the ecosystem and prevailing drivers of degradation and loss | There is a specific assessment of this ecosystem variable in the ESNET project . |
| 3.2 Clear and measurable biodiversity conservation outcomes are identified, benchmarked and periodically assessed | We have found an evaluation of biodiversity conservation, based on the guideline Measuring ecosystem services: Guidance on developing ecosystem service indicators. This document was an output of a UNEP-WCMC project. |
| 3.3 Monitoring includes periodic assessments of unintended adverse consequences for nature arising from the NbS | No evidence found during the evaluation. |
| 3.4 Opportunities to enhance ecosystem integrity and connectivity are identified and incorporated into the NbS strategy | No evidence found during the evaluation. |
| ISSUES ADDRESSED Economic feasibility | |
| CRITERIA 4. NbS are economically viable | |
| INDICATORS | DESCRIPTION |
| 4.1 The direct and indirect benefits and costs associated with the NbS, who pays and who benefits, are identified and documented | The economic benefits of ecosystem services are referred to in the documentation. However, specific information on the economic consequences is not found in the documentation. |
| 4.2 A cost-effectiveness study is provided to support the choice of NbS including the likely impact of any relevant regulations and subsidies | No evidence found during the evaluation. |
| 4.3 The effectiveness of the NbS design is justified against available alternative solutions, taking into account any associated externalities | No evidence found during the evaluation. |
| 4.4 NbS design considers a portfolio of resourcing options such as market-based, public sector, voluntary commitments and actions to support regulatory compliance | Several scenarios have been considered (in the OPERA project, for instance) including spatial and explicit information regarding the evaluation of: – Four scenarios which explore changes in the different types of land use and agricultural and forest management to support the spatially explicit modelling of land-cover changes; – Four scenarios of social values, public policy and economic context which produce markedly varied land use and landscape patterns. These differences particularly concern patterns of urban expansion, forest expansion and the associated losses of agricultural land. |

| ISSUES ADDRESSED Inclusive governance | |
|---|--|
| CRITERIA 5. NbS are based on inclusive, transparent and empowering governance processes | |
| INDICATORS | DESCRIPTION |
| 5.1 A defined and fully agreed upon feedback and grievance resolution mechanism is available to all stakeholders before an NbS intervention can be initiated | The projects provide stakeholders with user-friendly tools and instruments to enable them to apply ecosystem services science and knowledge in their field of work, in order to engage stakeholders and build a community around the outputs across science, policy and practice. Some variables to be highlighted about the stakeholders' involvement are the following: – Participatory Scenario Planning process for downscaling regional normative scenarios; – 19 institutions from 6 economic sectors were involved throughout a two-year process. Over twenty stakeholders representing the main management and decision-making bodies for land planning, agriculture, forestry, nature conservation, tourism and water management were involved. |
| 5.2 Participation is based on mutual respect and equality, regardless of gender, age or social status, and upholds the right of Indigenous Peoples to Free Prior and Informed Consent (FPIC) | The stakeholders include those involved in territorial and resource management, such as representatives of the government, local authorities, NGOs and regional natural parks. They represent the main economic sectors that have an impact on land use and natural resources: urban planning, agriculture, forestry, tourism and water management. The project details the high added value and mutual benefits of an interdisciplinary and participatory approach, based on active collaboration with local actors involved in the management of the territory and its resources, and with strong sectoral and geographic expertise. The active participation of stakeholders in the design and evaluation of the work facilitated the integration of local needs and expectations. |
| 5.3 Stakeholders who are directly and indirectly affected by the NbS have been identified and involved in all processes of the NbS intervention | This process has taken place, nevertheless, no specific reference to citizen participation is made. |
| 5.4 Decision-making processes document and respond to the rights and interests of all participating and affected stakeholders | No evidence found during the evaluation. |
| 5.5 Where the scale of the NbS extends beyond jurisdictional boundaries, mechanisms are established to enable joint decision making by the stakeholders in those jurisdictions affected by the NbS | No evidence found during the evaluation. |
| ISSUES ADDRESSED Balance trade-offs | |
| CRITERIA 6. NbS equitably balance trade-offs between achievement of their primary goal(s) and the continued provision of multiple benefits | |
| INDICATORS | DESCRIPTION |
| 6.1 The potential costs and benefits of associated trade-offs of the NbS intervention are explicitly acknowledged and inform safeguards and any appropriate corrective actions | This example aims to: 1) offer a better knowledge of mechanisms underpinning ecosystem services; 2) analyse trade-offs and synergies between biodiversity, critical ecosystem services and territorial management and 3) facilitate appropriation of tools and concepts by stakeholders. Knowledge of the synergies and trade-offs between ecosystem services is essential to manage ecosystems sustainably, and to maximise benefits for society. ESNET's key originality was its focus on the concept of ecosystem services networks, which aims to account for interactions (positive and negative) among ecosystem services from a functional perspective, thereby highlighting cause-effect relationships. |

| INDICATORS | DESCRIPTION |
|--|--|
| <p>6.2 The rights to, usage of and access to land and resources, along with the responsibilities of different stakeholders are acknowledged and respected</p> | <p>No evidence found during the evaluation.</p> |
| <p>6.3 Established safeguards are periodically reviewed to ensure that mutually agreed trade-off limits are respected and do not destabilise the entire NbS</p> | <p>No evidence found during the evaluation.</p> |
| <p>ISSUES ADDRESSED Adaptive management</p> | |
| <p>CRITERIA 7. NbS are managed adaptively, based on evidence</p> | |
| INDICATORS | DESCRIPTION |
| <p>7.1 An NbS strategy is established and used as a basis for regular monitoring and evaluation of the intervention</p> | <p>The evaluation is based on previous data and modelling of different future scenarios, for instance in terms of the evaluation of the dynamics of significant contrasting uses according to the planning choices which underlie them, in particular with regard to urban sprawl and forest expansion for the most contrasting scenarios. In terms of specific monitoring, the three major scientific challenges of the evaluation are: 1. Quantifying the capacity of the hydrosystem to provide ecosystem services of interest to its actors; 2. Identifying and analysing the synergies and spatial compromises between ecosystem services, or sets of ecosystem services; 3. Carry out an evaluation of sets of ecosystem services with local stakeholders to analyse their future trajectories. Nevertheless, the monitoring of the benefits in terms of their effectiveness in addressing societal challenges is not explicitly specified in the document.</p> |
| <p>7.2 A monitoring and evaluation plan is developed and implemented throughout the intervention lifecycle</p> | <p>In the project there is a combination of modelling and mapping. In terms of modelling: the DINAMICA platform is used to represent recent land use change dynamics and major future trajectories under different scenarios, such as urban consolidation or the continuation of peri-urban sprawl. Such land use and management projections will provide data for the modelling of changes for 11 ecosystem services: 3 provisioning services, 2 cultural services and 6 abiotic and biotic regulation services, as well as for terrestrial vertebrate and plant diversity. Mapping was an essential method (ESNET) and was supported by multi-source mapping of land use / land cover at fine spatial (15 m) and typological (especially for agricultural ecosystems) resolution. This mapping was done for the baseline (2010) and for four scenarios for 2040. These scenarios were co-produced with stakeholders by adapting, downscaling and making spatially explicit the Montagne 2040 scenarios of the Rhône-Alpes administrative region. Nevertheless, there is no explicit reference to continuous monitoring after implementation.</p> |
| <p>7.3 A framework for iterative learning that enables adaptive management is applied throughout the intervention lifecycle</p> | <p>No evidence found during the evaluation.</p> |

| ISSUES ADDRESSED Mainstreaming | |
|---|---|
| CRITERIA | |
| 8. NbS are sustainable and mainstreamed within an appropriate jurisdictional context | |
| INDICATORS | DESCRIPTION |
| 8.1 NbS design, implementation and lessons learnt are shared to trigger transformative change | The results of the projects are well suited for the mainstreaming of ecosystem services in local decision making and land management at a time when ecosystem services are emerging as an important topic in national (and European) policy. Due to the time and resources invested in the various interventions, advanced coordination and previous experience of transdisciplinary research are essential to obtain value from learnt lessons. |
| 8.2 NbS inform and enhance facilitating policy and regulation frameworks to support their uptake and mainstreaming | The main challenges for mainstreaming the ecosystem services concepts in practical usage are related to the various trade-offs that arise from: <ul style="list-style-type: none"> - The multiple functions and uses of ecosystems at a given location; - The time period over which functions and use are being considered; - The effects of local decision making elsewhere; and - The different ways in which social/cultural and market/non-market values are assigned to ecosystem services. |
| 8.3 Where relevant, NbS contribute to national and global targets for human well-being, climate change, biodiversity and human rights, including the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) | No evidence found during the evaluation. |



© IMAGE SOURCE: <https://openstax-project.eu/node/323>



Jerusalem (Israel) Gazelle Valley Urban Nature Park



This initiative was established in the context of Jerusalem's Local Action for Biodiversity legacy project for the International Decade of Biodiversity. The main goal is to protect the rapidly declining native mountain gazelle population in an urban nature park, combining wildlife conservation, local recreation and education.

Gazelle Valley, the foremost urban nature site in Israel, opened to the public in 2015 after a decade-long public campaign to save the inner-city greenspace from development. It replicates natural habitat. The main purpose of the initiative is adapting the park by means of:

- Maintaining a breeding population of mountain gazelles (*Gazella gazella*) in the park, in order to reintroduce members of this endangered species into the wild;
- Creating a functioning urban ecosystem and promoting biodiversity, both flora – the park has over 500 species of plant life, many of which were reintroduced in an effort to recreate the original flora that existed in the Jerusalem hills prior to the 20th century – and fauna, with a variety of arthropods, reptiles, amphibians and small mammals, as well as over 170 species of migratory and resident birds; the park is also a Greek tortoise shelter, receiving tortoises that have been in domestic environments;

- Raising civil awareness of the importance of natural ecosystems through specific events and providing facilities for social gathering in urban nature (picnic spots and outdoor classrooms), which is particularly important in 2020; it is conceptualised as a social hub;
- Enabling the whole park to act as a run-off water filter collecting rainwater from dry river valleys, with an extensive meadow at the lowest point to allow the collected water to seep into the aquifer;
- Maintaining an innovative water circulation system that connects a series of ponds with the main lake., so that collected rainwater is pumped back upstream and is recirculated through the valley. The water is ecologically cleansed by plants to make it safe.

In view of these specific actions, the ecosystem services approach appears to be the main driver, but climate change adaptation is also a factor, specifically in terms of the water management system designed for the park. Finally, social interaction and education activities are very much a part of the key goals, devoted primarily to increasing awareness of biodiversity, wildlife protection, climate change and ecosystem management.



Documents

Jerusalem Gazelle Valley Park website:

<https://www.gazelle-valley.com/> <https://www.gazelle-valley.com/eng/>

Jerusalem Gazelle Valley Park Conservation Program 282–283, Climate Change and Cities: Second Assessment Report of the Urban Climate Change Research Network

<https://uccrn.ei.columbia.edu/arc3.2>

Original Gazelle Valley master plan (Hebrew)

<https://www.gazelle-valley.com/wp-content/uploads/2020/05/%D7%AA%D7%9B%D7%A0%D7%99%D7%AA-%D7%90%D7%91-%D7%A2%D7%9E%D7%A7-%D7%94%D7%A6%D7%91%D7%90%D7%99%D7%9D-%D7%99%D7%A8%D7%95%D7%A9%D7%9C%D7%99%D7%9D-%D7%9C%D7%90%D7%AA%D7%A8.pdf>

Gazelle Valley bird ringing constant effort site (CES) scheme 2012–2020 result summary (Hebrew)

<https://www.gazelle-valley.com/wp-content/uploads/2020/10/CES-%D7%91%D7%A2%D7%9E%D7%A7-%D7%94%D7%A6%D7%91%D7%90%D7%99%D7%9D-%D7%9E%D7%A0%D7%99%D7%A8%D7%99%D7%AA-080920.pdf>

Mountain Gazelle raw population data – Gazelle Valley urban nature park

<https://www.gazelle-valley.com/wp-content/uploads/2020/10/Mountain-Gazelle-raw-population-data-Gazelle-Valley-urban-nature-park.pdf>

Full flora and fauna list – Gazelle Valley urban nature park

<https://www.gazelle-valley.com/wp-content/uploads/2020/10/flora-and-fauna-gazelle-valley.pdf>

Mammal biodiversity survey along Jerusalem's main corridor of urban nature

https://www.gazelle-valley.com/wp-content/uploads/2020/10/FootprintProject_1.docx

The Gazelle Valley amphibian survey

https://www.gazelle-valley.com/wp-content/uploads/2020/10/AmphibianProject_1.docx

| ISSUES ADDRESSED Societal challenges Climate change / Food security / Water security / Disaster risk / Human health / Economic and social development | |
|--|--|
|  | |
| CRITERIA 1. NbS effectively address societal challenges | |
| INDICATORS | DESCRIPTION |
| 1.1 The most pressing societal challenges for rights holders and beneficiaries are prioritised | Biodiversity and the conservation of wildlife are key drivers of the intervention. In this respect, creating a natural urban ecosystem is the main goal of the project. This specific goal is related to climate change and disaster risk, which was the ethos behind the water management system. Social development is part of the societal challenges addressed by the project, since it intends to provide a social hub for gathering and developing educational activities aligned with the goals of the park. |
| 1.2 The societal challenges addressed are clearly understood and documented | The park is an important resource for the adjacent densely populated neighbourhoods. Volunteers of all ages and abilities make up the team who carry out most of the maintenance needs. The Park provides an important outdoor retreat from urban stress. |
| 1.3 Human well-being outcomes arising from the NbS are identified, benchmarked and periodically assessed | Management of the park is routinely evaluated by the municipality of Jerusalem, which funds the entire project. The Society for the Protection of Nature in Israel (SPNI) manages the Park and has to re-apply annually for its position and prove the site is being run to the satisfaction of the inhabitants of Jerusalem. |
| ISSUES ADDRESSED Design at scale City-wide / District / Urban acupuncture | |
| CRITERIA 2. Design of NbS is informed by scale | |
| INDICATORS | DESCRIPTION |
| 2.1 Design of NbS recognises and responds to the interactions between the economy, society and ecosystems | No evidence. |
| 2.2 Design of NbS is integrated with other complementary interventions and seeks synergies across sectors | The Park is managed jointly by the municipality of Jerusalem and the SPNI. The park works in close cooperation with the Jerusalem Bird Observatory, within the SPNI community in Jerusalem. Tours, seminars and conventions are regularly held in the park, hosting companies and decision makers from across the country. The Gazelle Valley Park is leading several joint projects with organisations such as: <ul style="list-style-type: none"> – Israel Nature and Parks Authority – participates in both the gazelle reintroduction programme and the shelter for displaced wild Greek tortoises operating in the park; – Hebrew University of Jerusalem (HUJI) – two current research projects are in progress within the park, in close cooperation with the park's personnel; – Ramat Ha Nativ nature park – takes part in the gazelle reintroduction programme as the first destination for the preliminary reintroduction attempts. Data and samples from the park are shared with researchers studying the mountain gazelles at Ramat Ha Nativ; – Several schools, both City run and private, including special education programmes, take part in regular weekly volunteering sessions; – A national youth volunteering initiative of the Ministry of Education encourages high school students to fulfil a considerable number of hours volunteering. |
| 2.3 Design of NbS incorporates risk identification and risk management beyond the intervention site | No evidence found during the evaluation. |

| ISSUES ADDRESSED Biodiversity net-gain | |
|---|---|
| CRITERIA 3. NbS result in net gain to biodiversity and ecosystem integrity | |
| INDICATORS | DESCRIPTION |
| 3.1 NbS actions directly respond to evidence-based assessment of the current state of the ecosystem and prevailing drivers of degradation and loss | A comprehensive survey of flora and fauna was conducted before the Park's formal establishment and influenced the infrastructure planning for the park and the botanic enrichment programme, which rehabilitates the site's ecosystem and contributes to the conservation of endangered flora. |
| 3.2 Clear and measurable biodiversity conservation outcomes are identified, benchmarked and periodically assessed | An ongoing CES bird-ringing research project has been taking place on site since 2012, in order to evaluate the effects achieved by the habitat rehabilitation efforts. |
| 3.3 Monitoring includes periodic assessments of unintended adverse consequences for nature arising from the NbS | An amphibian survey performed by HUJI researchers was launched in order to assess the possible negative effects some interventions in the park had on two threatened amphibian species. |
| 3.4 Opportunities to enhance ecosystem integrity and connectivity are identified and incorporated into the NbS strategy | Evaluations of the numbers and diversity of migratory birds is routinely carried out by staff and volunteers, alongside the data collected by the CES ringing research. These efforts are aimed at evaluating the growing diversity of breeding bird species on site, including the locally critically endangered ferruginous duck (<i>Aythya nyroca</i>). Another research project aims at evaluating the dispersal of small to medium-sized mammals into the city's urban nature sites from the surrounding mountains. Gazelle Valley nature park is one of the main sites this research will focus on. |
| ISSUES ADDRESSED Economic feasibility | |
| CRITERIA 4. NbS are economically viable | |
| INDICATORS | DESCRIPTION |
| 4.1 The direct and indirect benefits and costs associated with the NbS, who pays and who benefits, are identified and documented | No evidence found during the evaluation – pending. |
| 4.2 A cost-effectiveness study is provided to support the choice of NbS including the likely impact of any relevant regulations and subsidies | No evidence found during the evaluation. |
| 4.3 The effectiveness of the NbS design is justified against available alternative solutions, taking into account any associated externalities | As mentioned in section 1.3, the current park administration appointed by the SPNI must reapply periodically in an open tender, and their performance is evaluated and compared to the offers made by competing organisations. |
| 4.4 NbS design considers a portfolio of resourcing options such as market-based, public sector, voluntary commitments and actions to support regulatory compliance | Volunteers are an integral part of the management of the park, receiving the public, monitoring the wildlife and undertaking routine maintenance. During recent lockdown periods volunteers have been given special passes to allow the Park to continue to function. |

| ISSUES ADDRESSED Inclusive governance | |
|---|---|
| CRITERIA 5. NbS are based on inclusive, transparent and empowering governance processes | |
| INDICATORS | DESCRIPTION |
| 5.1 A defined and fully agreed upon feedback and grievance resolution mechanism is available to all stakeholders before an NbS intervention can be initiated | No evidence found during the evaluation. |
| 5.2 Participation is based on mutual respect and equality, regardless of gender, age or social status, and upholds the right of Indigenous Peoples to Free Prior and Informed Consent (FPIC) | All materials and signage are produced and published in three languages: Hebrew, Arabic and English. Staff and volunteers of all abilities are encouraged to become part of the Gazelle Valley Community. |
| 5.3 Stakeholders who are directly and indirectly affected by the NbS have been identified and involved in all processes of the NbS intervention | The Gazelle Valley Park was established in its current form following years of public participation in the planning process. A resident's convention from the adjacent neighbourhoods gave the public the opportunity to voice their opinions and eventually vote for their preferred design for the park, which was subsequently implemented. |
| 5.4 Decision-making processes document and respond to the rights and interests of all participating and affected stakeholders | There are detailed minutes in Hebrew of the planning processes for the park both in the Municipality and in Public Participation (available on request). |
| 5.5 Where the scale of the NbS extends beyond jurisdictional boundaries, mechanisms are established to enable joint decision making by the stakeholders in those jurisdictions affected by the NbS | Not applicable. |
| ISSUES ADDRESSED Balance trade-offs | |
| CRITERIA 6. NbS equitably balance trade-offs between achievement of their primary goal(s) and the continued provision of multiple benefits | |
| INDICATORS | DESCRIPTION |
| 6.1 The potential costs and benefits of associated trade-offs of the NbS intervention are explicitly acknowledged and inform safeguards and any appropriate corrective actions | The water run-off management was the driving force behind the support by the local water authority for the infrastructure of the Park. Since copious amounts of rainwater have been collected by the natural filtration systems, there has been no local flooding. Seasonal flooding of the area had been damaging to road infrastructure as well as personal property. This has now ceased because of NbS. |
| 6.2 The rights to, usage of and access to land and resources, along with the responsibilities of different stakeholders are acknowledged and respected | The stakeholders in this case are acknowledged as the mountain gazelles. Two-thirds of the park is set aside for their use only. The public may visit the other third but the defining line between the public and the wildlife is only a thin cord. This is a new concept to many of the visitors and is often a test of self-restraint. |
| 6.3 Established safeguards are periodically reviewed to ensure that mutually agreed trade-off limits are respected and do not destabilise the entire NbS | No evidence found during the evaluation. |

| ISSUES ADDRESSED Adaptive management | |
|---|--|
| CRITERIA 7. NbS are managed adaptively, based on evidence | |
| INDICATORS | DESCRIPTION |
| 7.1 An NbS strategy is established and used as a basis for regular monitoring and evaluation of the intervention | The park staff and management apply established policies regarding the mountain gazelles, the water circulation system, and the botanic enrichment and endangered flora conservation programmes. Any intervention only takes place after considering its possible repercussions and with regard to crucial time periods for the ecosystem such as breeding periods, the dry and wet seasons, and the various annual cycles of the plantlife. |
| 7.2 A monitoring and evaluation plan is developed and implemented throughout the intervention lifecycle | The main subject of the intervention – the local population of mountain gazelles – is being closely monitored by staff members employed for this sole purpose. Varied tracking options are in use, and veterinary professionals, government officials and university researchers are included in the decision-making processes regarding the gazelles. |
| 7.3 A framework for iterative learning that enables adaptive management is applied throughout the intervention lifecycle | No evidence found during the evaluation. |
| ISSUES ADDRESSED Mainstreaming | |
| CRITERIA 8. NbS are sustainable and mainstreamed within an appropriate jurisdictional context | |
| INDICATORS | DESCRIPTION |
| 8.1 NbS design, implementation and lessons learnt are shared to trigger transformative change | The park's master plan, as well as documents containing specific information about the flora and fauna, are publicly available on the park's website. |
| 8.2 NbS inform and enhance facilitating policy and regulation frameworks to support their uptake and mainstreaming | No evidence found during the evaluation. |
| 8.3 Where relevant, NbS contribute to national and global targets for human well-being, climate change, biodiversity and human rights, including the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) | The Gazelle Valley Urban Nature Park is used as a successful example of NbS for other projects both within Jerusalem and nationwide. |



© IMAGE SOURCE: <https://www.gazelle-valley.com/>; <https://www.gazelle-valley.com/>



Malta. The Alter Aqua. Non-Conventional Water Resources Programme (NCWRP)



Malta is acknowledged as the water-poorest country in Europe. With limited freshwater resources, further depleted due to climate change impacts, a dense population and a rising water demand, the Maltese Islands suffer from water scarcity and heavily depend on desalination to tackle their water deficit. Responding to the need to bridge the gap between water demand and supply, along with promoting a new water culture, locally and nationally, the Alter Aqua Programme aims to advance the utilisation of non-conventional water resources, such as rain-, storm- and greywater, for secondary uses, as a sustainable, cost-effective way to enhance water availability and adapt to climate change. In parallel, it raises awareness among educational and technical community audiences, the authorities and the wider public, towards a more responsible attitude to water saving.

