TOWARDS A MORE RESILIENT LISBON URBAN GREEN INFRASTRUCTURE AS AN ADAPTATION TO CLIMATE CHANGE:

PROJECT LIFE LUNGS

Coordination:

LISBOA
CÂMARA MUNICIPAL

Life

LIFE LUNGS

PROJECT SHEET

Acronym: LIFE LUNGS

Designation: Towards a more resilient Lisbon UrbaN Green InfraStructure as an adaptation to climate change

Funding Programme: European Commission – LIFE Programme

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Coordination: Lisbon City Council, Municipal Directorate for the Environment, Green Structure, Climate and Energy

Partners: Malaga City Council and Municipal Management of Urbanism, Works and Infrastructures (Spain)

Place of intervention: City of Lisbon

Replication site: Malaga

Key concepts: Sustainable city, climate adaptation, green infrastructure, efficient water management, co-creation and capacity building

Objective: to serve people

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ÍNDICE

1. FRAMEWORK

Currently, more than half of the world's population lives in cities. According to United Nations estimates, this number could reach two-thirds by 2050, reinforcing the role of cities and their governments as central actors in shared and integrated climate action on a global scale.

Lisbon, by taking the lead in climate action at the local level, has accepted the challenge launched by the Adaptation Mission and the 100 Smart and Climate Neutral Cities by 2030 initiative, committing to ambitious targets set out in its **Lisbon Climate City Contract 2030**, awarded with the **Mission Label**, in March 2024.

In anticipation of the goal of climate neutrality by 2030, Lisbon is committed to implementing innovative, technological, participatory and effective impact actions - both mitigating, through the reduction of greenhouse gas emissions, and adaptive, with special emphasis on Nature-based Solutions (NbS). These solutions seek to strengthen the resilience of natural, social and economic systems, ensuring that the city continues to respond to people's needs.

It is in this context that the interventions carried out within the scope of the LIFE LUNGS Project are presented. The actions developed represent a set of lessons learned and good practices, which are intended to inspire other cities, policy makers, experts and researchers. The objective is to promote the active involvement of the community in the transformation of society, by thinking about the present and action oriented towards the future.


Life

2. LISBON CLIMATE CITY CONTRACT 2030

By taking the European lead in climate action, Lisbon is committed to ambitious targets, expressed in its Climate City Contract 2030, focused on five major strategic axes:

- Reduce Greenhouse Gas (GHG) emissions by 80% and accelerate the energy transition, promoting climate change mitigation;
- Adapt the city to extreme events, with a focus on reducing social, economic and environmental impacts;
- Increase sink areas and carbon sequestration capacity, through the enhancement of green spaces and Nature-based Solutions (NbS);
- Ensure a just and inclusive transition, assuring that all citizens benefit from the climate transformation process;
- Promote transversal and integrated interventions, capable of generating synergies and maximizing co-benefits for the city and people.

It is based on current climate projections that Lisbon has committed to acting in a structured, participatory and coordinated way to minimize its impacts. The expected climate scenarios point to:

- Increase in temperature (average, maximum and minimum), in the number of days with values above 35 °C and tropical nights (above 20 °C), with more frequent heat waves and increasing of the "Heat Island" effect;
- Decrease in average annual rainfall (fewer days with precipitation) and increase in water scarcity, with more frequent and intense dry periods;
- Rise in the average sea level and increase in the occurrence of tidal uplift events due to storms;
- Increased frequency of extreme weather events, such as intense precipitation with floods, strong winds with gusts, among other storm situations.

LISBON NEEDS EVERYONE

The complexity of the climate neutrality challenge, coupled with the city's dynamic ecosystem, imposes the urgent need to:

- Involve as many people, companies and organizations as possible;
- Educate for sustainability;
- Promote climate literacy;
- Encourage participatory and responsible citizenship.

For more information see: netzerocities.app/resource-4423

Adapting the city incorporates intervening in the territory to make it more resilient, sustainable, balanced, inclusive and attractive, both for the current population and for future generations. It is investing on co-benefits and raising the quality-of-life standards of those who choose Lisbon to live.