The Alter Aqua programme is an ongoing multi-stakeholder initiative started in 2011, designed and implemented by the Global Water Partnership – Mediterranean, in partnership with the Energy and Water Agency within the Ministry for Energy, Enterprise and Sustainable Development, the Ministry for Gozo and the Eco-Gozo Project, as well as The Coca-Cola Foundation and General Soft Drinks Co. Ltd.

The programme was funded through a \$1.4 million investment by the Coca-Cola Foundation, the philanthropic arm of The Coca-Cola Company. The programme aimed at mobilising non-conventional water resources to increase water availability in a sustainable, cost-effective way and promote a new water culture, at both local and national level. In this framework, the programme has implemented significant green infrastructure works, including installation and reinstatement of non-conventional water resource systems such



© IMAGE SOURCE: https://www.gwp.org/globalassets/global/ncwrp/gwp_brochure_body_for_web.pdf

as rainwater harvesting, stormwater management and greywater reuse systems in selected public buildings and areas. Through its practical actions the programme has positively impacted the lives of 65,000 people (around 15% of the population) in the Maltese Islands by collecting and reusing more than 19 million litres of water annually – equivalent to the monthly water consumption of over 1,000 families in Malta. Its applications to install greywater recycling systems and reinstate rainwater harvesting reservoirs have opened up new opportunities to collect rainwater for use in landscape irrigation and new forestation projects as well as green roof irrigation.

The programme included various awareness-raising campaigns and capacity building towards sustainable water use. The target groups for these actions were school students, teachers, local authorities, local technicians and national NGOs. The current phase (2019–2021) focuses on engaging college and university students and young professionals in studying and applying non-conventional water resources and nature based solutions for improved water management in the Maltese Islands. This could definitely represent a best practice example of sustainable water resource management in Mediterranean countries and regions.

Documents

Good Practice Example 21: The Alter Aqua - Non-Conventional Water Resources Programme in Malta. www.gwpmed.org/NCWR

GRETA - "Green infrastructure: Enhancing biodiversity and ecosystem services for territorial development"- ESPON <https://www.espon.eu/green-infrastructure>

ReNature: Promoting research excellence in nature-based solutions for innovation, sustainable economic growth and human well-being in Malta. <http://renature-project.eu/>



© IMAGE SOURCE: https://www.gwp.org/globalassets/global/mwr/gwp_brochure_body_for_web.pdf

| ISSUES ADDRESSED Societal challenges Climate change / Food security / Water security / Disaster risk / Human health / Economic and social development | | |
|--|---|--|
| CRITERIA 1. NbS effectively address societal challenges | | |
| INDICATORS | DESCRIPTION | |
| 1.1 The most pressing societal challenges for rights holders and beneficiaries are prioritised | Yes, the programme focused mainly on the following challenges: Protecting biodiversity Mitigating and/or adapting to climate change Promoting health and well-being Enhancing the green economy Enhancing urban attractiveness. | |
| 1.2 The societal challenges addressed are clearly understood and documented | Yes, there have been intense educational and awareness-raising campaigns. Science in The City showcases the success of the Alter Aqua Project capacity-building and awareness-raising activities for: <ul style="list-style-type: none"> – The local and regional councils of the Maltese Islands to enhance their capacity to manage non-conventional water resources; – National NGOs; – Youth and particularly tertiary education students and young professionals; – The general public, to sensitise them to sustainable water use and the NCWR solutions that can be easily and cost-effectively applied at domestic and community level. | |
| 1.3 Human well-being outcomes arising from the NbS are identified, benchmarked and periodically assessed | No evidence found during the evaluation. | |

ISSUES ADDRESSED

Design at scale

City-wide / District / Urban acupuncture

CRITERIA

2. Design of NbS is informed by scale

| INDICATORS | DESCRIPTION |
|---|---|
| <p>2.1 Design of NbS recognises and responds to the interactions between the economy, society and ecosystems</p> | <p>The programme has a holistic approach towards non-conventional water resources management, aiming to:</p> <p>PROMOTE the use of non-conventional water resources, especially rainwater harvesting and greywater recycling, through demo applications, as a useful method for increasing local water availability and climate change adaptation;</p> <p>CULTIVATE a new culture of sustainable water use and saving and the utilisation of non-conventional water resources among targeted stakeholders and the general public, through education, training, capacity building and awareness raising;</p> <p>SHARE knowledge and experiences on non-conventional water resources management, as good practice with replication potential in further water-scarce areas.</p> <p>The following works were completed during the first phase of the programme (2011–2013):</p> <ul style="list-style-type: none"> - Installation of 4 innovative rainwater harvesting systems in 4 public schools on the Island of Gozo. The rainwater collected is used for toilet flushing. - Reinstatement of 5 existing rainwater harvesting systems in 3 schools and on the Experimental Farm. The rainwater collected is used for toilet flushing in the schools and for irrigation on the farm. - Construction of rubble walls in Ramla Valley, the largest and most fertile valley in the Island of Gozo. The rubble walls prevent silting and ensure that the dams are kept in good condition, capturing as much rainwater as possible, thus also allowing aquifer recharge. - Installation of a greywater recycling system at the Gozo football stadium. The greywater treated is used for irrigation of the green football pitch. <p>The works completed in the second phase of the programme (2013–2018) are the following:</p> <ul style="list-style-type: none"> - Installation of a greywater recycling system and a green roof at the Malta College of Arts, Science and Technology (MCAST). The treated greywater is used to irrigate the green roof. The greywater system, besides being functional, will also serve for educational purposes for students studying Water Technologies. - Installation of 2 greywater recycling systems, one system at the Qrendi School for students with disabilities, recycling the water from the jacuzzi used for physiotherapy to irrigate the school garden, and the other at the National Swimming Pool, recycling greywater generated in the showers for toilet flushing. - Reinstatement of the rainwater harvesting reservoir at the Ministry of Gozo. The collected rainwater run-off water is used for landscaping irrigation and new forestation projects. - Reinstatement of a rainwater harvesting reservoir in San Anton's Palace, the Presidential Residence. <p>In the third phase of the Programme (2019–2021), the following works have already been completed:</p> <ul style="list-style-type: none"> - Reinstatement of a historical reservoir in Fort Rinella, for landscaping - Reinstatement of 4 rainwater harvesting reservoirs in Kalkara Gardens for landscaping. Runoff water is used for landscaping irrigation and new forestation projects. |

| INDICATORS | DESCRIPTION |
|--|---|
| 2.2 Design of NbS is integrated with other complementary interventions and seeks synergies across sectors | Yes, most of the installations were implemented in existing public buildings. Besides contributing to the local water budget, what is more important is the demonstration effect. A number of different technologies, at different scales and in various public facilities are showcased, many of them innovative and pioneering for the Maltese Islands. By selecting highly frequented as well as landmark public buildings and areas accessible to the general public for NCWR applications, insights are obtained into their specificities and benefits, making their adoption possible at domestic, community and national level. For example, the application of a greywater recycling system in MCAST, coupled with a green roof, not only reuses the greywater, which has become a resource instead of waste, but also offers the benefits of a green roof: a greener, cooler and more pleasant environment. Moreover, it serves for educational purposes, as students of water-related technologies study the process, while biology and biodiversity students also assess the potential of greywater recycling for green roof irrigation and the green roofs' effect on the microclimate. |
| 2.3 Design of NbS incorporates risk identification and risk management beyond the intervention site | No evidence found during the evaluation. |
| ISSUES ADDRESSED Biodiversity net-gain | |
| CRITERIA 3. NbS result in net gain to biodiversity and ecosystem integrity | |
| INDICATORS | DESCRIPTION |
| 3.1 NbS actions directly respond to evidence-based assessment of the current state of the ecosystem and prevailing drivers of degradation and loss | Biodiversity was not contemplated as the main challenge. The main challenges were water run-off control and the increase of water storage and reuse. Nevertheless, biodiversity will potentially receive a positive impact even though this has not been monitored. |
| 3.2 Clear and measurable biodiversity conservation outcomes are identified, benchmarked and periodically assessed | No evidence found during the evaluation. |
| 3.3 Monitoring includes periodic assessments of unintended adverse consequences for nature arising from the NbS | No evidence found during the evaluation. |
| 3.4 Opportunities to enhance ecosystem integrity and connectivity are identified and incorporated into the NbS strategy | No evidence found during the evaluation. |
| ISSUES ADDRESSED Economic feasibility | |
| CRITERIA 4. NbS are economically viable | |
| INDICATORS | DESCRIPTION |
| 4.1 The direct and indirect benefits and costs associated with the NbS, who pays and who benefits, are identified and documented | The estimated amount of water annually collected and reused from all green infrastructure works implemented within Alter Aqua in 2011–2015 amounts to 16.7 million litres, equivalent to the monthly water consumption of 1,000 families in Malta. This represents an important contribution to the local water budget. |
| 4.2 A cost-effectiveness study is provided to support the choice of NbS including the likely impact of any relevant regulations and subsidies | The socio-economic costs of a lack of water sources are already weighing heavily on the domestic, industrial, agricultural and tourism sectors of the economy. The interventions were implemented in public buildings and public areas accessible to the general public. On the one hand this represents the Maltese Government's ambition to set the standard and promote the use of NbS, while implementing NbS in public buildings guarantees variability in economic and regulatory terms. |

| INDICATORS | DESCRIPTION |
|--|--|
| <p>4.3 The effectiveness of the NbS design is justified against available alternative solutions, taking into account any associated externalities</p> | <p>No evidence found during the evaluation.</p> |
| <p>4.4 NbS design considers a portfolio of resourcing options such as market-based, public sector, voluntary commitments and actions to support regulatory compliance</p> | <p>The programme contemplates complementary actions aimed at maximising benefits (economic, social and environmental), as well as complying with the regulatory framework.</p> |
| <p>ISSUES ADDRESSED Inclusive governance</p> | |
| <p>CRITERIA 5. NbS are based on inclusive, transparent and empowering governance processes</p> | |
| INDICATORS | DESCRIPTION |
| <p>5.1 A defined and fully agreed upon feedback and grievance resolution mechanism is available to all stakeholders before an NbS intervention can be initiated</p> | <p>The Alter Aqua programme is an ongoing multi-stakeholder initiative launched in 2011, designed and implemented by the Global Water Partnership – Mediterranean, in partnership with the Energy and Water Agency within the Ministry for Energy, Enterprise and Sustainable Development, the Ministry for Gozo and the Eco-Gozo Project, as well as The Coca-Cola Foundation and General Soft Drinks Co. Ltd.</p> |
| <p>5.2 Participation is based on mutual respect and equality, regardless of gender, age or social status, and upholds the right of Indigenous Peoples to Free Prior and Informed Consent (FPIC)</p> | <p>Particularly relevant is the extraordinary effort put into educational activities:</p> <ul style="list-style-type: none"> - Alter Aqua educational material on NCWR has been developed by the secretariat of the Mediterranean Information Office for Environment, Culture and Sustainable Development 's Mediterranean Education Initiative on Environment and Sustainability (MIO-ECSDE/MEdIES), in collaboration with Nature Trust Malta, to raise awareness and educate students in sustainable water use. - Educational activities and hands-on sessions have been organised for students in the Maltese Islands aiming at raising awareness on NCWR, sustainable water use, etc. More than 3,200 students participated in these educational activities during the 1st phase of implementation (2011–2013). In the 2nd phase of the Alter Aqua programme, 3,440 students participated in educational activities. - The Alter Aqua video game has been produced. It is a helpful interactive tool to raise awareness and sensitise primary and secondary school students on the use of non-conventional water resources and water saving in everyday life. - Local teachers and educators have been instructed in how to apply the Alter Aqua educational material. In the 1st phase of the Alter Aqua Programme 255 persons were instructed. In the 2nd phase of the Alter Aqua Programme 277 persons were instructed. - Educational activities have enhanced related technical skills of local workers and technical services of local authorities, on traditional know-how as well as on modern technologies for NCWR schemes and water related innovations. - Capacity building for Youth, focusing on two main streams, technical and non-technical, has allowed college and university students and young professionals to develop their skills in the methodology, design and applications of NCWR management. Students and young professionals in social sciences improved their skills in communicating the value of water, Malta's water heritage, etc. |
| <p>5.3 Stakeholders who are directly and indirectly affected by the NbS have been identified and involved in all processes of the NbS intervention</p> | <p>No evidence found during the evaluation.</p> |
| <p>5.4 Decision-making processes document and respond to the rights and interests of all participating and affected stakeholders</p> | <p>The Alter Aqua educational material is the result of a fruitful cooperation between the EkoSkola Team and the MEdIES team from Greece, with the intention to raise awareness and sensitise the educational community on the very crucial issue of NCWR across the Mediterranean, and particularly in the Maltese Islands.</p> <p>The material has been developed based on the principles of Education for Sustainable Development (ESD). It aspires to be a flexible tool in the hands of the keen educator aiming to develop the imagination, curiosity, creativity, observation, skills and knowledge of his/her students, as well as a "new water ethic" attitude in line with sustainability.</p> |

| INDICATORS | DESCRIPTION |
|--|---|
| 5.5 Where the scale of the NbS extends beyond jurisdictional boundaries, mechanisms are established to enable joint decision making by the stakeholders in those jurisdictions affected by the NbS | No evidence found during the evaluation. |
| ISSUES ADDRESSED Balance trade-offs | |
| CRITERIA 6. NbS equitably balance trade-offs between achievement of their primary goal(s) and the continued provision of multiple benefits | |
| INDICATORS | DESCRIPTION |
| 6.1 The potential costs and benefits of associated trade-offs of the NbS intervention are explicitly acknowledged and inform safeguards and any appropriate corrective actions | No evidence found during the evaluation. |
| 6.2 The rights to, usage of and access to land and resources, along with the responsibilities of different stakeholders are acknowledged and respected | This is definitely one of the key premises of the programme. |
| 6.3 Established safeguards are periodically reviewed to ensure that mutually agreed trade-off limits are respected and do not destabilise the entire NbS | No evidence found during the evaluation. |
| ISSUES ADDRESSED Adaptive management | |
| CRITERIA 7. NbS are managed adaptively, based on evidence | |
| INDICATORS | DESCRIPTION |
| 7.1 An NbS strategy is established and used as a basis for regular monitoring and evaluation of the intervention | Regular monitoring of the water quantity is being undertaken. |
| 7.2 A monitoring and evaluation plan is developed and implemented throughout the intervention lifecycle | No evidence found during the evaluation. |
| 7.3 A framework for iterative learning that enables adaptive management is applied throughout the intervention lifecycle | No evidence found during the evaluation. |

ISSUES ADDRESSED
Mainstreaming

CRITERIA

8. NbS are sustainable and mainstreamed within an appropriate jurisdictional context

INDICATORS

DESCRIPTION

8.1 NbS design, implementation and lessons learnt are shared to trigger transformative change

Absolutely. One of the key premises of the programme was providing evidence and demonstration cases to trigger changes and boost non-conventional water use in private sectors and private housing as well. In this respect, the general public were made aware of sustainable water use and the NCWR solutions that can be easily and cost-effectively applied at domestic and community level. A widespread campaign for dissemination was also set up. Awareness raising and dissemination of programme results is carried out through targeted events and/or conferences. Some highlights include the following:

- The Alter Aqua Programme was included as an example of best practice for climate change adaptation through the use of NCWR and alternative water resources in the Mediterranean and was presented by GWP-Med at the 6th World Water Forum (12–16 March 2012, Marseille, France).
- A National Consultation on Non-Conventional Water Resources Management in the Maltese Islands was organised by Alter Aqua in partnership with the Ministry for Energy and Health (Valletta, 6 May 2014)
- An Alter Aqua Outreach Event was held in Gozo (5 May 2014)
- An Alter Aqua corner and hands-on activities were organised at various events: Lejlet Lapsi - Notte Gozitana (Gozo, 10–12 May 2013); World Water Day in Malta (Valletta, 22 March 2014); Opening of the Heritage Trail (Pembroke, 3–4 May 2014).
- Presentations have been given at various conferences, meetings and forums: 5th Beirut Water Week (22–23 May 2014); Global Environmental Change in the Mediterranean City and the Role of Global Earth Observations Conference, (Athens, 10–11 June 2014); annual GWP Consulting Partners Meeting (Trinidad, 27–28 June 2014); Rainwater Harvesting Knowledge Exchange Forum (Saint Lucia, Caribbean, 21–23 October 2014); Greening the Islands Conference on the Italian island of Pantelleria (30–31 October 2014); Malta Water Week (Valletta, 25–26 March, 2015).
- The dedicated website www.gozowater.com was developed to tell the stories of people involved in the Programme, as well as to testify to the Programme's contribution to Gozo's water scarcity challenge.

8.2 NbS inform and enhance facilitating policy and regulation frameworks to support their uptake and mainstreaming

No evidence found during the evaluation.

| INDICATORS | DESCRIPTION |
|--|---|
| <p>8.3 Where relevant, NbS contribute to national and global targets for human well-being, climate change, biodiversity and human rights, including the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP)</p> | <p>In Malta there is not one single overarching national policy or strategy for green infrastructure (GI). This is in compliance with the EU Green Infrastructure Strategy (2013), as this strategy is not a directive and therefore it is not mandatory to transpose it into national law in the Member States. However, several of Malta's policies explicitly address green infrastructure and connectivity, and the government has introduced various policies to preserve Malta's biodiversity.</p> <p>The Green Economy Action Plan (2015) could be one of the policy instruments to which the Alter Aqua programme could contribute. This draft action plan sets out the government's vision for the green economy in Malta, focusing particularly on achieving sustainable growth, the effective use of resources, ensuring ecosystem resilience and enhancing social equity. A range of Action Points, which aim at stimulating the transition towards a green economy, is also included in the document (Ministry for Sustainable Development, the Environment and Climate Change, 2015).</p> <p>For spatial planning, the Planning authority in Malta has had a Strategic Plan for the Environment and Development since 2015. This policy document is a tool to enhance greening of open spaces, developing ecological corridors and improving the quality of life in urban areas (the Planning Authority, 2018a). The Alter Aqua programme is definitely in line with it.</p> <p>Although biodiversity is not the key driver of the AlterAqua programme, it is worth mentioning that Malta's National Biodiversity Strategy and Action Plan 2012–2020 includes five policy goals with 20 action tasks that should be fulfilled by 2020. The strategy aims to integrate GI within spatial planning policies, and it identifies GI as one of the main options for improving ecosystems and their services. The policy document is viewed as a driver to enhance Malta's biodiversity, as well as the 2020 global and EU targets for biodiversity.</p> <p>Another GI-related policy document is the National Climate Change Adaptation Strategy (adopted in 2012). This document states the importance of the conservation of habitats, ecosystems and biodiversity as core elements of climate change adaptation (action 17) and specifies that cost benefit analyses and environment impact assessments should be used as tools to fulfil these tasks (Ministry for Resources and Rural Affairs, 2012, p.17).</p> |

Workshop with stakeholders



© IMAGE SOURCE: <https://www.energywateragency.gov.mt/news/workshops-as-part-of-the-alter-aqua-programme/>



Tirana (Albania)

Adaptation Action Plan: Northern Boulevard and River project & Magnet project area



The adaptation action plan for Tirana focused on three steps in close relation to one another:

1. Evaluation of general adaptation options regarding most of the existing and future risks that have been identified concerning vulnerable sectors, objects and areas as a result of the vulnerability assessment;
2. Survey of selected representative situations (case studies) and development of example solutions or adaptation options; and
3. Development of an action plan summarising all potential adaptation options for the different fields and sectors.

Seven case study areas were selected for this plan, three of which are highlighted as examples of good practice:

Number 5, Tirana River project:

Ongoing project for the restoration of the Tirana River aiming at flood risk mitigation, improvement of the banks, and new recreation and housing areas. Climate change adaptation actions in Tirana mainly address informal settlements along the

Tirana River; flood risks; waste and river pollution problems. The most important development project in Tirana is the restoration of the Tirana River and its flood plain. There is a high potential for upgrading the situation, and now there are ongoing redevelopment activities for the river, housing and land use.

Number 6, Northern Boulevard project :

Ongoing project for the improvement and development of the northern area of Tirana city centre up to the Tirana River in the north (see figure 2). Also, the connections of the city centre will be improved and a new Boulevard, housing areas, business areas and a green corridor are being developed.

Number 7, Magnet project area:

Ongoing development of a new quarter in the west of Tirana city centre. The whole block is subject to new investment, housing, businesses, car parks and green space. The focus is on sustainable, climate friendly solutions and adapted design and constructions, involving experience of climate-oriented urban development.

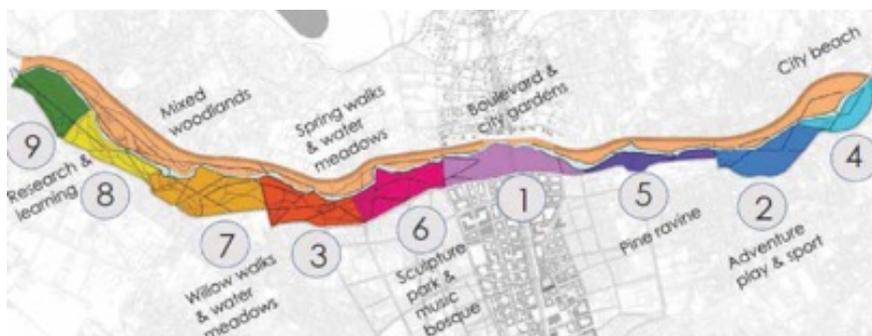


Figure 1. Tirana River project

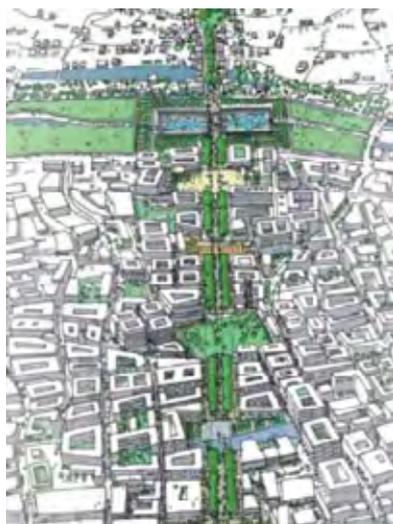


Figure 2. Northern Boulevard project



© IMAGE SOURCE: <https://www.oneworlds.com/our-works/tirana-northern-boulevard-river-project-masterplan>

Documents

RESEARCH ARTICLE (Open Access): Climate Change Adaptation Actions in Tirana. JAMARBER MALLTEZI (Department of Agroenvironment and Ecology, Agricultural University of Tirana, Tirana, Albania), ROMEO HANXHARI (Municipality of Tirana, Tirana, Albania), GAVROSH ZELA (Research and technological organization (RTO) based in Spain), SULEJMAN SULÇE (Research and technological organization (RTO) based in Spain)
http://ajas.ubt.edu.al/wp-content/uploads/2018/05/5_MALLTEZI-pp-102-111.pdf

Sustainable City Platform

https://sustainablecities.eu/transformative-actions-database/?c=search&action_id=eu2ii6rw

| ISSUES ADDRESSED Societal challenges Climate change / Disaster risk / Human health / Economic and social development | |
|---|--|
|  | |
| CRITERIA 1. NbS effectively address societal challenges | |
| INDICATORS | DESCRIPTION |
| 1.1 The most pressing societal challenges for rights holders and beneficiaries are prioritised | Climate change and Disaster risk management are assessed not only as a reaction to flooding but also in terms of heat waves. Also, Human health (in terms of social development and thermal stress) and Economic development are challenges that are relevant in the project. |
| 1.2 The societal challenges addressed are clearly understood and documented | The Adaptation Action Plan of Tirana is the framework and climate change is the key driver, including disaster risk management (floods, high temperatures and heat waves and poor air circulation). Nevertheless, other societal challenges, like human health and socio-economic development, are also understood and documented. The Tirana Climate Change Adaptation Action Plan indicates that the main challenges in Tirana are: Urban sprawl: The structural form of the city and the distribution and density of land uses have a profound effect on the overall efficiency and performance of the city's physical and community infrastructure systems. While Tirana's centre has the vibrancy of a dense cosmopolitan city, towards the edges of the city we find the legacy of recent periods of uncontrolled growth and informal settlements. If left uncontrolled, the city's growth could take the form of continuing sprawl, leading to rising infrastructure costs, longer commuting times, destruction of the natural environment and productive agricultural areas, and overall rising energy and transport fuel consumption. Open green space: The Territorial Urban Plan of Tirana indicates that the ratio of open green space per 100,000 inhabitants is only 4.6 ha. This is a low value, and inhabitants have complained about the lack of green areas within their neighbourhoods, indicating this is a local issue for many city areas. Pollution of water bodies: The Tirana River in the north and the Lana River in the south are the two main receiving points for city sewage and drainage. However, there is no water treatment plant in Tirana [...]. For comparison, the water quality recorded is more than 50% worse than the effluent quality of a typical wastewater treatment plant in Europe. Biodiversity: Biodiversity quality data is limited for Tirana for both terrestrial and aquatic ecology. Anecdotal evidence indicates that Tirana's biodiversity quality is poor. |
| 1.3 Human well-being outcomes arising from the NbS are identified, benchmarked and periodically assessed | No evidence found during the evaluation. |
| ISSUES ADDRESSED Design at scale City-wide / District / Urban acupuncture | |
| CRITERIA 2. Design of NbS is informed by scale | |
| INDICATORS | DESCRIPTION |
| 2.1 Design of NbS recognises and responds to the interactions between the economy, society and ecosystems | The initiative (and the highlighted projects) considered provides an integrated vision of the following aspects: Economy: development and new investments in business areas, adapted design and constructions; Society: new recreation and housing areas; Ecosystems: restoration of the Tirana River banks and flood plains, reduction of waste and river pollution problems, development of a green corridor, green areas, and promotion of climate friendly designs. |

| INDICATORS | DESCRIPTION |
|--|--|
| <p>2.2 Design of NbS is integrated with other complementary interventions and seeks synergies across sectors</p> | <p>Tirana Municipality cooperated with the GIZ-funded Climate Change Adaptation Project in order to integrate climate change adaptation (CCA) into their management and planning processes within the different sectors of the city administration and into cross-cutting activities like spatial planning and strategic project development.</p> |
| <p>2.3 Design of NbS incorporates risk identification and risk management beyond the intervention site</p> | <p>One of the pillars of the Tirana Adaptation Action Plan is focused on risk management, mainly of extreme weather events (like heat waves or heavy precipitation), and vulnerability analysis. Also, future risks and opportunities are assessed: climate change might increase future risks, but also may offer future opportunities. The assessment builds on the identified current vulnerability (see chapter 4.1) and the projected climate change trends (see chapter 3.3). Finally, a risk analysis is carried out for specific examples: Example 2: Water courses – flood risk in spatial planning.</p> |
| <p>ISSUES ADDRESSED Biodiversity net-gain</p> | |
| <p>CRITERIA 3. NbS result in net gain to biodiversity and ecosystem integrity</p> | |
| INDICATORS | DESCRIPTION |
| <p>3.1 NbS actions directly respond to evidence-based assessment of the current state of the ecosystem and prevailing drivers of degradation and loss</p> | <p>The actions respond to evidence-based assessment of the past (since the early 20th century) and current state of the weather (mainly temperatures and precipitation) in Tirana, while considering climate change scenarios too. The Adaptation Action Plan refers to both the results of the vulnerability assessment and the ongoing projects of the municipality. The focus was on improving the existing processes in the light of CCA needs, rather than on developing new processes.</p> |
| <p>3.2 Clear and measurable biodiversity conservation outcomes are identified, benchmarked and periodically assessed</p> | <p>No evidence found during the evaluation.</p> |
| <p>3.3 Monitoring includes periodic assessments of unintended adverse consequences for nature arising from the NbS</p> | <p>The implementation and monitoring of CCA actions are indicated in chapter 6 of the Tirana CCA Action Plan: The purpose of monitoring the implementation of the CCA action plan is to understand whether the project or activity delivers the planned benefits and to be able to adjust the measures and activities according to potentially changing conditions and new knowledge. Furthermore, the findings from the monitoring process should be reflected in a long-term adaptation strategy and in new adaptation measures as well as future planning. Monitoring Step 3: Assessment criteria and checks have been established to measure a wide range of objectives. These are specific for different situations, dependent not only on the local natural and technical background but also on the experts and decision makers in charge. To assess the degree to which these objectives have been attained, the working group might use structured goals.</p> |
| <p>3.4 Opportunities to enhance ecosystem integrity and connectivity are identified and incorporated into the NbS strategy</p> | <p>NbS actions are intended to improve the integration and connectivity of different areas. So, some examples of best practice in the Tirana Northern Boulevard and River Project are green corridors in coordination with housing and business areas (N–S & E–W)</p> |

| ISSUES ADDRESSED Economic feasibility | |
|---|--|
| CRITERIA 4. NbS are economically viable | |
| INDICATORS | DESCRIPTION |
| 4.1 The direct and indirect benefits and costs associated with the NbS, who pays and who benefits, are identified and documented | The improvement in the quantity and quality of green spaces and biodiversity in Tirana may provide a number of environmental, economic and social benefits. Some of them are: Climate change mitigation and adaptation: Green spaces may provide a range of mitigation and adaptation services, including: a) Provision of greater carbon capture and storage, thus reducing the risk of climate change; b) Protection of biodiversity in Tirana, enabling terrestrial ecosystems to remain habitable by a variety of plant and animal species; and c) Protection of Tirana's urban and rural areas of high economic value from changing weather patterns such as increased floods and heat waves. The improvement of green infrastructure through all Green Spaces & Biodiversity actions will enhance the quality perceived by our citizens, thus increasing the value that they place upon green spaces in terms of: a) Recreation and outdoor leisure activities, such as children's playgrounds in pocket parks and leisure areas along the restored lakes around Tirana; b) Improved health and well-being resulting from additional physical activity from cycling and walking along trails in green corridors and the Metrobosco, reducing health service costs; c) Increased cohesion and empowerment of the community through community ownership, management and use of green spaces, as well as improved image of place through the attractiveness of outdoor spaces. There is also a cost analysis for each action: see the Financial and Economic Assessment. |
| 4.2 A cost-effectiveness study is provided to support the choice of NbS including the likely impact of any relevant regulations and subsidies | No evidence found during the evaluation. |
| 4.3 The effectiveness of the NbS design is justified against available alternative solutions, taking into account any associated externalities | No evidence found during the evaluation. |
| 4.4 NbS design considers a portfolio of resourcing options such as market-based, public sector, voluntary commitments and actions to support regulatory compliance | No evidence found during the evaluation. |
| ISSUES ADDRESSED Inclusive governance | |
| CRITERIA 5. NbS are based on inclusive, transparent and empowering governance processes | |
| INDICATORS | DESCRIPTION |
| 5.1 A defined and fully agreed upon feedback and grievance resolution mechanism is available to all stakeholders before an NbS intervention can be initiated | The Environmental Policies and Environmental Education department has coordinated the activities in Tirana in order to receive feedback on the interventions. A working group comprising representatives of all relevant directorates and sectors carried out a vulnerability assessment and developed an action plan. The focus was on two main variables: – The City administration approves jointly developed measures to be incorporated in the city's planning and management processes. – The capacities of selected representatives and decision makers (like councillors, etc.) are developed to follow up the implementation of the developed measures after setting up the action plan. The interim results provide guidance for the political and administrative work in the city incorporating other politics and plans. |

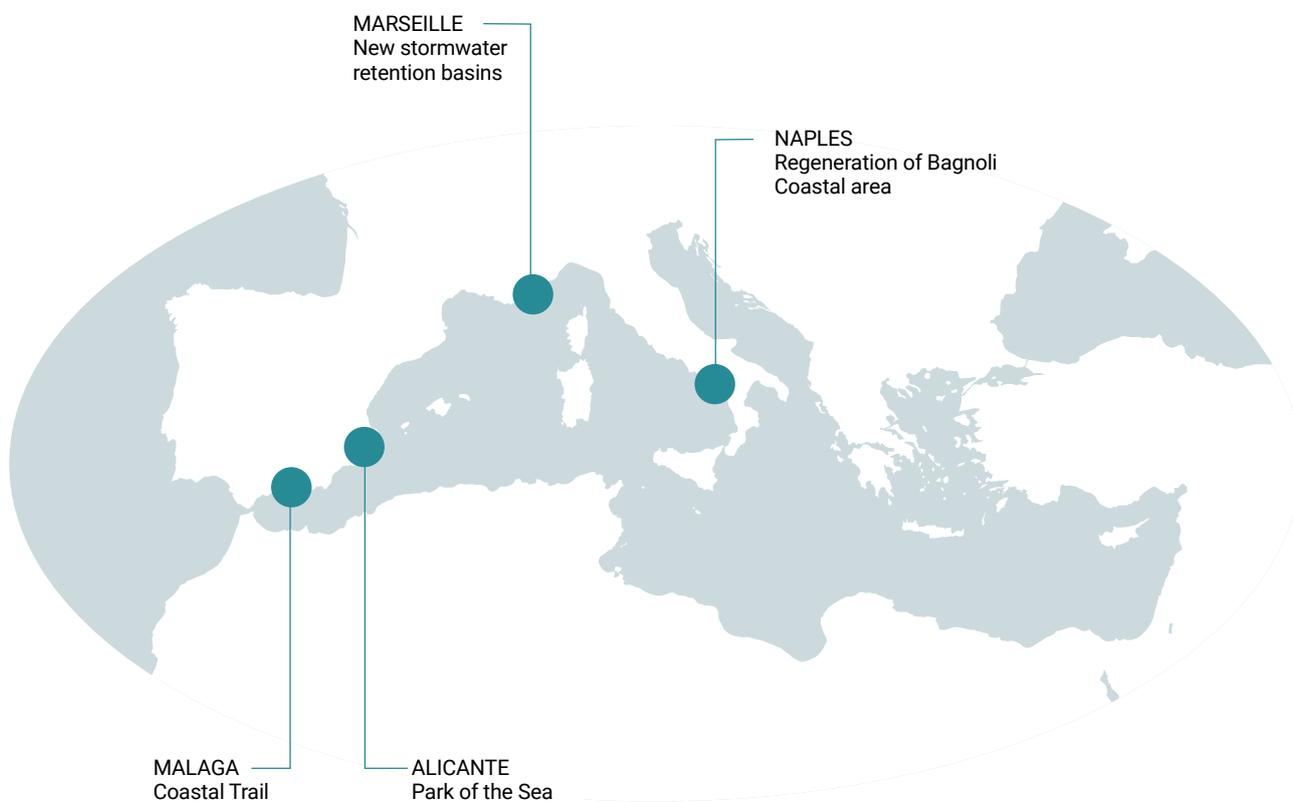
| INDICATORS | DESCRIPTION |
|--|---|
| 5.2 Participation is based on mutual respect and equality, regardless of gender, age or social status, and upholds the right of Indigenous Peoples to Free Prior and Informed Consent (FPIC) | The participatory approach that is presented is a top-down approach. So, based on the existing information, the citizens and other stakeholders have not been included in a horizontal participatory process. |
| 5.3 Stakeholders who are directly and indirectly affected by the NbS have been identified and involved in all processes of the NbS intervention | The stakeholders have been organised in a working group. |
| 5.4 Decision-making processes document and respond to the rights and interests of all participating and affected stakeholders | No evidence found during the evaluation. |
| 5.5 Where the scale of the NbS extends beyond jurisdictional boundaries, mechanisms are established to enable joint decision making by the stakeholders in those jurisdictions affected by the NbS | No evidence found during the evaluation. |
| ISSUES ADDRESSED Balance trade-offs | |
| CRITERIA 6. NbS equitably balance trade-offs between achievement of their primary goal(s) and the continued provision of multiple benefits | |
| INDICATORS | DESCRIPTION |
| 6.1 The potential costs and benefits of associated trade-offs of the NbS intervention are explicitly acknowledged and inform safeguards and any appropriate corrective actions | No evidence found during the evaluation. |
| 6.2 The rights to, usage of and access to land and resources, along with the responsibilities of different stakeholders are acknowledged and respected | No evidence found during the evaluation. |
| 6.3 Established safeguards are periodically reviewed to ensure that mutually agreed trade-off limits are respected and do not destabilise the entire NbS | No evidence found during the evaluation. |
| ISSUES ADDRESSED Adaptive management | |
| CRITERIA 7. NbS are managed adaptively, based on evidence | |
| INDICATORS | DESCRIPTION |
| 7.1 An NbS strategy is established and used as a basis for regular monitoring and evaluation of the intervention | The implementation and monitoring of CCA actions are indicated in chapter 6 of the Tirana CCA Action Plan (See 3.3. indicator). |
| 7.2 A monitoring and evaluation plan is developed and implemented throughout the intervention lifecycle | No evidence found during the evaluation. |
| 7.3 A framework for iterative learning that enables adaptive management is applied throughout the intervention lifecycle | No evidence found during the evaluation. |

| ISSUES ADDRESSED Mainstreaming | |
|---|---|
| CRITERIA 8. NbS are sustainable and mainstreamed within an appropriate jurisdictional context | |
| INDICATORS | DESCRIPTION |
| 8.1 NbS design, implementation and lessons learnt are shared to trigger transformative change | It is explicitly mentioned that NbS allow the city administration to improve decision making and planning related to adaptation to the potential impacts of climate change: The activities in Tirana are embedded in a wider international framework to allow an exchange of experiences, to mutually learn from others' approaches and to raise international political awareness on the progress being made on CCA in the Western Balkans. They are part of a trilateral cooperation scheme with Belgrade and Podgorica on one hand and also aim at including Tirana's advanced approach in the European Network "Mayors Adapt". |
| 8.2 NbS inform and enhance facilitating policy and regulation frameworks to support their uptake and mainstreaming | Project actions are perceived not as a "stand-alone policy". The results are guidance for the political and administrative work in the city in terms of delivering improved urban planning and investment decisions regarding the long-term challenges of climate change. |
| 8.3 Do relevant NbS contribute to national and global targets for human well-being, climate change, biodiversity and human rights, including the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), and how? | No evidence found during the evaluation. |





TYPE 3
NbS for coastal resilience
in a context of rising sea levels





Marseille (France)

New stormwater retention basins



The initiative is a combination of projects that took place between 2014 and 2018 with a total budget of 185 million euros. One of the key actions included the construction of 5 water retention basins totalling 127,000 m³. One of the interventions was planned in Calanques National Park.

The funding for the interventions came mainly from the public regional budget, the public local authority's budget and corporate investment. In the event of severe thunderstorms, sewage could not cope, and part of the water was indirectly discharged into the sea without going through sewage treatment plants. To prevent this from happening, five new stormwater retention basins were developed. This was one of the most important projects of recent years in terms of environmental protection. Over five years, 185 million euros-worth of major works were undertaken, including actions to preserve or restore the natural environment, such as establishing warning stations on the coast and rivers, promoting the growth of *Cystoseira algae* (which provide shelter and feeding habitat for many species of coastal fish) in Cortiou and creating shelters for fish in ports. (Source: Naturvation project).

Project objectives:

- "The construction of 5 retention basins will make it possible to regulate rainwater and to reduce the pollution rate too" (Ref. 1);
- Stop run-off entering the ocean and preventing people from swimming due to pollution (Refs. 1 and 2);
- Preserve the habitat of aquatic life and its environment (including access to food) (Ref. 1);
- Health, tourism and economic value (Ref. 2).

Implementation activities:

- "25 operations will be carried out according to a very precise schedule for the period 2014–2018" (Ref. 1);
- Restructuring the Southern Coastal Collector, and the collectors of the Avenue des Olives and the Avenue de la Rose. These two operations are important for the protection of bathing water quality;
- Securing and renovating several pumping and collecting stations;
- Modernising the control system for the sewerage system with the installation of new sensors and real-time modelling;
- Closing washing boxes and installing greywater pumps in the area's ports;
- Preserving or restoring the natural environment through actions such as setting up coastal and river warning stations, promoting the growth of *Cystoseira algae* (which provide shelter and food for numerous coastal fish species) in Cortiou, and creating shelters for fish in ports;
- Carrying out essential studies to ensure the future development of the sewerage system (Ref. 1).

Type of initiating organisation:

National government, Regional government, Local government / municipality, Private sector / Corporate / Company

Management set-up:

Co-governance or hybrid governance (mix of responsibilities between government and non-government actors)

Participatory approaches/ community involvement:

Unknown

Details on the roles of the organisations involved in the project:

€185.6 million for five years financed by MPM (Marseille Provence Métropole) and Seram (Marseille Sewerage Network Operations Company) within the framework of the Public Service Delegation (DSP) and the Water Agency. “In the framework of the DSP, Seram will build a 50,000 m³ storage basin near Géolide. MPM will be the contracting authority for the creation of the 4 additional basins.” The French State was also involved in this project: “An agglomeration contract signed for the improvement of the sanitation system and the quality of the aquatic environment between the State, MPM and the Water Agency” and “The State undertakes to assist the community in carrying out this programme.”