3. LIFE LUNGS FROM PROJECT TO ACTION

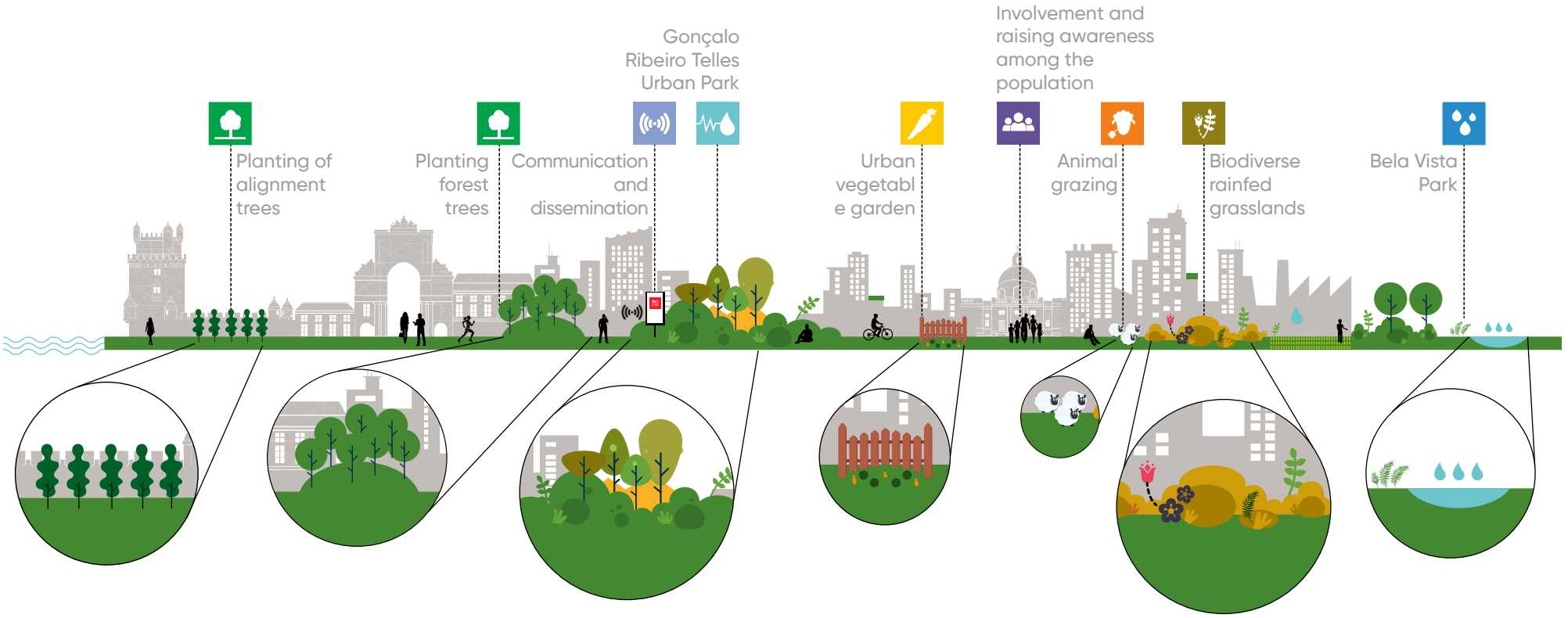
The LIFE LUNGS project was designed to strengthen the city of Lisbon's climate action strategy, promoting the transfer of knowledge, ideas and applicable procedures, combining science with experience in the implementation of Nature-based Solutions (NbS).

Following a holistic and participatory approach, the actions developed have contributed to increasing the city's adaptive capacity, responding to the main climate challenges:

- Increase in temperature – through the enlargement of the green structure, increase in shading areas and the improvement of local microclimatic conditions;
- Reduction of average annual rainfall – with the introduction of solutions with lower water requirements, such as biodiverse grasslands, plantations with native species, pilot systems for efficient irrigation and monitoring;
- Increased extreme precipitation events – by choosing more resilient species, mitigating soil erosion and promoting more effective water retention practices.

ACTIONS IMPLEMENTED

The actions implemented made it possible to increase the city's green structure, integrating various water elements, internally empowering the municipality's services, strengthening strategic partnerships, involving and holding the community accountable in the adoption of more sustainable behaviours, both individually and collectively, and also replicating good practices in other cities and regions, such as Malaga and the Lisbon Metropolitan Area.



3.1. PLANTING TREES AND SHRUBS

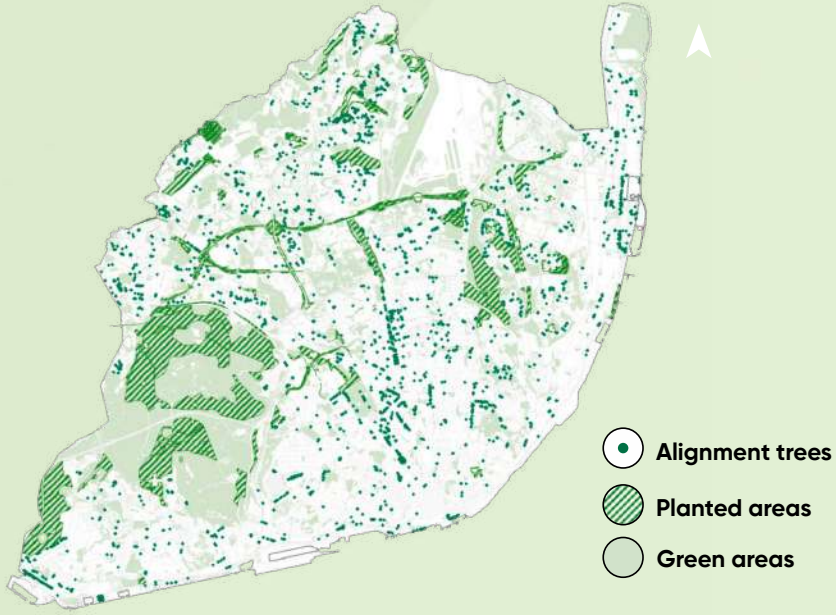
HIGHLIGHTS

The large-scale planting of trees and shrubs in green spaces, and the placement of alignment trees in the streets of Lisbon, with the "A tree on every corner" programme, are key actions in climate adaptation and in achieving the goals defined in **the City's Climate Contract for 2030**.

IMPLEMENTATION

During the planting period, several challenges associated with "**disruptive events" were registered**, with a strong impact on the normality of the city, namely:

- The **COVID-19 pandemic crisis**;
- **Climate change**, with sudden episodes of **intense rainfall**, **prolonged summers** with extreme temperatures and **water scarcity**, associated with long periods of drought;
- The **high number of trees and shrubs** to be planted, in a city 100% classified as **urban land**.



RESULTS

Through the planting actions, developed between 2019 and 2025, Lisbon's green spaces were reinforced and expanded, including greener and cooler streets. The success of this action has allowed:

- **Redefinition of procedures and action strategies;**
- **Training of technical teams;**
- **Deepened knowledge of the adaptability of species** to different urban environments;
- **Registering of tree and shrub heritage;**
- **Resizing and modernisation of irrigation systems,** focusing on water efficiency;
- **Strengthening of municipal investment;**
- **Strengthening of institutional partnerships;**
- **Involvement of the community.**

84 **%** NATIVE FOREST PLANTS USED

228,3 **ha** PLANTATION AREA

116.551 TREES AND SHRUBS PLANTED

3.2. BIODIVERSE RAINFED GRASSLANDS

HIGHLIGHTS

Biodiverse rainfed grasslands are good practice for climate adaptation in the urban context, emerging as an alternative or complementary to traditional lawns, which have greater maintenance and irrigation requirements. Biodiverse rainfed grasslands promote the enhancement of ecosystem services, with special emphasis on biodiversity, food support for livestock and pollinators, and present themselves as low-cost and highly resilient solutions.