Documents

www.naturvation.eu/nbs/marseille/5-new-stormwater-retention-basins

www.marseille-provence.fr/index.php/competences/eau-et-domaine-public/assainissement/l-eau-et-la-preservation-de-l-environnement

Press Release:

www.suez.com/-/media/suez-global/files/press-release/pdf-english/pr-suez-ganay-bassin-2017-03-20-en.pdf

Calanque. Marseille



© DUDLAJZOV / iDREAMSTIME.COM

| ISSUES ADDRESSED Societal challenges Climate change / Food security / Water security / Disaster risk / Human health / Economic and social development | |
|--|---|
|  | |
| CRITERIA 1. NbS effectively address societal challenges | |
| INDICATORS | DESCRIPTION |
| 1.1 The most pressing societal challenges for rights holders and beneficiaries are prioritised | The main drivers of the intervention are aligned with the societal challenge of climate change (including water management, coastal resilience and marine protection, biodiversity, and some co-benefits such as environmental quality, including air quality and waste management). Disaster risk related to flooding (water security) is another main goal of the initiative. Some points are also linked to health and well-being and to economic development and decent employment. |
| 1.2 The societal challenges addressed are clearly understood and documented | The most detailed ones are water management/security and secondly biodiversity. |
| 1.3 Human well-being outcomes arising from the NbS are identified, benchmarked and periodically assessed | No evidence found during the evaluation. |
| ISSUES ADDRESSED Design at scale City-wide / District / Urban acupuncture | |
| CRITERIA 2. Design of NbS is informed by scale | |
| INDICATORS | DESCRIPTION |
| 2.1 Design of NbS recognises and responds to the interactions between the economy, society and ecosystems | The initiative focuses mainly on water (in terms of management, security and flooding risk). The goal is to reduce the occurrence and impact of flooding in relation to extreme events (heavy rainfall) and the management of sea water and natural park pollution. These variables are connected with the economy, society and ecosystems, but the interactions between them are not addressed. |
| 2.2 Design of NbS is integrated with other complementary interventions and seeks synergies across sectors | As an example of this integrated vision, Marseille Provence Métropole (MPM) developed a large-scale programme to assess the following elements: water and the marine environment, urban waste-water, and urban community. One of the main goals is to improve the performance of wastewater treatment in the city and the quality of coastal waters and urban rivers. |
| 2.3 Design of NbS incorporates risk identification and risk management beyond the intervention site | The disaster risk related to flooding is addressed, and for that purpose dynamic stormwater management solutions are provided in the Ganay basin in order to prevent 1 million m ³ of untreated wastewater being discharged into Calanques National Park, cutting current discharges by 50%. Also the risk of rising sea levels is considered (aligned with flooding); a €750 billion annual bill is expected due to damage linked to this risk (World Bank economist Stephane Hallegatte led the study called "Future Flood Losses in Major Coastal Cities", published in <i>Nature Climate Change</i>). In this respect, coastal defence strategies were set out. |

| ISSUES ADDRESSED Biodiversity net-gain | |
|---|---|
| CRITERIA 3. NbS result in net gain to biodiversity and ecosystem integrity | |
| INDICATORS | DESCRIPTION |
| 3.1 NbS actions directly respond to evidence-based assessment of the current state of the ecosystem and prevailing drivers of degradation and loss | The actions are described in detail suggesting that the assessment is addressed: Actions to preserve or restore the natural environment include establishing alert stations on the coast and rivers and measures to promote biodiversity. |
| 3.2 Clear and measurable biodiversity conservation outcomes are identified, benchmarked and periodically assessed | No evidence found during the evaluation. |
| 3.3 Monitoring includes periodic assessments of unintended adverse consequences for nature arising from the NbS | The expected impacts are monitored constantly in the case of seawater quality. The long-term effects of treatment plants are already being monitored by measuring the evolution of Posidonia meadows or the bacteriology of mussels, for example. In addition, so-called "Siren" beacons are going to be set up at sea and on rivers, and thereby impact swimming areas. On the Hock, the Huveaune and in Prado Bay, these stations will continuously measure the state of the water: oxygen content, temperature, etc. They will be calibrated with sampling devices in order to carry out a more detailed analysis in the event of any abnormal variation in the parameters monitored. There is no information about other variables that are being periodically monitored. |
| 3.4 Opportunities to enhance ecosystem integrity and connectivity are identified and incorporated into the NbS strategy | No evidence found during the evaluation. |
| ISSUES ADDRESSED Economic feasibility | |
| CRITERIA 4. NbS are economically viable | |
| INDICATORS | DESCRIPTION |
| 4.1 The direct and indirect benefits and costs associated with the NbS, who pays and who benefits, are identified and documented | The main stakeholders that will directly benefit from the projects are the national government, local government/municipality and citizens or community groups. However, there is no economic information available about the direct and indirect benefits and costs associated with the NbS. |
| 4.2 A cost-effectiveness study is provided to support the choice of NbS including the likely impact of any relevant regulations and subsidies | No evidence found during the evaluation. |
| 4.3 The effectiveness of the NbS design is justified against available alternative solutions, taking into account any associated externalities | No evidence found during the evaluation. |
| 4.4 NbS design considers a portfolio of resourcing options such as market-based, public sector, voluntary commitments and actions to support regulatory compliance | No evidence found during the evaluation. |

| ISSUES ADDRESSED Inclusive governance | |
|---|--|
| CRITERIA 5. NbS are based on inclusive, transparent and empowering governance processes | |
| INDICATORS | DESCRIPTION |
| 5.1 A defined and fully agreed upon feedback and grievance resolution mechanism is available to all stakeholders before an NbS intervention can be initiated | No evidence found during the evaluation. |
| 5.2 Participation is based on mutual respect and equality, regardless of gender, age or social status, and upholds the right of Indigenous Peoples to Free Prior and Informed Consent (FPIC) | No evidence found during the evaluation. |
| 5.3 Stakeholders who are directly and indirectly affected by the NbS have been identified and involved in all processes of the NbS intervention | No evidence found during the evaluation. |
| 5.4 Decision-making processes document and respond to the rights and interests of all participating and affected stakeholders | No information available or accessible in English. |
| 5.5 Where the scale of the NbS extends beyond jurisdictional boundaries, mechanisms are established to enable joint decision making by the stakeholders in those jurisdictions affected by the NbS | No evidence found during the evaluation. |
| ISSUES ADDRESSED Balance trade-offs | |
| CRITERIA 6. NbS equitably balance trade-offs between achievement of their primary goal(s) and the continued provision of multiple benefits | |
| INDICATORS | DESCRIPTION |
| 6.1 The potential costs and benefits of associated trade-offs of the NbS intervention are explicitly acknowledged and inform safeguards and any appropriate corrective actions | From a theoretical point of view the costs of the increasing risk of flooding are acknowledged. The coastal defences may attract population and assets in protected areas and thus put them at risk if the defence fails, so these defences could magnify – not reduce – the vulnerability of some cities. |
| 6.2 The rights to, usage of and access to land and resources, along with the responsibilities of different stakeholders are acknowledged and respected | No evidence found during the evaluation. |
| 6.3 Established safeguards are periodically reviewed to ensure that mutually agreed trade-off limits are respected and do not destabilise the entire NbS | No evidence found during the evaluation. |

| ISSUES ADDRESSED Adaptive management | |
|---|--|
| CRITERIA 7. NbS are managed adaptively, based on evidence | |
| INDICATORS | DESCRIPTION |
| 7.1 An NbS strategy is established and used as a basis for regular monitoring and evaluation of the intervention | The monitoring actions are not explicitly linked to an NbS strategy. As mentioned before, the monitoring activities are mainly linked to water quality. Hydraulic simulation tools have been created, like weather systems that help to “predict” the weather. |
| 7.2 A monitoring and evaluation plan is developed and implemented throughout the intervention lifecycle | No evidence found during the evaluation. |
| 7.3 A framework for iterative learning that enables adaptive management is applied throughout the intervention lifecycle | No evidence found during the evaluation. |
| ISSUES ADDRESSED Mainstreaming | |
| CRITERIA 8. NbS are sustainable and mainstreamed within an appropriate jurisdictional context | |
| INDICATORS | DESCRIPTION |
| 8.1 NbS design, implementation and lessons learnt are shared to trigger transformative change | No evidence found during the evaluation. |
| 8.2 NbS inform and enhance facilitating policy and regulation frameworks to support their uptake and mainstreaming | No evidence found during the evaluation. |
| 8.3 Where relevant, NbS contribute to national and global targets for human well-being, climate change, biodiversity and human rights, including the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) | No evidence found during the evaluation. |



Alicante (Spain) Park of the Sea – *Parque del Mar*



To understand this initiative it is important to highlight that its context is the Port of Alicante – a state-owned port of general interest – which results in complex governance with several public authorities involved. The port has its own autonomous management body, the Port Authority of Alicante, with a direct link to the local government in the city of Alicante. In this complex governance set-up, the port's status as infrastructure of general interest means that the Port Plan prevails over any other planning instrument, and this includes the PGOU (General Urban Development Plan). This initiative is one of the actions of the **Strategic Plan for the Port of Alicante**, which aims to define the development model for the port for the next 20 years, with its specific features, and the coordination of the port, industrial and urban areas.

In order to visually and acoustically isolate the impact that the port facilities have on the city, the Port Authority of Alicante has developed an attractive, high-quality green space, where the prevailing tree and bush species are native ones adapted to Alicante's climate, requiring low maintenance and water consumption and where citizens can spend their leisure time and enjoy cultural activities. To highlight the chromatic

and volumetric effect of certain species and at the same time provide a scenic background for the immediate surroundings, large numbers of specimens of the same species have been planted in groups covering significant parts of the total area of the park. In some cases, the ground level has been raised by more than five metres above its previous level to create artificial hills that give a feeling of movement to the structure of the park and its paths.

The total area of this park is approximately 24,700 m², located under the access bridge to the highway and its adjoining areas. It borders the Avenida de Elche to the west, and roads of the port area to the east, north and south.

Two main approaches have been taken in terms of garden design. First, a more careful treatment has been adopted for the main access areas, using bush, dwarf shrub and tree species and covering the ground with mixed grasses and Bermuda grass, which from the point of view of flowering and seed bearing are more attractive to the eye. In the rest of the park a different approach has been used, and forest species such as *Pinus halepensis* and *P. canariensis* among others have been planted.



© IMAGE SOURCE: <http://www.ingenierospaisajistas.com/parque-del-mar>

Paths have been laid out according to the relief of the land after earth moving, with a slight cross slope of around 1% to prevent puddle formation and gradients kept below 8% to facilitate access by people with disabilities.

A lake has been constructed in the parking area close to the children playgrounds at the centre of this urban park. Integrated into the landscape, it is an ornamental reservoir of 3,360 m³, with a depth that never exceeds 0.6 metres. It can be filled with salt water from the subsoil, which can be renewed as often as is deemed convenient, or with water from the drinking water supply or a mixture of both. The bottom, banks and crest of the lake are covered with a layer of high-density polyethylene 1.2 mm thick. Ornamental features have been installed inside the park, as well as wooden benches, litter bins, swings for children, a petanque court, jogging tracks and other leisure facilities.

This action has required an investment of approximately EUR 460,000.

Key features of this project are:

- Strong landscape approach grounded in the European Landscape Convention (that is, perceived landscape) and in a specific climatic context. This is a very important aspect and the intervention has been designed with this approach (perceived landscape and climate).
 - With this landscape approach, a buffer zone has been designed between the port area, the hard industrial area, and the consolidated urban area.
 - One function of this transition area is to be a public space accessible to the community.
 - It is very important to highlight that the intervention is carried out on port land, with the economic implications that this has. The Parque del Mar project would not have been economically viable otherwise.
- However, the port authority's investment and commitment to sustainability is clear, responding to social demands for the use of public space, identity creation, and urban landscape in general.
 - The climate in this transition zone has been an important consideration and the shaded part is key for the use of the park.
 - Although a formal public consultation process has not been carried out, the social demands known to exist or collected through public channels for receiving suggestions have been taken into account, since social acceptance of the intervention is regarded as essential.
 - Another noteworthy aspect is the area of influence and impact of the intervention. It is considered not to be limited to the urban area immediately adjacent to the park but rather to be that of the Port itself, extending outside the province of Alicante to Valencia, Murcia, Albacete and beyond.
 - The park's function as an acoustic barrier stands out, as it was designed bearing in mind the acoustic dimension for the chosen topography.

There is a second phase of this intervention, "Parque del Mar II", currently under tender within the Strategic Plan. It will focus on:

- Elements of the existing cultural heritage;
- Social demand and acceptance;
- Water efficiency and use;
- Criteria for selecting protected species for the nursery of local species; in the first phase the aim was only to restore degraded habitats, but in the second part water efficiency is key and also endangered species may be planted.



© IMAGE SOURCE: <http://www.ingenierospaisajista.com/parque-del-mar>

Documents

Alicante Port. (n.d). "Environment".
<http://www.puertoalicante.com/en/publicaciones/memorias/>

Gobierno de España. (2003). Agencia Estatal Boletín Oficial del Estado. RESOLUCIÓN de 4 de febrero de 2003, de la Secretaría General de Medio Ambiente.
<http://www.boe.es/buscar/doc.php?id=BOE-A-2003-3692>

Anon. (n.d). "Medio Ambiente recuperará la fachada marítima de Alicante y conectará la ciudad con los humedales de Elche y Santa Pola". lasprovincias.es.
http://www.lasprovincias.es/alicante/prensa/20071016/comarcas/medio-ambiente-recuperara-fachada_20071016.html

Anon.(2010) El parque del Mar: Didáctico.
<http://alacantideprofit.blogspot.se/2010/11/el-parque-didactico.html>

Proyecto Naturvation:
<https://naturvation.eu/nbs/alicantealacant/vegetable-barriers-port-alicante>

ISSUES ADDRESSED
Societal challenges

Water security / Human health / Economic and social development



CRITERIA

1. NbS effectively address societal challenges

| INDICATORS | DESCRIPTION |
|---|---|
| 1.1 The most pressing societal challenges for rights holders and beneficiaries are prioritised | The societal challenges addressed in the area are the following: water security, climate change in terms of its co-benefits (green space, habitats and biodiversity, environmental quality, including air quality and waste management), and there is an explicit reference to human health, linked to some environmental benefits and also aligned with social justice, cohesion and equity. In these terms, social development is also considered. Finally, economic development is one of the goals of the intervention. |
| 1.2 The societal challenges addressed are clearly understood and documented | Some of the main drivers of the intervention are clearly considered and documented: water management and air quality mainly, since different assessment methodologies and tools are applied. |
| 1.3 Human well-being outcomes arising from the NbS are identified, benchmarked and periodically assessed | In relation to human health, air quality seems to be the only variable that is periodically assessed, for specific factors such as PM10. In addition, meteorological conditions are monitored; the approach is not explicitly linked to thermal comfort. |

ISSUES ADDRESSED
Design at scale

District

CRITERIA

2. Design of NbS is informed by scale

| INDICATORS | DESCRIPTION |
|--|--|
| 2.1 Design of NbS recognises and responds to the interactions between the economy, society and ecosystems | The interaction between society and ecosystem is especially important in the project since it combines blue and green elements in a new green area in order to address citizens' complaints about the pollution created by the port infrastructure and activities. One of the main goals of the project is to reduce the port's visual impact and to improve environmental quality in the immediate neighbourhood. |
| 2.2 Design of NbS is integrated with other complementary interventions and seeks synergies across sectors | The complementary interventions are linked to the other specific goals of the port and aligned with other interventions in the area or with the plans or programmes of other authorities or stakeholders. However, given the port's status as infrastructure of general interest, the Port Plan prevails over any other planning instrument, and this includes the PGOU. |
| 2.3 Design of NbS incorporates risk identification and risk management beyond the intervention site | Included in the Strategic Plan of the Port of Alicante. |

| ISSUES ADDRESSED Biodiversity net-gain | |
|---|---|
| CRITERIA 3. NbS result in net gain to biodiversity and ecosystem integrity | |
| INDICATORS | DESCRIPTION |
| 3.1 NbS actions directly respond to evidence-based assessment of the current state of the ecosystem and prevailing drivers of degradation and loss | In terms of human health and well-being it seems that the area is degraded, since several citizens' complaints about environmental quality are reported as one of the reasons for developing the project. There is no information on other aspects of ecosystem degradation. |
| 3.2 Clear and measurable biodiversity conservation outcomes are identified, benchmarked and periodically assessed | The second phase of this intervention, "Parque del Mar II", currently under tender within the Strategic Plan, will include criteria for selecting protected species for the nursery of local species; in the first phase the aim was only to restore degraded habitats, but in the second part water efficiency is key and also endangered species may be planted. |
| 3.3 Monitoring includes periodic assessments of unintended adverse consequences for nature arising from the NbS | No evidence found during the evaluation. |
| 3.4 Opportunities to enhance ecosystem integrity and connectivity are identified and incorporated into the NbS strategy | There is a second phase of this intervention, "Parque del Mar II", currently under tender within the Strategic Plan. It will focus on: <ul style="list-style-type: none"> - elements of the existing cultural heritage; - social demand and acceptance; - water efficiency and use; - criteria for selecting protected species for the nursery of local species; in the first phase the aim was only to restore degraded habitats, but in the second part water efficiency is key and also endangered species may be planted. |
| ISSUES ADDRESSED Economic feasibility | |
| CRITERIA 4. NbS are economically viable | |
| INDICATORS | DESCRIPTION |
| 4.1 The direct and indirect benefits and costs associated with the NbS, who pays and who benefits, are identified and documented | It is very important to highlight that the intervention is carried out on port land, with the economic implications that this has. The Parque del Mar project would not have been economically viable otherwise. However, the port authority's investment and commitment to sustainability is clear, responding to social demands for the use of public space, identity creation, and urban landscape in general. |
| 4.2 A cost-effectiveness study is provided to support the choice of NbS including the likely impact of any relevant regulations and subsidies | |
| 4.3 The effectiveness of the NbS design is justified against available alternative solutions, taking into account any associated externalities | |
| 4.4 NbS design considers a portfolio of resourcing options such as market-based, public sector, voluntary commitments and actions to support regulatory compliance | |

| ISSUES ADDRESSED Inclusive governance | |
|---|--|
| CRITERIA 5. NbS are based on inclusive, transparent and empowering governance processes | |
| INDICATORS | DESCRIPTION |
| 5.1 A defined and fully agreed upon feedback and grievance resolution mechanism is available to all stakeholders before an NbS intervention can be initiated | Although a formal public consultation process has not been carried out for this particular project, the social demands known to exist or collected through public channels for receiving suggestions over the years, have been taken into account, since social acceptance of the intervention is regarded as essential. |
| 5.2 Participation is based on mutual respect and equality, regardless of gender, age or social status, and upholds the right of Indigenous Peoples to Free Prior and Informed Consent (FPIC) | No evidence found during the evaluation. |
| 5.3 Stakeholders who are directly and indirectly affected by the NbS have been identified and involved in all processes of the NbS intervention | Stakeholders are identified nevertheless, their involvement in the process in terms of participation and decision making are not explained. |
| 5.4 Decision-making processes document and respond to the rights and interests of all participating and affected stakeholders | The approach for the decision-making process is based on co-governance or hybrid governance (mix of responsibilities between government and non-government actors); nevertheless, no citizen or community involvement is identified. |
| 5.5 Where the scale of the NbS extends beyond jurisdictional boundaries, mechanisms are established to enable joint decision making by the stakeholders in those jurisdictions affected by the NbS | The local government as well as the regional government have supported this initiative in order to align policies with regulations and citizens' rights after many disputes. |
| ISSUES ADDRESSED Balance trade-offs | |
| CRITERIA 6. NbS equitably balance trade-offs between achievement of their primary goal(s) and the continued provision of multiple benefits | |
| INDICATORS | DESCRIPTION |
| 6.1 The potential costs and benefits of associated trade-offs of the NbS intervention are explicitly acknowledged and inform safeguards and any appropriate corrective actions | The second phase of this intervention, "Parque del Mar II", currently under tender within the Strategic Plan, will include water efficiency and use among its criteria. |
| 6.2 The rights to, usage of and access to land and resources, along with the responsibilities of different stakeholders are acknowledged and respected | With a landscape approach, a buffer zone has been designed between the port area, the hard industrial area, and the consolidated urban area. One function of this transition area is to be a public space accessible to the community |
| 6.3 Established safeguards are periodically reviewed to ensure that mutually agreed trade-off limits are respected and do not destabilise the entire NbS | No evidence found during the evaluation. |

| ISSUES ADDRESSED Adaptive management | |
|---|--|
| CRITERIA 7. NbS are managed adaptively, based on evidence | |
| INDICATORS | DESCRIPTION |
| 7.1 An NbS strategy is established and used as a basis for regular monitoring and evaluation of the intervention | Regular monitoring of air quality and noise is in place (through a formal monitoring system including monitoring/evaluation reports). |
| 7.2 A monitoring and evaluation plan is developed and implemented throughout the intervention lifecycle | No evidence found during the evaluation. |
| 7.3 A framework for iterative learning that enables adaptive management is applied throughout the intervention lifecycle | No evidence found during the evaluation. |
| ISSUES ADDRESSED Mainstreaming | |
| CRITERIA 8. NbS are sustainable and mainstreamed within an appropriate jurisdictional context | |
| INDICATORS | DESCRIPTION |
| 8.1 NbS design, implementation and lessons learnt are shared to trigger transformative change | Great efforts have been devoted to making the intervention visible so as to reinforce social acceptance. |
| 8.2 NbS inform and enhance facilitating policy and regulation frameworks to support their uptake and mainstreaming | The NbS is included in the Strategic Plan of the Port of Alicante. |
| 8.3 Where relevant, NbS contribute to national and global targets for human well-being, climate change, biodiversity and human rights, including the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) | The societal challenges that are addressed by the project are the following: <ul style="list-style-type: none"> - Water management (SDG 6); - Green space, habitats and biodiversity (SDG 15); - Environmental quality, including air quality and waste management; - Regeneration, land-use and urban development; - Social justice, cohesion and equity (SDG 10); - Health and well-being (SDG 3). |



Málaga (Spain) Coastal Trail – *Senda Litoral*



The Coastal Trail (*Senda Litoral*) of Málaga Province is a project led by the Provincial Council with the collaboration of the 14 coastal municipalities, the coastal communities, the Department of Agriculture, Livestock, Fisheries and Sustainable Development of the Andalusian Regional Government and the Ministry of Agriculture, Food and Environment through the Department of Coasts and the Maritime Environment. This project provides connectivity from Manilva to Nerja along the entire coast, covering about 180 kilometres. Around 80% of Málaga's coastline is already passable (as of mid-July 2017), through multiple infrastructure schemes. Therefore, the pending assignments correspond to the remaining 20%. This is a

challenging long-term project that will take five years to implement, since it involves the more complicated coastal sections. The work, which is already underway in many of the 167 sections, will connect existing parts of the trail (boardwalks, lanes and paths) and build new links in coordination with the other competent institutions.