IMPLEMENTATION

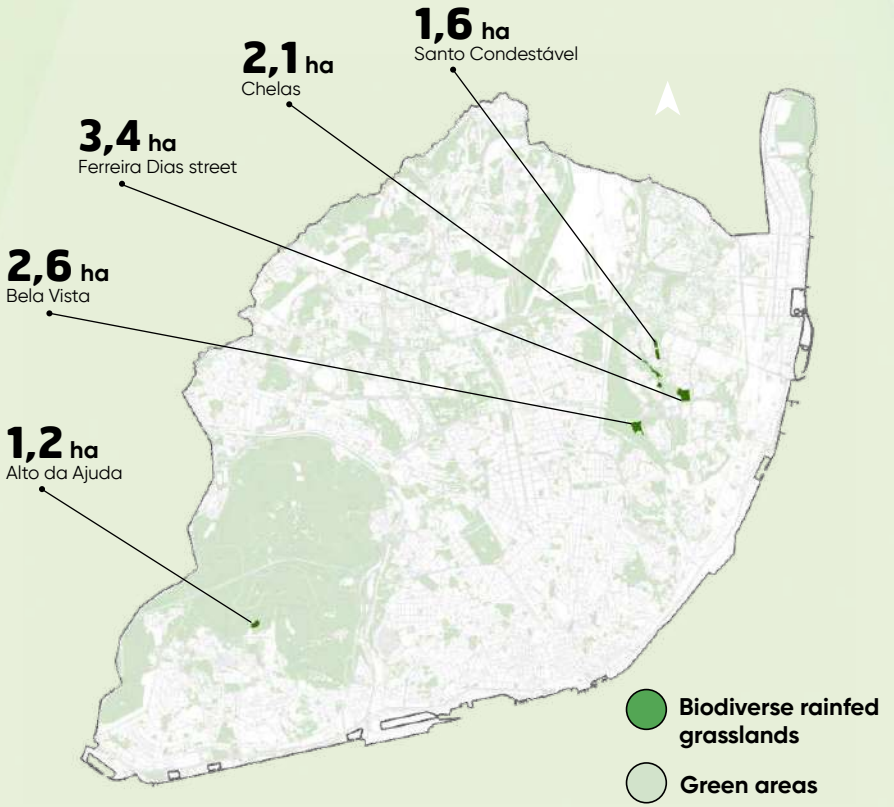
The implementation took place through concerted actions of conversion, preparation and sowing of land. Key challenges included:

- The **appropriate choice of combinations of species**;
- The **adaptation of fertilization needs** to the type of soil;
- Effective **planning for maintenance**;
- The **definition of messaging for public awareness**.

RESULTS

Biodiverse rainfed grasslands contributed to the reinforcing and enhancing this type of vegetation cover in the city, with sowing carried out in 2019 and 2021. This Nature-based Solution (NbS) promotes the balanced growth of herbaceous plants, favouring the control of invasive species, the increase of biodiversity and the ecological resilience of urban spaces.

AREAS INTERVENED WITH GRASSLANDS:



5 SITES INTERVENED

10.9 ha PLANTED AREA

587 Kg SEEDS USED

11 LEGUMINOUS SPECIES INTRODUCED

3.3. ANIMAL GRAZING

HIGHLIGHTS

The practice of grazing in green areas, such as biodiverse meadows with pasture potential, is an innovative and valued approach in Lisbon. The introduction of herds in the city had as its main objectives the replacement of machinery in the maintenance of green spaces and generate environmental and social benefits.

IMPLEMENTATION

The grazing action took place in two distinct phases:

- **Test phase**: carried out over 26 days to assess feasibility;
- **Operationalization phase**: implemented with permanent and rotating grazing over 300 days.

RESULTS

Regular grazing proved to be a fundamental action to ensure the maintenance of green spaces without intensive use of machinery, while promoting the natural fertilization of the soil and the enhancement of the urban landscape. This practice was implemented at an initial stage, between 2020 and 2021, and then between 2023 and 2024.

The daily work carried out with the team of hired shepherds contributed to rethinking new ways of occupying and managing the green areas of cities, in particular with regard to the use of biodiverse rainfed meadows as sustainable pastures.

3 ha GRAZING AREA
326 GRAZING DAYS
6 GRAZING SITES
30 SHEEP

3.4. URBAN VEGETABLE GARDENS

HIGHLIGHTS

Within the scope of the municipal water efficiency strategy, the identification of solutions that promote the reduction of water consumption in Municipal urban vegetable gardens is a relevant challenge for the city and the community, while aiming to promote social inclusion.