NOTE: The data mentioned here are always estimates taken from studies and projects, taking into account that the Coastal Trail is planned jointly with all the institutions involved and is currently being executed. Therefore, the data as finally implemented may differ.

Documents

Diputación de Málaga, "¿Qué es la Senda Litoral?"
<http://www.sendalitoral.es/es/6199/>



© IMAGE SOURCE: <http://www.sendalitoral.es/es/>

| | | |
|---|---|---|
| <p>ISSUES ADDRESSED Societal challenges Climate change / Food security / Water security / Disaster risk / Human health / Economic and social development</p> | |  |
| <p>CRITERIA 1. NbS effectively address societal challenges</p> | | |
| INDICATORS | DESCRIPTION | |
| 1.1 The most pressing societal challenges for rights holders and beneficiaries are prioritised | The intervention is mainly driven by economic development; nevertheless, it will also generate social development. In any case, the references to public places and the restoration of natural areas are also highlighted in the project, as it is mainly focused on making the area more attractive for tourism. . | |
| 1.2 The societal challenges addressed are clearly understood and documented | Only tourism is documented in detail. | |
| 1.3 Human well-being outcomes arising from the NbS are identified, benchmarked and periodically assessed | There are specific references to the enjoyment of natural and cultural heritage as a contribution to human well-being. However, there is no explicit information on this point. | |
| <p>ISSUES ADDRESSED Design at scale City-wide / District / Urban acupuncture</p> | | |
| <p>CRITERIA 2. Design of NbS is informed by scale</p> | | |
| INDICATORS | DESCRIPTION | |
| 2.1 Design of NbS recognises and responds to the interactions between the economy, society and ecosystems | There is a reference to these interactions in the definition of the goals of the project: increasing connectivity, improving tourist attractiveness, improving the economic development of the area, showcasing heritage, enhancing the area's environmental value and providing an opportunity to create an area for leisure and sports. | |
| 2.2 Design of NbS is integrated with other complementary interventions and seeks synergies across sectors | Synergies are identified considering the high requirements of the project in terms of involving different authorities and key stakeholders from different sectors and for different variables (natural and cultural heritage, tourism, economic development, etc.). In this respect projects and programmes of different scales and governance levels must be assessed. One example of these synergies is the sister project, the Great Málaga Path (GSM) | |
| 2.3 Design of NbS incorporates risk identification and risk management beyond the intervention site | The only risks that are mentioned in detail are the ones related to connectivity, in terms of engineering the different parts of the trail to provide continuity between them. | |

New bridge over Guadalhorce river. Part of the Senda Litoral project in the province of Málaga.



© IMAGE SOURCE: <http://www.sendalitoral.es/es/>

| ISSUES ADDRESSED Biodiversity net-gain | |
|---|---|
| CRITERIA 3. NbS result in net gain to biodiversity and ecosystem integrity | |
| INDICATORS | DESCRIPTION |
| 3.1 NbS actions directly respond to evidence-based assessment of the current state of the ecosystem and prevailing drivers of degradation and loss | Biodiversity is addressed in the project, which details the various species and links them to the main hazards that have an impact on them (overexploitation of fishing grounds, uncontrolled dumping and mass tourism). The climate driver is also included. |
| 3.2 Clear and measurable biodiversity conservation outcomes are identified, benchmarked and periodically assessed | No evidence found during the evaluation. |
| 3.3 Monitoring includes periodic assessments of unintended adverse consequences for nature arising from the NbS | No evidence found during the evaluation. |
| 3.4 Opportunities to enhance ecosystem integrity and connectivity are identified and incorporated into the NbS strategy | This opportunity is clearly related to the improvement of connectivity between the different parts of the trail. The main goal is to create a tourist attraction that promotes the Costa del Sol as a single resource. This can also have positive impacts in terms of biodiversity. |
| ISSUES ADDRESSED Economic feasibility | |
| CRITERIA 4. NbS are economically viable | |
| INDICATORS | DESCRIPTION |
| 4.1 The direct and indirect benefits and costs associated with the NbS, who pays and who benefits, are identified and documented | Yes, an economic study specifies the costs and benefits, in particular: <ul style="list-style-type: none"> – Boosting sustainable tourism; – Showcasing the coastal environment and providing access to public spaces. This project will allow people to access areas of beaches and public land in the maritime domain, as well as to travel along the coast to see up close areas of great natural value that mark out our municipalities and add huge appeal to this Coastal Trail. Examples include the Cantales de La Araña, the Rock of the Raven, Punta Chullera in Manilva, the Dunes of Artola, the delta of the River Vélez, the mouth of the Guadalhorce or the rocky stretch between Calahonda and Calaburras, in Mijas. – Value of historical resources: The opening of the Coastal Trail will allow you to see the 42 beacon towers along the Málaga coast, or the Phoenician sites of Vélez Málaga. |
| 4.2 A cost-effectiveness study is provided to support the choice of NbS including the likely impact of any relevant regulations and subsidies | Yes, an in-depth economic study has been undertaken. A study carried out by the Planning and Development Company (SOPDE) for the Provincial Council indicates that this project will have an economic impact of more than 40 million euros (24 million will be generated by managing the trail for tourism and another 16 million will result from its construction) and it may support around 400 jobs per year. Of these, around 270 will be created and maintained annually for tourism activities and for operating the trail, while some 130 will be created for five years to carry out the works needed to complete the project. The economic effects of the final commissioning of the Coastal Trail are based on four main factors: <ul style="list-style-type: none"> – changing the activities of tourists, who will include their tour as a part of their holiday; – increasing the average length of stay because of this new attraction; – capturing new visitors; and – the economic effects for the construction industry and associated businesses. The study also takes into account the multiplier effect, i.e. the set of increases that will occur in the province's income as a result of an external increase in consumption and investment. |

| INDICATORS | DESCRIPTION |
|--|---|
| 4.3 The effectiveness of the NbS design is justified against available alternative solutions, taking into account any associated externalities | No evidence found during the evaluation. |
| 4.4 NbS design considers a portfolio of resourcing options such as market-based, public sector, voluntary commitments and actions to support regulatory compliance | No evidence found during the evaluation. |
| ISSUES ADDRESSED Inclusive governance | |
| CRITERIA 5. NbS are based on inclusive, transparent and empowering governance processes | |
| INDICATORS | DESCRIPTION |
| 5.1 A defined and fully agreed upon feedback and grievance resolution mechanism is available to all stakeholders before an NbS intervention can be initiated | The Coastal Trail of Málaga Province is a project led by the Provincial Council that has the collaboration of the 14 coastal municipalities, the coastal communities, the Ministry of Agriculture, Livestock, Fisheries and Sustainable Development of the Andalusian Regional Government and the Ministry of Agriculture, Food and Environment through the Department of Coasts and Maritime Environment. |
| 5.2 Participation is based on mutual respect and equality, regardless of gender, age or social status, and upholds the right of Indigenous Peoples to Free Prior and Informed Consent (FPIC) | Participation takes into consideration the effects of green areas of high ecological value on the municipalities that the Coastal Trail crosses by. |
| 5.3 Stakeholders who are directly and indirectly affected by the NbS have been identified and involved in all processes of the NbS intervention | No evidence found during the evaluation. |
| 5.4 Decision-making processes document and respond to the rights and interests of all participating and affected stakeholders | No information available or accessible in English. |
| 5.5 Where the scale of the NbS extends beyond jurisdictional boundaries, mechanisms are established to enable joint decision making by the stakeholders in those jurisdictions affected by the NbS | It is conceived as a green infrastructure scheme that connects many sites of high ecological value along the coastline. Thus, touring the coast will allow people to see up close areas of great natural value that mark out the municipalities in Málaga province and add huge appeal to this Coastal Trail. Examples include the Cantales de La Araña, the Rock of the Raven, Punta Chullera in Manilva, the Dunes of Artola, the delta of the River Vélez, the mouth of the Guadalhorce or the rocky stretch between Calahonda and Calaburras, in Mijas. |
| ISSUES ADDRESSED Balance trade-offs | |
| CRITERIA 6. NbS equitably balance trade-offs between achievement of their primary goal(s) and the continued provision of multiple benefits | |
| INDICATORS | DESCRIPTION |
| 6.1 The potential costs and benefits of associated trade-offs of the NbS intervention are explicitly acknowledged and inform safeguards and any appropriate corrective actions | No evidence found during the evaluation. |
| 6.2 The rights to, usage of and access to land and resources, along with the responsibilities of different stakeholders are acknowledged and respected | No evidence found during the evaluation. |

| INDICATORS | DESCRIPTION |
|---|---|
| 6.3 Established safeguards are periodically reviewed to ensure that mutually agreed trade-off limits are respected and do not destabilise the entire NbS | No evidence found during the evaluation. |
| ISSUES ADDRESSED Adaptive management | |
| CRITERIA 7. NbS are managed adaptively, based on evidence | |
| INDICATORS | DESCRIPTION |
| 7.1 An NbS strategy is established and used as a basis for regular monitoring and evaluation of the intervention | No evidence found during the evaluation. |
| 7.2 A monitoring and evaluation plan is developed and implemented throughout the intervention lifecycle | No evidence found during the evaluation. |
| 7.3 A framework for iterative learning that enables adaptive management is applied throughout the intervention lifecycle | No evidence found during the evaluation. |
| ISSUES ADDRESSED Mainstreaming | |
| CRITERIA 8. NbS are sustainable and mainstreamed within an appropriate jurisdictional context | |
| INDICATORS | DESCRIPTION |
| 8.1 NbS design, implementation and lessons learnt are shared to trigger transformative change | The Coastal Trail will in itself be an important tourist resource because it can really be travelled between Nerja and Manilva along the coast, and this opens up alternative marketing and business opportunities for our entrepreneurs, hotels and hospitality, sports and active tourism businesses. It is a sister project of the Great Málaga Path (Gran Senda de Málaga – GSM), the circular route through the province along roads and trails, which has already become a national landmark for active tourism. Some of its sections will be shared with the Coastal Trail (such as stage 1 of the GSM, Málaga to Rincón de la Victoria, or stage 30, Estepona to Marbella). In addition, the Coastal Trail will help to promote the Costa del Sol as a single product that covers the entire coast of the province, from east to west, since there is often talk of the Eastern and Western Costa del Sol, but this distinction must be only geographical because the brand belongs to our entire province. |
| 8.2 NbS inform and enhance facilitating policy and regulation frameworks to support their uptake and mainstreaming | No evidence found during the evaluation. |
| 8.3 Where relevant, NbS contribute to national and global targets for human well-being, climate change, biodiversity and human rights, including the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) | No explicit evidence found during the evaluation. |



Naples (Italy) Regeneration of Bagnoli coastal area



The initiative is under development in the project phase. The first phase of the International Ideas Competition for the former Italsider industrial area was successfully concluded. By the deadline of the call, scheduled for 11.00 a.m. on 7 January 2020, 36 applications from groupings of architectural firms had been submitted, which included over 160 studies, 40 of them international, testifying to the strong interest that the initiative aroused. This stage influences the result of the assessment of the project; nevertheless, it could be a good opportunity to test the potential of the standard in order to identify gaps or variables to be improved, since we are at the very beginning of the project's conceptualisation.

The project is being developed under the framework of the Environmental Remediation and Urban Regeneration Programme (*Programma di risanamento ambientale e di rigenerazione urbana*) (Excerpt pursuant to Art. 11a of Decree-Law No 210 of 30/12/2015), Bagnoli–Coroglio Site of Major National Interest (*Sito di rilevante interesse nazionale di Bagnoli-Coroglio*) (30/04/2019), the main aim of which is to set out a programme of environmental regeneration for the area focusing on the following objectives or actions:

- To restore urban parks along the coast, to mitigate urban pollution;
- To cultivate botanical species under glass, in order to reduce the environmental impact of the area;
- To treat wastewater to depollute the coastal zone.

The project contributes to the aim of developing a public beach and park for the city. This description, which briefly reviews the main stages of this story, aims to highlight the entire process of drawing up the environmental redevelopment and restoration project for the area, presenting it not only as an interweaving of architecture, urban visions, urban planning, environmental restrictions, politics and legal events, but also as an example of strong popular participation in the construction of a "City Project".

In that respect, the city of Naples has implemented a comprehensive **plan of urban regeneration for the Bagnoli coastal area**. The national agency **Invitalia** was called on by the government to develop a regeneration plan. In particular, the main points of the project related to **NbS** in the **development of a waterfront**, as part of the regeneration of the coast including the main park and the beach, experimenting with botanical species to reduce the environmental impact in the area. This plan is designed to upgrade and restore the green area, and to mitigate urban pollution.

The International Ideas Competition for the Bagnoli area is intended to design the new landscape for the former industrial area of Naples, which covers an area of 250 hectares, transforming it into one of the largest and most fascinating international urban parks. The future of the Bagnoli site, as in the Environmental Remediation and Urban Regeneration Programme, is to make the most of geographic, landscape, environmental, social and cultural resources to restore the quality of life and general well-being for citizens and future users of this area. Invitalia, the National Development Agency based in Rome, has launched this competition, which is part of an ambitious environmental remediation and urban regeneration project.

This vision is planned to be materialised through a low-density settlement project within a high-quality environment, the key elements of which are green areas and a range of new residential, commercial and tertiary activities. At its core is a large urban park of about 120 hectares, which is expected to develop into a new green heart of Naples. It will be an attraction hosting industrial archaeology artefacts, research spaces, leisure and sporting activities, and with its 2 km of waterfront it will form an ideal link with the Gulf of Naples.

This call will help to determine the future park design, outlining the overall three-dimensional plan of the area so as to better enhance landscape and natural heritage.



Documents

<https://naturvation.eu/nbs/napoli/regeneration-bagnoli-coastal-area>

<https://landizer.net/bagnoli-urbanature-international-ideas-competition-for-the-design-of-the-renewed-bagnoli-area/>

RILANCIO BAGNOLI. Programma di bonifica ambientale e rigenerazione urbana

<https://www.invitalia.it/cosa-facciamo/rilanciamo-le-aree-di-crisi-industriale/rilancio-bagnoli>

<https://www.invitalia.it/cosa-facciamo/rilanciamo-le-aree-di-crisi-industriale/rilancio-bagnoli/documenti>

PROGRAMMA DI RISANAMENTO AMBIENTALE E DI RIGENERAZIONE URBANA SITO DI RILEVANTE INTERESSE NAZIONALE DI BAGNOLICOROGLIO

<https://www.invitalia.it/-/media/invitalia/documenti/rilanciamo-le-aree-di-crisi-industriale/bagnoli/13-programma-di-risanamento-ambientale-e-rigenerazione-urbana.pdf?la=it&hash=C4764F81AF2BAD8A236147DD69E6D44149C4E2EC>

NAPOLI E IL PAESAGGIO COSTIERO: IL RECUPERO AMBIENTALE DI BAGNOLI E LA RIGENERAZIONE DEL LITORALE FLEGREO

https://www.researchgate.net/publication/315050644_NAPOLI_E_IL_PAESAGGIO_COSTIERO_IL_RECUPERO_AMBIENTALE_DI_BAGNOLI_E_LA_RIGENERAZIONE_DEL_LITORALE_FLEGREO

https://rua.ua.es/dspace/bitstream/10045/80228/1/EURAU18PROCEEDINGS_66.pdf

<https://content.sciendo.com/view/journals/quageo/38/4/article-p119.xml?lang=en>

<https://www.teknoring.com/news/riqualificazione-urbana/riqualificazione-di-bagnoli-a-che-punto-siamo-con-la-riqualificazione/>

https://www.researchgate.net/figure/The-Bagnoli-brownfield-site-and-coastal-area-sketch-map_fig1_223267519

| ISSUES ADDRESSED Societal challenges Climate change / Food security / Water security / Disaster risk / Human health / Economic and social development | |
|--|---|
|  | |
| CRITERIA 1. NbS effectively address societal challenges | |
| INDICATORS | DESCRIPTION |
| 1.1 The most pressing societal challenges for rights holders and beneficiaries are prioritised | There are no specific references to climate change as the driver for the intervention. Nevertheless, some related challenges are the main drivers for the project: water security (mainly concerning quality of sea water, beaches, etc.), disaster risks (focus on quality of land and seawater related to industrial pollution problems), human health and well-being, and socio-economic development (mainly tourism and housing). |
| 1.2 The societal challenges addressed are clearly understood and documented | The societal challenges considered are addressed clearly: water security and socio-economic development, besides the risk related to land and sea pollution. |
| 1.3 Human well-being outcomes arising from the NbS are identified, benchmarked and periodically assessed | No evidence found during the evaluation. |
| ISSUES ADDRESSED Design at scale City-wide / District / Urban acupuncture | |
| CRITERIA 2. Design of NbS is informed by scale | |
| INDICATORS | DESCRIPTION |
| 2.1 Design of NbS recognises and responds to the interactions between the economy, society and ecosystems | The main action of the project related to NbS is the development of a waterfront, as part of the regeneration of the coast including the main park and the beach, experimenting with botanical species to reduce the environmental impact in the area. In this respect, the projected future of the Bagnoli site, as shown in the Environmental Remediation and Urban Regeneration Programme (PRARU), is to make the most of geographic, landscape, environmental, social and cultural resources to restore the quality of life and general well-being for citizens and future users of this area. |
| 2.2 Design of NbS is integrated with other complementary interventions and seeks synergies across sectors | The intervention to regenerate the Bagnoli coastal area is included within the PRARU. The regeneration of the Bagnoli coast is also associated with other plans concerning mobility, industrial and cultural heritage, environment, coast, water, etc. Therefore, a more general project framework is conceptualised, in which urban planning is the cross-cutting variable. |
| 2.3 Design of NbS incorporates risk identification and risk management beyond the intervention site | The intervention programme includes a health–environmental risk analysis based on existing legislation (Environmental Code: Part IV - Legislative Decree 152/06 and subsequent amendments), which makes use of baseline data, once validated by the Control Bodies, and defines the objectives of the remediation interventions in accordance with the intended use of the area (green/residential or commercial/industrial). Additionally as part of the management of these risks, sensors will be used to monitor the geological and environmental risks in the area. For the water network, risk management has focused on mitigation of the hydrogeological risk. |

| ISSUES ADDRESSED Biodiversity net-gain | |
|---|---|
| CRITERIA 3. NbS result in net gain to biodiversity and ecosystem integrity | |
| INDICATORS | DESCRIPTION |
| 3.1 NbS actions directly respond to evidence-based assessment of the current state of the ecosystem and prevailing drivers of degradation and loss | The environmental remediation and urban regeneration strategy for the area is based on an analysis of the context: a classification of the Bagnoli-Coroglio area which includes the following elements: Main characteristics of the reference area subject to intervention: land use classification, history, archaeology and landscape, the industrial history of the site, recognition of the interventions, programmes and implementation plans underway in the area of interest, constraints of the area; the history of remediation and the pollution situation on land and at sea; the energy potential of the Bagnoli-Coroglio area; the current state of infrastructure: waterfront, tourist port, piers, water supply network; the mobility, size and structural characteristics of the population, the fight against social exclusion; and the economic and social system: research and tourism. |
| 3.2 Clear and measurable biodiversity conservation outcomes are identified, benchmarked and periodically assessed | No evidence found during the evaluation. |
| 3.3 Monitoring includes periodic assessments of unintended adverse consequences for nature arising from the NbS | The monitoring system is related to the second general objective of the project: creating a smart city using sensors to support the exploitation of the area and ensure high resilience to territorial changes. Bagnoli Smart City is conceptualised as a set of infrastructure networks and monitoring and early-warning systems capable of ensuring a high degree of resilience to territorial changes (natural and anthropic), protecting the infrastructure itself, all buildings and people from the risks associated with bradyseism, climate change and hydrogeological instability, while offering innovative services to users to improve the usability and sustainability of the area, such as smart parking, smart transportation, smart lighting, etc. The variables that are most considered for monitoring are water and energy, with a view to developing a transportation system providing access to the area to meet the demand generated. |
| 3.4 Opportunities to enhance ecosystem integrity and connectivity are identified and incorporated into the NbS strategy | No evidence found during the evaluation. |
| ISSUES ADDRESSED Economic feasibility | |
| CRITERIA 4. NbS are economically viable | |
| INDICATORS | DESCRIPTION |
| 4.1 The direct and indirect benefits and costs associated with the NbS, who pays and who benefits, are identified and documented | The estimated cost of remediation will be part of the exercise, considering the information presented in the project on the modelling process; there will be a part for determining the reclamation costs of the dry land and flooded areas, a part for determining the costs of remediation measures on the coast above sea level and on the seabed, and a part for estimating of the costs of remediation and environmental remediation. Nevertheless, no information is available about economic benefits except the cost-benefit analysis for transport infrastructure, which uses a procedure to select an optimal transport scenario to ensure adequate access to the area of the Bagnoli-Coroglio Site of National Interest. |
| 4.2 A cost-effectiveness study is provided to support the choice of NbS including the likely impact of any relevant regulations and subsidies | No evidence found during the evaluation. |

| INDICATORS | DESCRIPTION |
|--|---|
| 4.3 The effectiveness of the NbS design is justified against available alternative solutions, taking into account any associated externalities | The programme considers evaluation of the alternative intervention scenarios in terms of different end-uses of the areas and their potential effects on the metropolitan area. |
| 4.4 NbS design considers a portfolio of resourcing options such as market-based, public sector, voluntary commitments and actions to support regulatory compliance | The Bagnoli coastal area regeneration programme sets out a cost plan, identifies possible sources of funding, describes the effects of the PRARU and provides a summary schedule for the current project configuration. |
| ISSUES ADDRESSED Inclusive governance | |
| CRITERIA 5. NbS are based on inclusive, transparent and empowering governance processes | |
| INDICATORS | DESCRIPTION |
| 5.1 A defined and fully agreed upon feedback and grievance resolution mechanism is available to all stakeholders before an NbS intervention can be initiated | The programme has a specific part focusing on initiatives to ensure civil participation and the involvement of other entities in the development and implementation of the programme. The need to share and evaluate the main choices of the programme with stakeholders in the Bagnoli area has led to their developing an awareness of being part of a process of regeneration of an area that has been mistreated for too long. Two phases of participation are planned: the first one for the participation of individual citizens and associations, and a second with the involvement of institutional stakeholders (decision makers and policy makers). During this process, the discussion will focus on the different proposals put forward for the Bagnoli Area Redevelopment Project. Additionally, the Interinstitutional Agreement has established thematic technical teams and, finally, agreements have been signed for the acquisition of specific technical contributions. |
| 5.2 Participation is based on mutual respect and equality, regardless of gender, age or social status, and upholds the right of Indigenous Peoples to Free Prior and Informed Consent (FPIC) | No evidence found during the evaluation. |
| 5.3 Stakeholders who are directly and indirectly affected by the NbS have been identified and involved in all processes of the NbS intervention | Considering the information presented, all the relevant stakeholders have been involved and the project enjoys very solid participation by the community, good enough to have produced a shared view for the City Project. This participatory approach started in 2017. Agreement has been reached between institutions and citizens about the vision and objectives of the transformation of Bagnoli. Recently, technical meetings have been held in which representatives of the Municipality and the Region, agents appointed by the Government and representatives of the communities participate. The goal is the construction of a shared strategy that leads to the drafting of a concrete City project, in which the city community recognises itself as an author. |
| 5.4 Decision-making processes document and respond to the rights and interests of all participating and affected stakeholders | No evidence found during the evaluation. |
| 5.5 Where the scale of the NbS extends beyond jurisdictional boundaries, mechanisms are established to enable joint decision making by the stakeholders in those jurisdictions affected by the NbS | No evidence found during the evaluation. |

| ISSUES ADDRESSED Balance trade-offs | |
|---|---|
| CRITERIA 6. NbS equitably balance trade-offs between achievement of their primary goal(s) and the continued provision of multiple benefits | |
| INDICATORS | DESCRIPTION |
| 6.1 The potential costs and benefits of associated trade-offs of the NbS intervention are explicitly acknowledged and inform safeguards and any appropriate corrective actions | Section 5.2 of the Strategic Environmental Evaluation: Environmental Report (<i>Valutazione Ambientale Strategica: Rapporto Ambientale</i>) is an evaluation of the effects of PRARU actions on environmental and anthropic issues: The evaluation forms "Effects of PRARU actions on environmental issues" and "Effects of PRARU actions on anthropic issues" analyse and evaluate quantitatively the interactions between PRARU actions and environmental issues or anthropic activities, respectively. |
| 6.2 The rights to, usage of and access to land and resources, along with the responsibilities of different stakeholders are acknowledged and respected | Section 5.3 of the Strategic Environmental Evaluation: Environmental Report, analyses the characterisation of the effects of the PRARU actions on environmental and anthropic issues and the evaluation of the cumulative effects. The cumulative environmental effects that can be generated by each action were therefore assessed and characterised thematically on the forms "Characterisation of the effects of PRARU actions on environmental issues" and "Characterisation of the effects of PRARU actions on anthropic issues". The assessment of the significance of the cumulative effects is based, for each individual issue, on the overlap of the effects of the actions and on the assessment of their possible interrelations. For each topic considered, the assessment of the cumulative effects weights the different characteristics of the effect, especially the significance or intensity of the individual effects and the environmental or anthropic reference object on which the effect acts.. |
| 6.3 Established safeguards are periodically reviewed to ensure that mutually agreed trade-off limits are respected and do not destabilise the entire NbS | No evidence found during the evaluation. |
| ISSUES ADDRESSED Adaptive management | |
| CRITERIA 7. NbS are managed adaptively, based on evidence | |
| INDICATORS | DESCRIPTION |
| 7.1 An NbS strategy is established and used as a basis for regular monitoring and evaluation of the intervention | The monitoring strategy is embodied in the Bagnoli Smart City: a set of infrastructure networks and monitoring and early-warning systems capable of ensuring a high degree of resilience to territorial changes (natural and anthropic), protecting the infrastructure itself, all buildings and people from the risks associated with bradyseism, climate change and hydrogeological instability, while offering innovative services to users to improve the usability and sustainability of the area, such as smart parking, smart transportation, smart lighting, etc. |
| 7.2 A monitoring and evaluation plan is developed and implemented throughout the intervention lifecycle | There is a monitoring and evaluation plan, but this is not developed and implemented throughout the whole intervention lifecycle. |
| 7.3 A framework for iterative learning that enables adaptive management is applied throughout the intervention lifecycle | No evidence found during the evaluation. |

ISSUES ADDRESSED
Mainstreaming

| CRITERIA | |
|---|--|
| 8. NbS are sustainable and mainstreamed within an appropriate jurisdictional context | |
| INDICATORS | DESCRIPTION |
| 8.1 NbS design, implementation and lessons learnt are shared to trigger transformative change | No evidence found during the evaluation. |
| 8.2 NbS inform and enhance facilitating policy and regulation frameworks to support their uptake and mainstreaming | The project is conceptualised in existing policy and regulation frameworks. The main ones are the PRARU, which incorporates the intervention to regenerate the Bagnoli coastal area, and the City Project, whose development is based on strong community participation. |
| 8.3 Where relevant, NbS contribute to national and global targets for human well-being, climate change, biodiversity and human rights, including the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) | No evidence found during the evaluation. |



TYPE 4
Mature projects





Barcelona (Spain) Green Infrastructure and Biodiversity Plan



The Green Infrastructure (GI) and Biodiversity Plan in Barcelona is a holistic strategic initiative that brings together several plans, programmes and projects that enhance well-being by providing ecosystem services and places for biodiversity, incorporating nature in the city and thereby improving its resilience.

The overarching Plan is put into practice through several projects and actions. Figure 1 below shows the general complex of plans and programmes under the umbrella of the GI and Biodiversity Plan. The Plan has two phases: The First Phase mainly covers the period 2016–2019 and the Second Phase or New Plan (currently under development) will cover 2021–2030. The Plan includes urban planning and specific interventions (around 65 projects in the First Phase) and other actions all contributing to the Plan's implementation.

The New Plan marks a major departure from the previous phase in the classification and management of green spaces, and it places particular focus on Biodiversity as a main goal in response to the EU Biodiversity Strategy approach and requirements. The challenges of the Plan are presented in the technical and legal documentation, and in the urban

transformation projects. It is worth mentioning that the development of this Plan has placed Biodiversity issues within the Department of Legal Services and Urban Planning – an extraordinary achievement for the city of Barcelona, and an example for other cities around the globe.

- Manual organic gardening;
- Revision of the Green Space Maintenance Sheet;
- Review of gardening procedures; review of maintenance levels of gardening; naturalised ponds;
- Management protocols: Management criteria for biota, ponds and ornamental fountains; tree pruning protocol; tree pruning environmental instruction respecting the faunal calendar; swarm collection protocol on public roads;
- Montjuic cliff protection;
- Environmental Ordinance; Collserola special plan
- Technical specifications for tendering projects;
- Bases and regulations for the use of urban garden plots;
- Licenses and authorisations regulating the use of natural spaces;
- Mas Ravetllat, Les Glòries, Can Soler, Pi i Margall, Meridiana, Superilles, C. de Moura, etc.

Plan del Verde y de la Biodiversidad de Barcelona 2020. Representación de los corredores en la zona este de la ciudad.



© IMAGE SOURCE: https://ajuntament.barcelona.cat/ecologiaurbana/sites/default/files/PlanVerde_2020.pdf

The Programme for the Promotion of Urban Green Infrastructure 2017–2030 is the realisation of the Green Infrastructure and Biodiversity Plan, in which the City Council establishes the objective of “achieving a green infrastructure that offers the maximum ecosystem services in a city where nature and cities interact and are empowered.” Likewise, it responds to municipal commitments such as the Citizens’ Commitment to Sustainability 2012–22, which promotes the “renaturing of the city”, and the Barcelona Climate Commitment, which sets the objective of “increasing urban green by 1 square meter for each current inhabitant by 2030, to generate greater adaptation of the city to the possible effects of climate change.”

This Programme is currently gathering protagonists. It stands out among all the initiatives included under the umbrella of the Plan and provides 25 concrete actions boosting GI in the city.

One of the key goals of the Plan is the signing of the Green and Biodiversity Charter and Manual, based on a common strategic Green Urban Development Model for the city of Barcelona. This vision is being partly defined by the

Superblocks Mobility and Urban Model (<http://www.bcnecologia.net/en/conceptual-model/superblocks>), an ambitious project that improves mobility and quality of life and increases the green areas in the urban fabric by 91%.

There has been a major paradigm shift in the way Green Spaces are managed and maintained in Barcelona. In the First Phase of the Plan, green spaces were classified in four maintenance intensity levels depending on their character and attributes. The New Plan takes an integrated, holistic approach classifying all green spaces in 3 broad categories or types of spaces: biodiversity, cultural heritage and urban. The three different types of spaces correspond to differences in management.

The new green management model means working not only with the new types of green spaces described above but also with new approaches, topics and challenges regarding the flora and fauna: unique flora, invasive species, vertebrates and invertebrates. New governance has also been promoted, with cross-cutting work with those involved and affected (BCASA, IMPUQV, Animal Rights Directorate, ASPB, Projects, etc.), in which participation is incorporated as a tool to improve organisation and management. The challenges of the Plan are shared, promoted and worked on through exchanges and innovation beyond the EU.

Plan del Verde y de la Biodiversidad de Barcelona 2020. Escuela del Bosc. Montjuïc.



The New Plan improves knowledge about green spaces and biodiversity and works through an information system; there are a number of projects supporting this action (Lines 3 and 7 of the Plan).

Some of these projects are:

- Biodiversity indicators (in preparation);
- Annual survey of common birds (Catalan common bird survey – SOCC), amphibians, butterflies, hedgehogs, bats;
- Ponds: Water quality, benthic fauna and macroinvertebrates;
- Study on the identification and mapping of invasive plants in the city and its surroundings;
- Geolocation of orchids;
- Species nurseries, aromatic spirals for pollinators;
- Inventory of urban donors;
- Study of the seabed and biodiversity in the Parc dels Escullers;
- Monitoring the city's vegetation cover (NDVI);
- Inventory of all the green spaces in the city managed by Parks and Gardens (NEV);
- Studies of the ecosystem / socio-environmental services of the city's green spaces; calculation of

the ecosystem services of the trees in the urban area, by the I-tree method;

- Selection, description and assessment of new species for gardening with the potential to adapt to climate change;
- Atlas of the nesting birds of Barcelona and Digital Atlas of Biodiversity of the city of Barcelona.

The Digital Atlas of Biodiversity of the city of Barcelona is one of the tools that helps to display a large amount of information on green spaces. It is a map of the city of Barcelona divided up into 73 neighbourhoods that provides a snapshot of the city's trees, green-space plants, birds, butterflies, vertebrate animals and other features, either separately or together. The tool provides information on the inventory of species (flora and fauna). The inventory is updated every 5–10 years and the study is subcontracted by the municipality via a public procurement process, requiring huge effort in resource mobilisation.



© IMAGE SOURCE: https://ajuntament.barcelona.cat/ecologiaurbana/sites/default/files/PlanVerte_2020.pdf

Documents

IUCN (2016) "Nature-based Solutions to address global societal challenges". Editors: E Cohen-Shacham, G Walters, C Janzen, S Maginnis. Case Study 9 Spain: Developing the Barcelona Green Infrastructure (GI) and Biodiversity Plan (pp.72-75)

https://serval.unil.ch/resource/serval:BIB_93FD38C8836B.P001/REF

The Programme for the Promotion of Urban Green Infrastructure

<https://ajuntament.barcelona.cat/ecologiaurbana/es/que-hacemos-y-porque/ciudad-verde-y-biodiversidad>

Mesura de govern: programa d'impuls de la infraestructura verda urbana. Increment i millora del verd (2017)

https://ajuntament.barcelona.cat/ecologiaurbana/sites/default/files/Balanc_Verd_Biodiversitat.pdf

Medida de gobierno: programa de impulso de la infraestructura verde urbana

https://bcnroc.ajuntament.barcelona.cat/jspui/bitstream/11703/104927/1/esp_Mesura%20de%20govern%20increment%20verd_08_06_2017.pdf

Plan del Verde y de la Biodiversidad de Barcelona 2020

https://ajuntament.barcelona.cat/ecologiaurbana/sites/default/files/PlanVerde_2020.pdf

Naturvation: <https://naturvation.eu/location/europe/es/barcelona>

Oppla: <https://oppla.eu/casestudy/17283>

Other references

Ajuntament de Barcelona. Barcelona Green Infrastructure and Biodiversity Plan 2020 [online report], (2013).

<https://ajuntament.barcelona.cat/ecologiaurbana/sites/default/files/Barcelona%20green%20infrastructure%20and%20biodiversity%20plan%202020.pdf>

Ajuntament de Barcelona, 'Ecologia, Urbanisme i Mobilitat' Pla BUITS [website], (n.d.).

<https://ajuntament.barcelona.cat/ecologiaurbana/ca/pla-buits>

Baró, F., Chaparro, L., Gómez-Baggethun, E., Langemeyer, J., Nowak, D.J. and Terradas, J. (2014). Contribution of ecosystem services to air quality and climate change mitigation policies: the case of urban forests in Barcelona, Spain. *Ambio* 43(4): 466-479.

Marulli, J. and Mallarach, J.M. (2005). A GIS methodology for assessing ecological connectivity: application to the Barcelona Metropolitan Area. *Landscape and Urban Planning* 71: 243-262.

Schewenius, M., McPhearson, T. and Elmqvist, T. (2014). Opportunities for increasing resilience and sustainability of urban social-ecological systems: insights from the URBES and the cities and biodiversity outlook projects. *Ambio* 43(4): 434-444.

URBES (Urban Biodiversity and Ecosystem Services). Green Infrastructure, a wealth for cities. Factsheet 6 [online report], (2014)

https://www.iucn.org/sites/dev/files/import/downloads/urbes_factsheet_06_web.pdf

| ISSUES ADDRESSED Societal challenges Climate change / Water security / Human health / Economic development | |
|---|---|
|  | |
| CRITERIA 1. NbS effectively address societal challenges | |
| INDICATORS | DESCRIPTION |
| 1.1 The most pressing societal challenges for rights holders and beneficiaries are prioritised | <p>The prioritised global societal challenges are biodiversity, climate change (resilience) including water management, alongside human health and social development.</p> <p>The Plan aims to create a city where natural heritage and biodiversity are preserved and enhanced, where maximum green infrastructure (GI) and connectivity are achieved, as well as maximum social and environmental services from GI, and a city that is more resilient in the face of climate change. Restoring and enhancing GI through this plan provides the inhabitants of Barcelona with many ecosystem services such as air purification, noise reduction, regulation of urban climate and temperature, reduction in energy consumption and CO₂ emissions, water cycle regulation, recreation, improvement in mental health and general well-being. In addition to these benefits to humans, GI supports biodiversity, provides habitats for flora and fauna and creates ecological connectivity.</p> |
| 1.2 The societal challenges addressed are clearly understood and documented | <p>The main goals are explicit and well detailed in the documents regarding the Plan and the programme which deploys it.</p> |
| 1.3 Human well-being outcomes arising from the NbS are identified, benchmarked and periodically assessed | <p>During the First Phase of the Plan, a specific study analysed the provision of ecosystem services by the green areas of the city, including: climate change adaptation (thermal regulation, for instance), well-being (social interaction and contact with nature) and environmental co-benefits including noise and air quality improvements and biodiversity. Finally, positive economic impacts were also reported.</p> |
| ISSUES ADDRESSED Design at scale City-wide / District / Urban acupuncture | |
| CRITERIA 2. Design of NbS is informed by scale | |
| INDICATORS | DESCRIPTION |
| 2.1 Design of NbS recognises and responds to the interactions between the economy, society and ecosystems | <p>The Plan and programmes that deploy it adopt an holistic approach to socio-ecological systems, in which interactions between natural ecosystems and society are reported and analysed.</p> |
| 2.2 Design of NbS is integrated with other complementary interventions and seeks synergies across sectors | <p>The Plan acts as an umbrella for a number of initiatives and plans which are aligned with each other and work towards a common vision of the City. GI is a factor that cuts across different urban plans and policies, especially those linked to the Programme to Boost Green Infrastructure, the Citizens' Commitment to Sustainability 2012–22 and the Barcelona Climate Commitment.</p> <p>In that respect it has become a common driver of urban policies on planning, public health, sustainability, social rights and culture.</p> |
| 2.3 Design of NbS incorporates risk identification and risk management beyond the intervention site | <p>The Plan incorporates risk identification and management from the perspective of climate change.</p> |

| ISSUES ADDRESSED Biodiversity net-gain | |
|---|--|
| CRITERIA 3. NbS result in net gain to biodiversity and ecosystem integrity | |
| INDICATORS | DESCRIPTION |
| 3.1 NbS actions directly respond to evidence-based assessment of the current state of the ecosystem and prevailing drivers of degradation and loss | The Plan assesses the green spaces of the City and their biodiversity. The main goals are the following: <ul style="list-style-type: none"> – Characterisation of different types of spaces in the City – urban, green/ biodiversity, cultural heritage – by means of spatial analysis tools; – Use of the Normalized difference vegetation index to provide a periodic diagnosis of green areas. – Innovative approach for calculating the GI, using two quantitative indicators and one qualitative one. Usability and accessibility to urban green areas and related facilities are part of the analyses. Also, green cover is assessed in order to provide a complete inventory of green elements such as trees, urban green areas, gardens, etc. |
| 3.2 Clear and measurable biodiversity conservation outcomes are identified, benchmarked and periodically assessed | A periodic procedure for evaluating the state of GI at different levels is planned, to include the ecosystem services approach, the review of areas with the potential to host more green areas, and to create a spatial information system to track these elements. Biodiversity indicators are under development. |
| 3.3 Monitoring includes periodic assessments of unintended adverse consequences for nature arising from the NbS | The Digital Atlas of Biodiversity of the city of Barcelona is one of the tools that helps to display a large amount of information on green spaces. It is a map of the city of Barcelona divided up into 73 neighbourhoods that provides a snapshot of the city's trees, green-space plants, birds, butterflies and animals and other features. It is to be updated every 5–10 years. |
| 3.4 Opportunities to enhance ecosystem integrity and connectivity are identified and incorporated into the NbS strategy | These opportunities are identified at different points in the development of the Plan and are a common item that is continuously addressed. The development of permeable areas and corridors to link biodiversity areas is explicit in the project. Creating a general presence of green elements in the city is a main goal. With the increase in biomass, biodiversity and green cover, more urban spaces will be taken over by new green areas (rooftop gardens, green walls, etc.) and trees (Trees Master Plan). |