IMPLEMENTATION

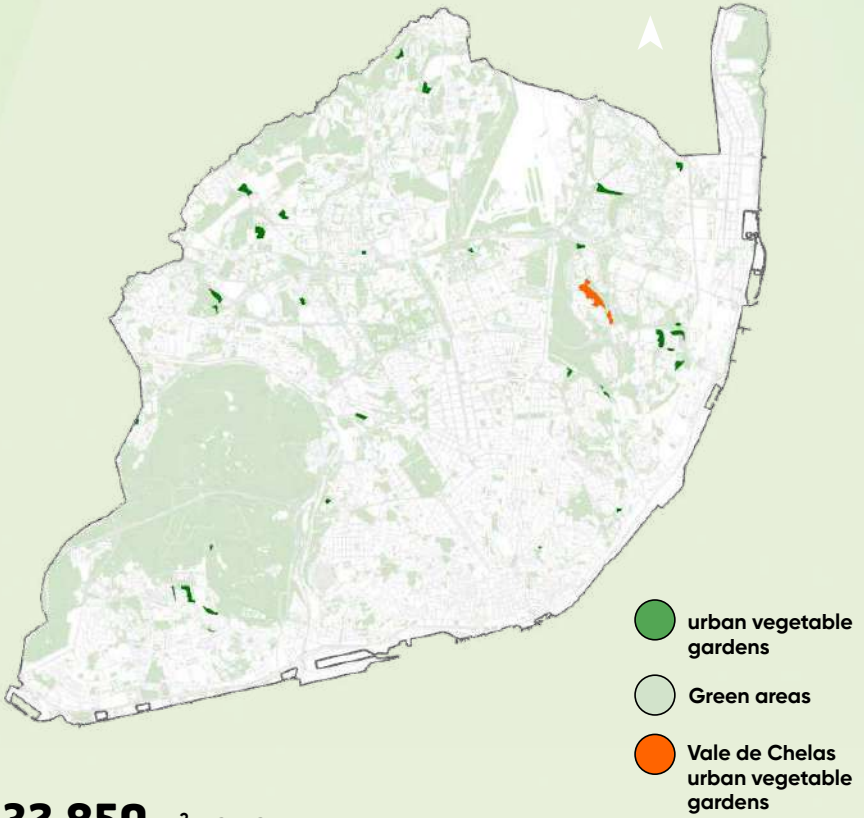
The action focused on the implementation of a pilot project for efficient water management in the Vale de Chelas urban vegetable gardens, consisting of:

- An intelligent remote-control system, with a main meter that limits irrigation schedules, allowing the definition of periods of "no irrigation" and adjustable according to the occurrence of significant rainfall;
- 65 manual meters, installed at the entrances to the horticultural plots;
- 12 sectoral meters with remote control, allowing the differentiation of consumption between groups of plots and other uses.

RESULTS

As a result of this action, an intelligent irrigation monitoring system, mixed and sectorized, with real-time reading in some sectors, was implemented, complemented by a local monitoring system. The installation took place between 2022 and 2023.

This solution allowed an effective reduction in water consumption for irrigation and promoted a greater acceptance of gardeners to changes in behaviour, both individually and collectively.



32.850 m^2 AGRICULTURAL AREA
220 CULTIVATED PLOTS
150 m^2 PLOT AREA
56 SHARED SHELTERS

3.5. BELA VISTA PARK

HIGHLIGHTS

Associated with the challenge of promoting efficient water management, it is essential to find in situ solutions capable of reducing consumption and valuing the use of rainwater. It is in this context that the retention basin of the Bela Vista Sul Urban Park arises.

Although initially only the creation of a retention basin was planned – a temporary pond fed by surface runoff and infiltration – the final solution also integrated a permanent pond with aquatic plants, flanked by riparian vegetation, trees and shrubs in the surrounding area, in response to requests from the community.

IMPLEMENTATION

The retention basin implemented in the Bela Vista Sul Urban Park consists of a pond with an area of 1,700 m2 (1400 m2 fed by rainwater and 300 m2 by drinking water), ensuring its permanence throughout the year.

This solution aims to:

- Contribute to local water needs;
- Create a humid habitat;
- Valuing the landscape and biodiversity;
- Incorporate the preferences of the local community.

RESULTS

The retention basin implemented in 2024 constitutes a Nature-based Solutions (NbS) of relevance to the Bela Vista Sul Urban Park, with the potential to be replicated in other green spaces in the city.

1.700 m^2 BASIN AREA

700 m^3 BASIN CAPACITY

682 PLANTS

(62 IN THE SURROUNDING AREA AND 620 ON THE BANKS)

3.6. GONÇALO RIBEIRO TELLES URBAN PARK

HIGHLIGHTS

The investment made by the municipality in Nature-based Solutions (NbS), focused on people and *climate proof*, transformed the old Praça de Espanha into the current Gonçalo Ribeiro Telles Urban Park. This project is an excellent case study for monitoring the positive impacts associated with:

- Cooling by creating a local microclimate;
- Flood control and regulation of flood peaks;
- Efficient water management, responding to periods of scarcity.