| ISSUES ADDRESSED Economic feasibility | |
|--|--|
| CRITERIA 4. NbS are economically viable | |
| INDICATORS | DESCRIPTION |
| 4.1 The direct and indirect benefits and costs associated with the NbS, who pays and who benefits, are identified and documented | The Programme for 2017–2030 includes a municipal activity budget for investment in greening and green space management. However, no cost-benefit analysis has been undertaken <i>per se</i> . |
| 4.2 A cost-effectiveness study is provided to support the choice of NbS including the likely impact of any relevant regulations and subsidies | No evidence found of cost-effectiveness study <i>per se</i> . The Urban Green Infrastructure Promotion Programme aims to deploy the strategy to increase and improve the green heritage and biodiversity already existing in Barcelona. The budget allocated for the maintenance and conservation of this heritage has a direct impact on the achievement of the programme. For this reason, the financial framework is proposed in accordance with the current expenditure forecast of chapter 2 of the Municipal Institute of Parks and Gardens of Barcelona and in accordance with the municipal investment proposal (PIM) for Urban Ecology for the remainder of the mandate. |

| INDICATORS | DESCRIPTION |
|--|--|
| 4.3 The effectiveness of the NbS design is justified against available alternative solutions, taking into account any associated externalities | The new plan will incorporate a cost-benefit analysis of traditional and sustainable gardening. |
| 4.4 NbS design considers a portfolio of resourcing options such as market-based, public sector, voluntary commitments and actions to support regulatory compliance | No evidence found. |
| ISSUES ADDRESSED Inclusive governance | |
| CRITERIA 5. NbS are based on inclusive, transparent and empowering governance processes | |
| INDICATORS | DESCRIPTION |
| 5.1 A defined and fully agreed upon feedback and grievance resolution mechanism is available to all stakeholders before an NbS intervention can be initiated | A participatory approach was used for drafting the Plan. This process enriches the results and also increases public awareness and the maintenance of GI. Participants included multi-level government representatives, researchers and social, environmental and private institutions. Also, in 2008, a citizens' opinion survey was carried out, which concluded that citizens associate green areas with health, freedom, nature and relaxation and provided proposals for specific interventions to increase cleanliness and security in these areas. |
| 5.2 Participation is based on mutual respect and equality, regardless of gender, age or social status, and upholds the right of Indigenous Peoples to Free Prior and Informed Consent (FPIC) | Yes. The involvement, participation and collaboration of the general public, groups and organisations, and both public and private entities in municipal projects is made effective through a variety of instruments and consultative and participatory bodies: Citizen involvement, Citizens' Council for sustainability, Barcelona + Sustainable Network, International projects, Mobility Pact, Anti-Pollution Working Group and Working Group on Health and Noise. |
| 5.3 Stakeholders who are directly and indirectly affected by the NbS have been identified and involved in all processes of the NbS intervention | Yes, it has been done for the various processes and projects related to the Plan. |
| 5.4 Decision-making processes document and respond to the rights and interests of all participating and affected stakeholders | The Second Phase of the Plan reinforces the promotion of a new governance model, with cross-cutting work with those involved and affected (BCASA, IMPUQV, Animal Rights Directorate, ASPB, Projects, etc.), in which participation is incorporated as a tool to improve organisation and management. It also incorporates academia and research & innovation centres: – Naturalització; Agricultura Urbana; – MCNB-Jardí Botànic, Collserola, Zoo, ECSCC, ASPB, Consorci Besòs; – AMB, DIBA-Xarxa Mun., Gene. Cat., FEMP-Red Bio; – NTJ, ICTA, CREAM, CTFC, ISGlobal, UB, Univ.Lleida. |
| 5.5 Where the scale of the NbS extends beyond jurisdictional boundaries, mechanisms are established to enable joint decision making by the stakeholders in those jurisdictions affected by the NbS | The challenges of the Plan are shared, promoted and worked on through exchanges and innovation beyond the EU. |

| ISSUES ADDRESSED Balance trade-offs | |
|---|--|
| CRITERIA 6. NbS equitably balance trade-offs between achievement of their primary goal(s) and the continued provision of multiple benefits | |
| INDICATORS | DESCRIPTION |
| 6.1 The potential costs and benefits of associated trade-offs of the NbS intervention are explicitly acknowledged and inform safeguards and any appropriate corrective actions | This still remains a challenge in the Plan and the programmes and initiatives that support its deployment. This kind of analysis is subcontracted on demand and linked to specific interventions and not developed at the scale of Barcelona city. These studies are highly time and resource consuming. |
| 6.2 The rights to, usage of and access to land and resources, along with the responsibilities of different stakeholders are acknowledged and respected | No evidence found. |
| 6.3 Established safeguards are periodically reviewed to ensure that mutually agreed trade-off limits are respected and do not destabilise the entire NbS | No evidence found. |
| ISSUES ADDRESSED Adaptive management | |
| CRITERIA 7. NbS are managed adaptively, based on evidence | |
| INDICATORS | DESCRIPTION |
| 7.1 An NbS strategy is established and used as a basis for regular monitoring and evaluation of the intervention | The New Plan improves knowledge about green spaces and biodiversity and works through an information system which contributes to the adaptive management approach. There are a number of projects working in this direction: <ul style="list-style-type: none"> – Biodiversity indicators (in preparation); – Annual survey of common birds (SOCC), amphibians, butterflies, hedgehogs, bats; – Ponds: Water quality, benthic fauna and macroinvertebrates; – Study on the identification and mapping of invasive plants in the city and its surroundings; – Geolocation of orchids; – Species nurseries, aromatic spirals for pollinators; – Inventory of urban donors; – Study of the seabed and biodiversity in the Parc dels Escullis; – Monitoring the city's vegetation cover (NDVI); – Inventory of all the green spaces of the city managed by Parks and Gardens (NEV); – Studies of the ecosystem / socio-environmental services of the city's green spaces; calculation of the ecosystem services of the trees in the urban area, by the I-tree method; – Selection, description and assessment of new species for gardening with the potential to adapt to climate change; – Atlas of the nesting birds of Barcelona and Digital Atlas of Biodiversity of the city of Barcelona. |
| 7.2 A monitoring and evaluation plan is developed and implemented throughout the intervention lifecycle | Yes, and several initiatives contribute to the monitoring and evaluation of the plan's implementation- i.e. the Programme for the Promotion of Urban Green Infrastructure and the specific actions deployed within it. |
| 7.3 A framework for iterative learning that enables adaptive management is applied throughout the intervention lifecycle | Yes, see 7.1 |

ISSUES ADDRESSED
Mainstreaming

CRITERIA

8. NbS are sustainable and mainstreamed within an appropriate jurisdictional context

| INDICATORS | DESCRIPTION |
|--|--|
| <p>8.1 NbS design, implementation and lessons learnt are shared to trigger transformative change</p> | <ul style="list-style-type: none"> - Challenges. It is difficult to balance the intensive use of green space with its maintenance and conservation. City officials noted that integrating urban greenery into densely built urban environments and obtaining ownership of the required land is challenging. Developing green infrastructure is a slow process in a city of Barcelona's size. - Keys to success. Political support and willingness are essential for implementation to be successful (Hansen, 2015). Successful management of biodiversity and ecosystem services must be based on multi-scale, multi-sectoral, and multi-stakeholder involvement (Schewenius et al., 2014). Regular dialogue with urban policy makers and planners in the research process facilitates knowledge transfer (Schewenius et al., 2014). - Impact of GI. GI strategies at the municipal level have only limited effects on local air quality and greenhouse gas emissions offsets but could complement other policies intended to meet air quality and climate change mitigation policy targets. Strong coordination between municipal and regional governments dealing with environmental quality and urban planning is needed (Baró et al., 2014). - Public awareness. Citizens need to be aware of the important ecosystem services that green infrastructure provides, such as temperature regulation, stormwater run-off mitigation, and recreational opportunities, to create buy-in and participation in conservation activities (Baró et al., 2014). |
| <p>8.2 NbS inform and enhance facilitating policy and regulation frameworks to support their uptake and mainstreaming</p> | <p>GI is a factor that cuts across different urban plans and policies. The challenges of the Plan are presented in the technical and legal documentation, and in the urban transformation projects. It is worth mentioning that the development of this Plan has placed Biodiversity issues within the department of legal services and urban planning – an extraordinary achievement for the city of Barcelona, and an example for other cities around the globe. GI and biodiversity are, in a sense, becoming a driver of urban policies on planning, public health, sustainability, social rights and culture.</p> |
| <p>8.3 Where relevant, NbS contribute to national and global targets for human well-being, climate change, biodiversity and human rights, including the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP)</p> | <p>The New Plan marks a major departure from the previous phase in the classification and management of green spaces, and it places particular focus on Biodiversity as a main goal in response to the EU Biodiversity Strategy approach and requirements.</p> |



Slovenia

Establishing connectivity in the Ljubljana River and Green Parks Strategy



The main goal of this intervention is to restore the Ljubljana River corridor and improve the river's flow regime in the framework of the connection of two Natura 2000 sites, i.e. Ljubljansko Barje (Ljubljana Marshes) and Sava–Medvode–Kresnice. The project goals will be achieved through the removal of fish migration barriers, improvement of the water regime (thus restoring habitats), improvement of water infrastructure, water management and establishment of hydrological monitoring. The target fish species, whose habitats are to be improved, are Danube salmon (*Hucho hucho* L.), Danube roach (*Rutilus pigus virgo* Heckel) and striped chub (*Leuciscus souffia* Risso).

The water regime in the Ljubljana and its tributaries affects habitats covered by Natura 2000 and also activities related to fisheries, recreational boating, drainage/sewerage, agriculture and, ultimately, the entire infrastructure. During low water levels excessive soil drainage and subsidence occur, deteriorating the state of the entire infrastructure. In essence, the project is multipurpose and multifunctional.

Fužine Castle and the sluice gate on the Ljubljana at Ambrose Square will be refurbished and renovated. This will enable the migration of fish, which is now severely impeded. The existing chain lift mechanism provides rather coarse control of the gate and, consequently, of flows and water levels, resulting in the sudden emptying of the river upstream. Upgrading or improving the gate will allow for a finer degree of control of the Ljubljana's water levels, especially during low flows and droughts. This is vital since keeping the river at the right level affects the entire water regime of the Ljubljana Marshes

Initially, the river engineering measures will include sealing the weir located above the railway bridge over the Ljubljana in Zalog. That will mean that during dry conditions the water level will not fall and the conditions in the oxbows of the Ljubljana upstream will improve.

The engineering activities mainly focused on the river are linked to other urban projects related to the improvement of urban green spaces, improving the connectivity of the city in terms of green infrastructure by helping to creating linkages between biodiversity and culture.



© IMAGE SOURCE: http://keh.fgg.uni-lj.si/ljubljanaconnect/ANG_08_photo/default.htm

| ISSUES ADDRESSED Societal challenges Climate change / Food security / Water security / Disaster risk / Human health / Economic and social development | |
|--|---|
|  | |
| CRITERIA 1. NbS effectively address societal challenges | |
| INDICATORS | DESCRIPTION |
| 1.1 The most pressing societal challenges for rights holders and beneficiaries are prioritised | All the societal challenges are considered in the Ljubljana green strategy. This plan derives from the development of several projects that are specifically devoted to some of the societal challenges. For instance, in the case of the connectivity of the river water quality, risk management (flooding) and biodiversity (as a co-benefit of climate change) are the main drivers. In the case of green spaces, biodiversity is also a variable that is addressed, but social development has relatively more importance since it considers cultural variables and takes into account tourism. In general, improving climate change resilience is a cross-cutting variable. |
| 1.2 The societal challenges addressed are clearly understood and documented | Several documents have been created to explicitly describe the social challenges and the way they are addressed in the different projects of the initiative. |
| 1.3 Human well-being outcomes arising from the NbS are identified, benchmarked and periodically assessed | It is recognised that nature-based solutions provide key ecosystem services to residents, both improving citizens' well-being and attracting more tourists, while at the same time improving the city's climate change resilience. No information about benchmarking or periodic evaluations has been found. |
| ISSUES ADDRESSED Design at scale City-wide / District / Urban acupuncture | |
| CRITERIA 2. Design of NbS is informed by scale | |
| INDICATORS | DESCRIPTION |
| 2.1 Design of NbS recognises and responds to the interactions between the economy, society and ecosystems | Sustainability and the transversal consideration of the projects is something that is constantly addressed in the various projects of the initiative. The framework is the Vision Ljubljana 2025, which defines the goals of the city in terms of interaction between the economy, society and ecosystems. The specific projects also take account of the interaction, giving priority, in each case, to the variables that have more relative importance depending on the type of project. |
| 2.2 Design of NbS is integrated with other complementary interventions and seeks synergies across sectors | The integration of this intervention with other projects and programmes in the city at different levels is relevant: <ul style="list-style-type: none"> – At the Ljubljana city region level: The most important instrument at this level is the Regional Development Programme for the Urban Region of Ljubljana 2014–2020, which is a non-binding strategic document. – At the city level: The most important documents are the binding Municipal Spatial Plan and the non-binding Strategic Spatial Plan of Ljubljana. – Environmental Protection Programme 2014–2020, and the Sustainable Energy Action Plan to 2020. The most important change affecting the planning process in Ljubljana was the revision of the Municipal Spatial Plan in 2010, replacing a plan more than two decades old and closely following Vision2025, a long-term vision for urban development. |
| 2.3 Design of NbS incorporates risk identification and risk management beyond the intervention site | The initiative includes the removal of dams and other longitudinal barriers, which, in combination with other measures including reconnection of floodplains, oxbow lakes and other water retention bodies, can help reduce the flood risk. |

| ISSUES ADDRESSED Biodiversity net-gain | |
|---|---|
| CRITERIA 3. NbS result in net gain to biodiversity and ecosystem integrity | |
| INDICATORS | DESCRIPTION |
| 3.1 NbS actions directly respond to evidence-based assessment of the current state of the ecosystem and prevailing drivers of degradation and loss | Several diagnoses were developed to evaluate the current state of the ecosystems including primarily the following aspects: <ul style="list-style-type: none"> – Preliminary study of the habitat, hydrological and hydraulic conditions in the Ljubljana River corridor, with an estimation of the Danube salmon, Danube roach and striped chub populations; – The present situation of the Danube salmon, Danube roach and striped chub populations in the Ljubljana River corridor and its main tributaries; – Database on the Ljubljana River hydrological regime including the groundwater and surface water relationship. The analysis also includes preparatory actions for implementation of concrete conservation (restoration) actions. |
| 3.2 Clear and measurable biodiversity conservation outcomes are identified, benchmarked and periodically assessed | Monitoring is part of the actions in the initiative in connection with the restoration achievements. |
| 3.3 Monitoring includes periodic assessments of unintended adverse consequences for nature arising from the NbS | These elements are addressed periodically in order to draw up proposals for the minimisation and/or elimination of negative impacts on fish populations in the Ljubljana river. |
| 3.4 Opportunities to enhance ecosystem integrity and connectivity are identified and incorporated into the NbS strategy | One of the main drivers for the initiative in the improvement of ecosystem function is the connectivity and passability of the Ljubljana River downstream from the city of Ljubljana. |
| ISSUES ADDRESSED Economic feasibility | |
| CRITERIA 4. NbS are economically viable | |
| INDICATORS | DESCRIPTION |
| 4.1 The direct and indirect benefits and costs associated with the NbS, who pays and who benefits, are identified and documented | Detailed information about this variable is presented. The total budget of €1.19 million is funded by: <ul style="list-style-type: none"> – European Commission under LIFE+ Nature & Biodiversity 2010 (49.2%); – Ministry of Agriculture and the Environment of the Republic of Slovenia (20%); – Project Coordinator (19.7%): University of Ljubljana, Faculty of Civil and Geodetic Engineering (UL FGG); – Partners (11.1%): Purgator d.o.o. and Geateh d.o.o. The project made an analysis of long-term benefits including: <ul style="list-style-type: none"> – Environmental benefits: <ul style="list-style-type: none"> a) Direct/quantitative environmental benefits, – Long-term benefits and sustainability: <ul style="list-style-type: none"> a) Long-term/qualitative environmental benefits; b) Long-term/qualitative economic benefits; c) Long term/qualitative social benefits; d) Continuation of the project actions by the beneficiary or by other stakeholders. |
| 4.2 A cost-effectiveness study is provided to support the choice of NbS including the likely impact of any relevant regulations and subsidies | There is no information about cost-effectiveness in a holistic way, just a specific reference related to the cost effective system of monitoring fish migration with a camera. |
| 4.3 The effectiveness of the NbS design is justified against available alternative solutions, taking into account any associated externalities | No evidence found during the evaluation. |

| INDICATORS | DESCRIPTION |
|--|--|
| 4.4 NbS design considers a portfolio of resourcing options such as market-based, public sector, voluntary commitments and actions to support regulatory compliance | No evidence found during the evaluation. |
| ISSUES ADDRESSED Inclusive governance | |
| CRITERIA 5. NbS are based on inclusive, transparent and empowering governance processes | |
| INDICATORS | DESCRIPTION |
| 5.1 A defined and fully agreed upon feedback and grievance resolution mechanism is available to all stakeholders before an NbS intervention can be initiated | The available mechanism identified in the information only relates to technical stakeholders: i.e. the coordination and administration of the project by the project coordinator and the project steering group. |
| 5.2 Participation is based on mutual respect and equality, regardless of gender, age or social status, and upholds the right of Indigenous Peoples to Free Prior and Informed Consent (FPIC) | No evidence found during the evaluation. |
| 5.3 Stakeholders who are directly and indirectly affected by the NbS have been identified and involved in all processes of the NbS intervention | Based on the existing information, participation is ONLY focused on dissemination, mainly in technical forums. |
| 5.4 Decision-making processes document and respond to the rights and interests of all participating and affected stakeholders | There is no information about this specific element. It seems that decision-making processes are based only on technical assumptions. There is no information on whether the processes respond to the rights and interests of all participating and affected stakeholders. |
| 5.5 Where the scale of the NbS extends beyond jurisdictional boundaries, mechanisms are established to enable joint decision making by the stakeholders in those jurisdictions affected by the NbS | No evidence found during the evaluation. |
| ISSUES ADDRESSED Balance trade-offs | |
| CRITERIA 6. NbS equitably balance trade-offs between achievement of their primary goal(s) and the continued provision of multiple benefits | |
| INDICATORS | DESCRIPTION |
| 6.1 The potential costs and benefits of associated trade-offs of the NbS intervention are explicitly acknowledged and inform safeguards and any appropriate corrective actions | No evidence found during the evaluation. |
| 6.2 The rights to, usage of and access to land and resources, along with the responsibilities of different stakeholders are acknowledged and respected | Landowners and local residents are explicitly mentioned as stakeholders to be taken into consideration in the initiative. |
| 6.3 Established safeguards are periodically reviewed to ensure that mutually agreed trade-off limits are respected and do not destabilise the entire NbS | No evidence found during the evaluation. |

| ISSUES ADDRESSED Adaptive management | |
|---|--|
| CRITERIA 7. NbS are managed adaptively, based on evidence | |
| INDICATORS | DESCRIPTION |
| 7.1 An NbS strategy is established and used as a basis for regular monitoring and evaluation of the intervention | There are several references to monitoring activities in the initiative, mainly devoted to the following elements: <ul style="list-style-type: none"> – Innovative monitoring method and fish passability system; – Monitoring and evaluation of the project restoration achievements related to fish migration; – Monitoring and evaluation considering the ecohydrological survey system and hydraulic model. |
| 7.2 A monitoring and evaluation plan is developed and implemented throughout the intervention lifecycle | There is an analysis of long-term benefits: Environmental benefits, and long-term benefits and sustainability. It is mentioned that the main economic benefits are expected to come from keeping angling permits under strict control and from tourist interest in the biodiversity aspects of the river, such as underwater CCTV. |
| 7.3 A framework for iterative learning that enables adaptive management is applied throughout the intervention lifecycle | No evidence found during the evaluation. |
| ISSUES ADDRESSED Mainstreaming | |
| CRITERIA 8. NbS are sustainable and mainstreamed within an appropriate jurisdictional context | |
| INDICATORS | DESCRIPTION |
| 8.1 NbS design, implementation and lessons learnt are shared to trigger transformative change | The lessons learned have only been shared at a technical level in specific forums. |
| 8.2 NbS inform and enhance facilitating policy and regulation frameworks to support their uptake and mainstreaming | No evidence found during the evaluation. |
| 8.3 Where relevant, NbS contribute to national and global targets for human well-being, climate change, biodiversity and human rights, including the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) | No evidence found during the evaluation. |



Vitoria-Gasteiz (Spain) Urban Green Infrastructure System

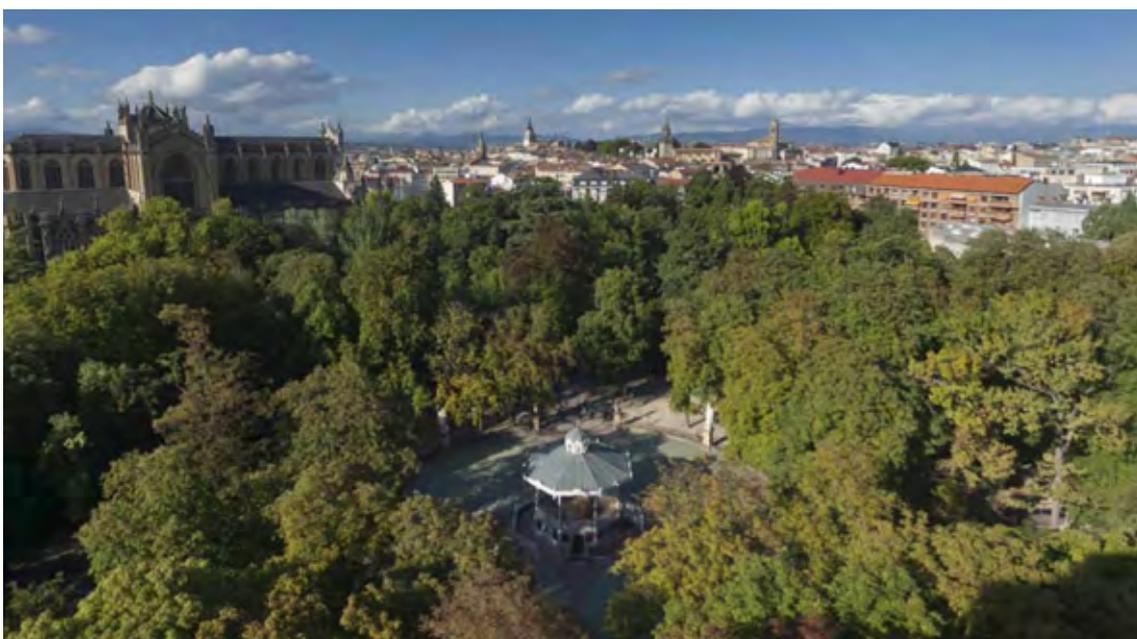


The Vitoria-Gasteiz Urban Green Infrastructure System has the following general objectives:

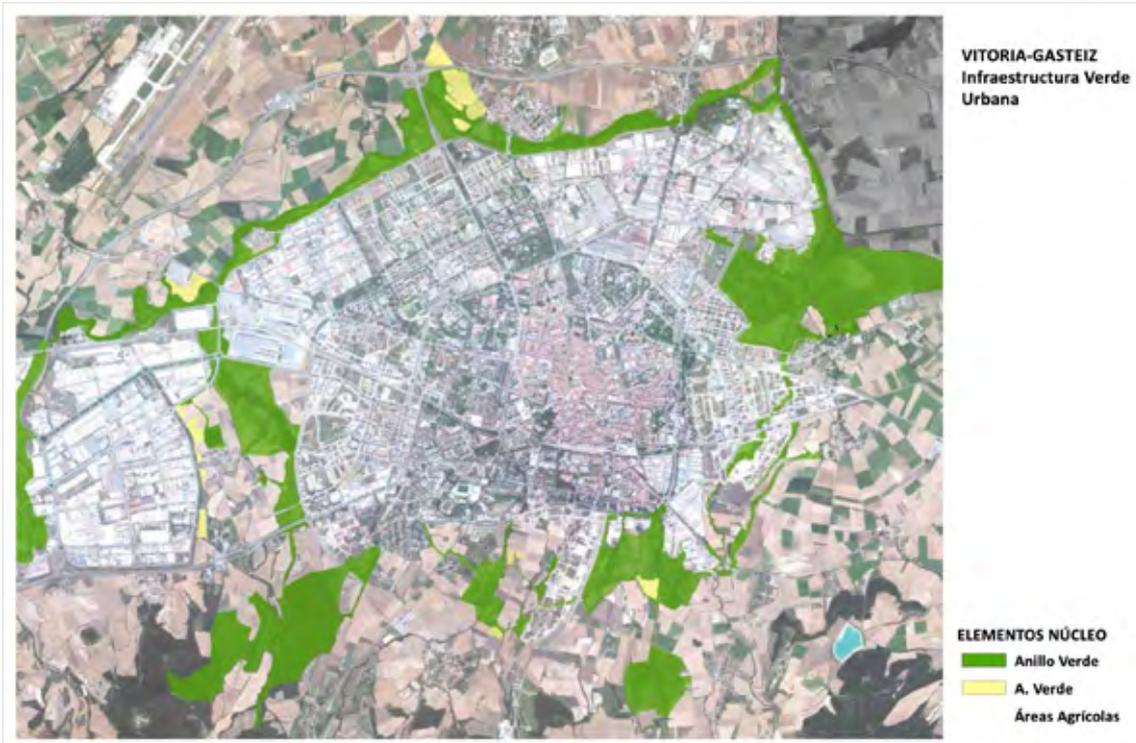
1. Promote biodiversity in the city, increasing spatial and functional connectivity between urban and peri-urban green spaces;
2. Increase the ecosystem services in the city, enforcing urban metabolism processes closer to natural processes and decreasing the consumption of natural resources;
3. Integrate ecological and hydrological processes and flows in the urban area through adequate planning;
4. Mitigate urban heat islands, curb climate change and improve conditions and adaptation processes; increase the resilience of the territory and reduce its vulnerability;
5. Promote compatible public use of green spaces, increase leisure and recreational opportunities, increase accessibility and rural-city connections, preserve cultural heritage and traditional landscapes and extend the sense of identity and belonging;

6. Create environments that contribute to health, collective well-being and the general habitability of the city;
7. Raise awareness about the relationship between nature, biodiversity and society and about ecosystem goods and services, including their economic value;
8. Contribute to economic development through green employment.

The area of Vitoria-Gasteiz is highly suitable for the provision of ecosystem services. These will be promoted through actions that facilitate future ecological connections between the places of greatest importance, and between natural spaces and urban and peri-urban green spaces. Bringing the ecological framework of the municipality to the very heart of the city is one of the goals that will be delivered through the Urban Green Infrastructure System. In its urban and peri-urban environment Vitoria-Gasteiz has many spaces and features of different types that already behave as components of an Urban Green Infrastructure System because they perform important environmental and social functions.



© IMAGE SOURCE: <https://www.vitoria-gasteiz.org/web/21/http.comentidosEstadisticasAdjuntos/62/95/63295.pdf>



The project is characterised by the widely different types of NbS that are implemented:

- GREEN BELT PARKS
- URBAN GREEN LAND: Urban green spaces and vacant plots.
- AGRICULTURAL BELT
- PUBLIC PLACES: Urban trails, greenways and ecological itineraries.
- SUSTAINABLE MOBILITY INFRASTRUCTURE: Cycle lanes and freed public space.

The Urban Green Infrastructure System in Vitoria-Gasteiz aims to form an interconnected network of green spaces and elements, in which each space or element acquires its own ecological function within the ecosystem.

Documents

<https://www.vitoria-gasteiz.org/wb021/http/contenidosEstaticos/adjuntos/eu/32/95/53295.pdf>

<https://www.vitoria-gasteiz.org/we001/was/we001Action.do?idioma=es&accion=anilloVerde&accionWe001=ficha>

| ISSUES ADDRESSED Societal challenges Climate change / Food security / Water security / Disaster risk / Human health / Economic and social development | |
|--|---|
|  | |
| CRITERIA 1. NbS effectively address societal challenges | |
| INDICATORS | DESCRIPTION |
| 1.1 The most pressing societal challenges for rights holders and beneficiaries are prioritised | All the societal challenges are considered conceptualised in the framework of biodiversity and ecosystem services and functions. |
| 1.2 The societal challenges addressed are clearly understood and documented | Yes, the various projects that contribute to the green infrastructure strategy address the specifically related social challenges at different levels of detail (considering the specific goals). In all cases, ecosystem services and functions are the cross-cutting variable. |
| 1.3 Human well-being outcomes arising from the NbS are identified, benchmarked and periodically assessed | <p>These variables are identified within the cultural function of ecosystems:</p> <ul style="list-style-type: none"> a) Recreation, well-being and health: recreational activities, aesthetic appreciation of nature, clean air, tourism or ecotourism; b) Land value: positive impact on the land and property; and c) Culture and sense of community: local identity, opportunities for education, training and social interaction. The goal corresponds to detailed objective 6: "Create environments that promote health, collective well-being and the general habitability of the city". <p>In the documentation, this variable is described as raising the health benefit aligned with climate and environment and social benefits.</p> <p>Urban Green Infrastructure provides benefits related to people's health, such as clean air, better water quality and a healthy urban environment, and improves the habitability of places to live and work. In urban areas, the benefits provided by Green Infrastructure are especially important for their contribution to the health and well-being of citizens. Among its numerous benefits are the improvement of air quality, the tempering of the urban climate and consequent reduction of the "urban heat island" effect, the reduction of air pollution and the social and communal functions played by urban green spaces; all of these aspects are related to the general habitability of cities.</p> <p>Some spaces, such as community gardens, create a strong sense of community, since they allow civil society to get involved through voluntary work, helping to combat social exclusion and isolation. Other spaces have an important educational component, such as vegetable gardens, which promote the connection between local food production and consumption.</p> <p>In addition, urban green networks facilitate the connection of urban green areas with rural and natural areas.</p> |
| ISSUES ADDRESSED Design at scale City-wide / District / Urban acupuncture | |
| CRITERIA 2. Design of NbS is informed by scale | |
| INDICATORS | DESCRIPTION |
| 2.1 Design of NbS recognises and responds to the interactions between the economy, society and ecosystems | <p>Ecosystem Services (ES) have economic benefits as well as environmental and social ones. This interaction is reflected above all in Objective 7: "Raising awareness of the relationship between nature, biodiversity and society and about ecosystem goods and services, including their economic value."</p> <p>In terms of spatial scale, Green Infrastructure is conceptualised as a cross-cutting intervention in the city. In this respect, Green Infrastructure not only forms a network of interconnected green spaces that are fundamental for the conservation of biodiversity, but it also produces a large number of environmental, social and economic benefits derived from the multiple functions and ecosystem services that nature provides, such as water regulation, erosion control, water purification and the mitigation of climate change, among others. Nature-based Solutions at the heart of Green Infrastructure have proven effective in this area, from both the environmental and the social and economic points of view.</p> |

| INDICATORS | DESCRIPTION |
|--|---|
| <p>2.2 Design of NbS is integrated with other complementary interventions and seeks synergies across sectors</p> | <p>This Green Infrastructure System maintains close and active links with other plans and programmes in order to share views and resources. Due to its multifunctional nature, the Vitoria-Gasteiz Urban Green Infrastructure System shares objectives with many other municipal strategies and plans, which are complementary or with which it creates synergies, among which the Biodiversity Conservation Strategy, the Plan for the Fight against Climate Change and the Climate Change Adaptation Plan especially stand out. It also has synergies with the Sustainable Mobility and Public Space Plan, the Health Plan and, of course, the General Urban Planning Plan, currently under review, which constitutes the regulatory and legal framework for the Urban Green Infrastructure System (and this plan should have the appropriate fit in the new General Urban Planning Plan to guarantee its implementation).</p> |
| <p>2.3 Design of NbS incorporates risk identification and risk management beyond the intervention site</p> | <p>This approach is framed with the ecosystem regulation services that help promote adaptation to and mitigation of climate change (water retention, reduction of run-off and reduction of the risk of flooding), which are addressed in more detail in pilot projects. The different projects will deal with different risks and will assess the variables that are required for the characteristics of the case considered.</p> |
| <p>ISSUES ADDRESSED Biodiversity net-gain</p> | |
| <p>CRITERIA 3. NbS result in net gain to biodiversity and ecosystem integrity</p> | |
| INDICATORS | DESCRIPTION |
| <p>3.1 NbS actions directly respond to evidence-based assessment of the current state of the ecosystem and prevailing drivers of degradation and loss</p> | <p>The design of the Vitoria-Gasteiz Urban Green Infrastructure System is conditioned by the city's setting including its particular biotic, hydrogeological and other conditions. The main elements that make up the initial proposal for the Vitoria-Gasteiz Urban Green Infrastructure System were selected on the basis of the analysis and diagnosis of the ecosystem functionality of green spaces in the city and its surroundings.</p> |
| <p>3.2 Clear and measurable biodiversity conservation outcomes are identified, benchmarked and periodically assessed</p> | <p>According to the Knowledge, Monitoring and Assessment work stream, implementation of the Urban Green Infrastructure System in Vitoria-Gasteiz involves periodically analysing the development of the system in relation to the benefits it brings and the habitability of the city. It is essential to develop innovative assessment instruments and study and research programmes that thoroughly, precisely and rigorously address various aspects of Urban Green Infrastructure. Some of the studies and analyses that are currently underway are devoted to the following elements: Identification of ecosystem goods and services provided by the Urban Green Infrastructure and selection of indicators, monitoring surveys of common birds in the urban environment, changes in water consumption for irrigation of parks and gardens, evaluation of the sink effect of urban trees, cost-benefit studies of the transformation and rewilding of green spaces, inventories of invasive alien species in the urban environment and the contribution of urban green spaces to decreasing the city's carbon footprint.</p> |
| <p>3.3 Monitoring includes periodic assessments of unintended adverse consequences for nature arising from the NbS</p> | <p>Periodic assessments of unintended adverse consequences for nature arising from the NbS are not explicitly mentioned in the documentation.</p> |
| <p>3.4 Opportunities to enhance ecosystem integrity and connectivity are identified and incorporated into the NbS strategy</p> | <p>Connectivity and ecosystem integrity are key drivers of the plan.</p> |

| ISSUES ADDRESSED Economic feasibility | |
|---|---|
| CRITERIA 4. NbS are economically viable | |
| INDICATORS | DESCRIPTION |
| 4.1 The direct and indirect benefits and costs associated with the NbS, who pays and who benefits, are identified and documented | The main benefits associated with ES are identified and help to shape the pilot studies. The available documentation contains no detailed information on the analysis of costs associated with the NbS, although it mentions that cost-benefit studies of the transformation and rewilding of green spaces will be carried out, probably linked to the pilot case studies. |
| 4.2 A cost-effectiveness study is provided to support the choice of NbS including the likely impact of any relevant regulations and subsidies | Detailed information has not been identified, nevertheless cost-benefit studies of the transformation and rewilding of green spaces are proposed. |
| 4.3 The effectiveness of the NbS design is justified against available alternative solutions, taking into account any associated externalities | An inventory of current NbS projects and potential future ones is being developed for Vitoria- Gasteiz. It includes information on the location of each project, its benefits and co-benefits in environmental, social and economic terms, and information about the reliability and viability of implementation in technical and legal terms. |
| 4.4 NbS design considers a portfolio of resourcing options such as market-based, public sector, voluntary commitments and actions to support regulatory compliance | No evidence of such specific information was found during the evaluation. |
| ISSUES ADDRESSED Inclusive governance | |
| CRITERIA 5. NbS are based on inclusive, transparent and empowering governance processes | |
| INDICATORS | DESCRIPTION |
| 5.1 A defined and fully agreed upon feedback and grievance resolution mechanism is available to all stakeholders before an NbS intervention can be initiated | Agreements with landowners were established over the years |
| 5.2 Participation is based on mutual respect and equality, regardless of gender, age or social status, and upholds the right of Indigenous Peoples to Free Prior and Informed Consent (FPIC) | In the project there is the specific action of Information, Communication and Citizen Participation, which includes: Preparation and development of a comprehensive communication and awareness programme aimed at citizens and different social agents to promote their participation in the definition of the system and in the establishment of urban measures and transformations that are proposed in the city and in different neighbourhoods. |
| 5.3 Stakeholders who are directly and indirectly affected by the NbS have been identified and involved in all processes of the NbS intervention | The fact that all stakeholders were recruited in a broad, participatory approach, which implies both the involvement of multiple social agents (residents, citizens' groups, schools, local businesses and the university) as well as collaboration and support from private initiatives, will guarantee that the system responds to the various objectives and existing sensitivities. The following mechanisms have been established: <ul style="list-style-type: none"> – Organisation of workshops, conferences, exhibitions, etc. that promote citizens' participation in planning new urban spaces linked to biodiversity; – Participatory biodiversity inventories; – Popular initiatives to support the transformation of green spaces, for example through popular planting campaigns similar to the "Adopt a tree" campaign; – Programmes to support citizens' initiatives for the development of urban gardens, school gardens and community gardens; – Sponsorship programmes for the transformation and improvement of degraded spaces. – Initiatives to encourage people to learn about and enjoy the Green Infrastructure (popular walks, guided tours, etc.). |

| INDICATORS | DESCRIPTION |
|--|---|
| 5.4 Decision-making processes document and respond to the rights and interests of all participating and affected stakeholders | The transformation process in the programme must address various objectives and consider the different sensitivities of the multiple social agents expected to participate. For this reason, since its inception, it has been regarded as an open process in which proposals and approaches are agreed upon before decisions are made. |
| 5.5 Where the scale of the NbS extends beyond jurisdictional boundaries, mechanisms are established to enable joint decision making by the stakeholders in those jurisdictions affected by the NbS | Yes, a governance framework is well established among the municipalities and the provincial and regional governments, and it has been operational since the early 1990s. |
| ISSUES ADDRESSED Balance trade-offs | |
| CRITERIA 6. NbS equitably balance trade-offs between achievement of their primary goal(s) and the continued provision of multiple benefits | |
| INDICATORS | DESCRIPTION |
| 6.1 The potential costs and benefits of associated trade-offs of the NbS intervention are explicitly acknowledged and inform safeguards and any appropriate corrective actions | The GI and urban transformation interventions have been assessed against their provision of ecosystem services for the city as a whole. Connectivity and accessibility are also assessed to ensure the coherence of the GI and to identify potential areas for the deployment of new green projects. |
| 6.2 The rights to, usage of and access to land and resources, along with the responsibilities of different stakeholders are acknowledged and respected | Yes, and guaranteed for all stakeholders affected. |
| 6.3 Established safeguards are periodically reviewed to ensure that mutually agreed trade-off limits are respected and do not destabilise the entire NbS | No evidence found during the evaluation. |
| ISSUES ADDRESSED Adaptive management | |
| CRITERIA 7. NbS are managed adaptively, based on evidence | |
| INDICATORS | DESCRIPTION |
| 7.1 An NbS strategy is established and used as a basis for regular monitoring and evaluation of the intervention | There is a specific Knowledge, Monitoring and Assessment work stream that is devoted to the analysis and diagnosis of the ecosystem functionality of green spaces in the city and its surroundings by means of a periodic monitoring system that measures the benefits provided by the system so that the effectiveness of the measures and actions carried out can be evaluated. Based on Spain's Millennium Ecosystem Assessment project (http://www.ecomilenio.es/sobre-eme), sponsored by the Biodiversity Foundation of the Ministry of Agriculture, Food and Environment and launched in 2009, this is the first analysis to be carried out on the state and trends of Spain's terrestrial and aquatic ecosystem services and their contribution to the well-being of its inhabitants. |
| 7.2 A monitoring and evaluation plan is developed and implemented throughout the intervention lifecycle | Yes, it is primarily linked to the environmental assessment procedure required by law for the approval of any plan or project. |
| 7.3 A framework for iterative learning that enables adaptive management is applied throughout the intervention lifecycle | No evidence for this specific aspect was found during the evaluation. However, Vitoria Gasteiz acknowledges the importance of the adaptive planning and management approaches in order to move towards territorial resilience and urban development, particularly in the context of climate change and the uncertainties that it implies. |

ISSUES ADDRESSED
Mainstreaming

CRITERIA

8. NbS are sustainable and mainstreamed within an appropriate jurisdictional context

| INDICATORS | DESCRIPTION |
|--|--|
| <p>8.1 NbS design, implementation and lessons learnt are shared to trigger transformative change</p> | <p>Given the innovative nature of the Green Infrastructure concept, it is considered essential to search for and analyse successful novel solutions conforming to good practice to support decision making at the local level. In this respect, collaboration arrangements with R&D entities, such as research centres, universities, knowledge networks, etc., can be invaluable. To work towards this goal, the participatory tools used in the project and the stakeholders involved create an optimum framework to promote and enhance the knowledge and benefits deriving from GI.</p> |
| <p>8.2 NbS inform and enhance facilitating policy and regulation frameworks to support their uptake and mainstreaming</p> | <p>One of the more remarkable examples of this, considering its significance for the city, is the integration of GI in urban planning. This approach has helped to create a new paradigm in the practice of urban planning, which consists of the incorporation of ecosystem services in the functioning of the city through the inclusion of a new concept of urban infrastructure. How to accommodate the various elements of the Green Infrastructure System in urban planning documentation and legislation is still a pending issue in terms of knowledge and practice. More flexible ways of managing the spaces must be found. The following aspects may be included in the future General Plan: Consolidation of the proposed System through its incorporation in the urban planning of the city; Establishment of objectives, criteria, rules and recommendations for use and management that protect the system and increase ecosystem services in the city; Development of a Green Areas Ordinance appropriate to the new concepts incorporated; Development and integration of specific plans, such as the Urban Tree Plan, the Landscape Plan, etc.</p> |
| <p>8.3 Where relevant, NbS contribute to national and global targets for human well-being, climate change, biodiversity and human rights, including the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP)</p> | <p>The System contributes to the EU Biodiversity Strategy, the Green Infrastructure and Biodiversity Strategy at national level in Spain and also the Climate Change Adaptation Strategy of the Basque Country, the implementation of which is supported by the UrbanKlima2050 LIFE project: https://urbanklima2050.eu/es/ .</p> |



**INTERNATIONAL UNION
FOR CONSERVATION OF NATURE**

**IUCN CENTRE FOR
MEDITERRANEAN COOPERATION**

Calle Marie Curie, 22
29590 Campanillas
Málaga, Spain
Tel.: +34 952 028430
Fax.: +34 952 028145
Email: uicnmed@iucn.org

www.iucn.org/resources/publications
www.iucn.org/mediterranean

 IUCNMed
 IUCN_Med