IMPLEMENTATION

The implemented solution includes the creation of a local monitoring station, consisting of the following equipment:

- A system for measuring the affluent flow rate into the drainage network;
- A weather station;
- An air quality measuring station;
- A noise station;
- Two piezometers.

RESULTS

This action, implemented in 2025, allows monitoring the co-benefits resulting from the transformation of an urban square into a green park:

- Connecting the Green Corridor of the Monsanto Forest Park and the city center;
- Strategic point in the drainage network, integrated in the Alcântara basin, responsible for the drainage of two thirds of the city;
- Space built in close relationship with nature, less demanding in maintenance and irrigation, and enriched in biodiversity.

In the medium and long term, this initiative reinforces the city's network of real-time environmental monitoring stations, making it possible to quantify the cost-benefit of Nature-based Solutions (NbS) in climate adaptation.

13 ENVIRONMENTAL PARAMETERS MONITORED

6 ha INTERVENED AREA

1.500 m³ CAPACITY

3.7. INVOLVEMENT AND RAISING AWARENESS AMONG THE POPULATION

HIGHLIGHTS

The challenges related to the goals and objectives of the Climate Contract of the City of Lisbon 2030 involve the entire community: everyone has an essential role on the path towards climate neutrality by 2030.

In this context, the LIFE LUNGS project was a relevant reinforcement, due to its connection to several national and international interlocutors.

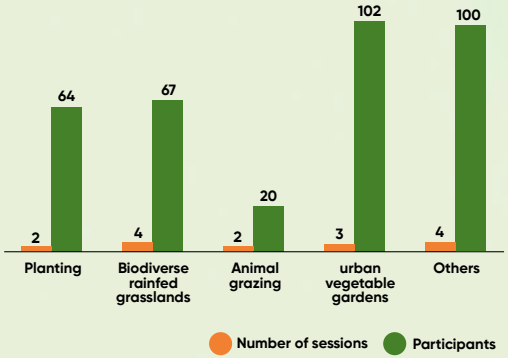
In addition to meetings, events, workshops and technical visits, information and awareness activities were also carried out, as well as community volunteering actions, namely the support of plantations, and training actions, both internal and external.

IMPLEMENTATION

The joint, inclusive and participatory involvement, as a strategy for sharing information, raising awareness and decision-making, required constant attention in the elaboration of a programme aimed at specific audiences and the population in general. This programme communicated the actions implemented, the barriers overcome, the replication carried out and the co-benefits achieved.

RESULTS

Through the involvement, active and informed participation, experimentation, accountability, training and awareness developed between 2019 and 2025, it was possible to reinforce the city's commitment, accelerate the change of individual and sectoral behaviours, promote synergies and deconstruct sectoral and territorial "silos".



This strategy was adopted in all the actions implemented in the project, allowing it to drive an international dimension, with transfer and replication actions to other cities, national and European, with emphasis on the municipality of Málaga, a partner in the project.

44 INITIATIVES CARRIED OUT

28 PLANTING ACTIONS

6.210 VOLUNTEERS

3.8. COMMUNICATION AND DISSEMINATION

HIGHLIGHTS

Investment in clear and effective communication was a fundamental premise for building continuous, participatory and inclusive relationships.

In this context, a set of tools focused on the project's website was created, with a link to the municipality's institutional website and to the social networks of Facebook, Instagram and Twitter.

In addition, several moments of information sharing were promoted, aimed at specific audiences and the general population.

IMPLEMENTATION

The communication plan developed included:

- The creation of the project's website, in June 2020 and on social networks;
- The design of various communication media, namely leaflets, infographics and videos;
- The creation of a page on the Biodiversity4All/iNaturalist platform.

RESULTS

Through these communication channels, it was possible to:

- Ensure the dissemination of the project, both at national and European level;
- Promote networking with other projects, reinforcing synergies;
- Ensure the presence and dissemination of the project in the European Climate Adaptation Platform.

7.916 INDIVIDUALS REACHED THROUGH THE WEBSITE

1.129 FACEBOOK FOLLOWERS

471 POSTS ON SOCIAL MEDIA (FACEBOOK, INSTAGRAM AND TWITTER)

82 PUBLISHED NEWS

9 NEWS REPORTS

27 INFORMATION PANELS INSTALLED

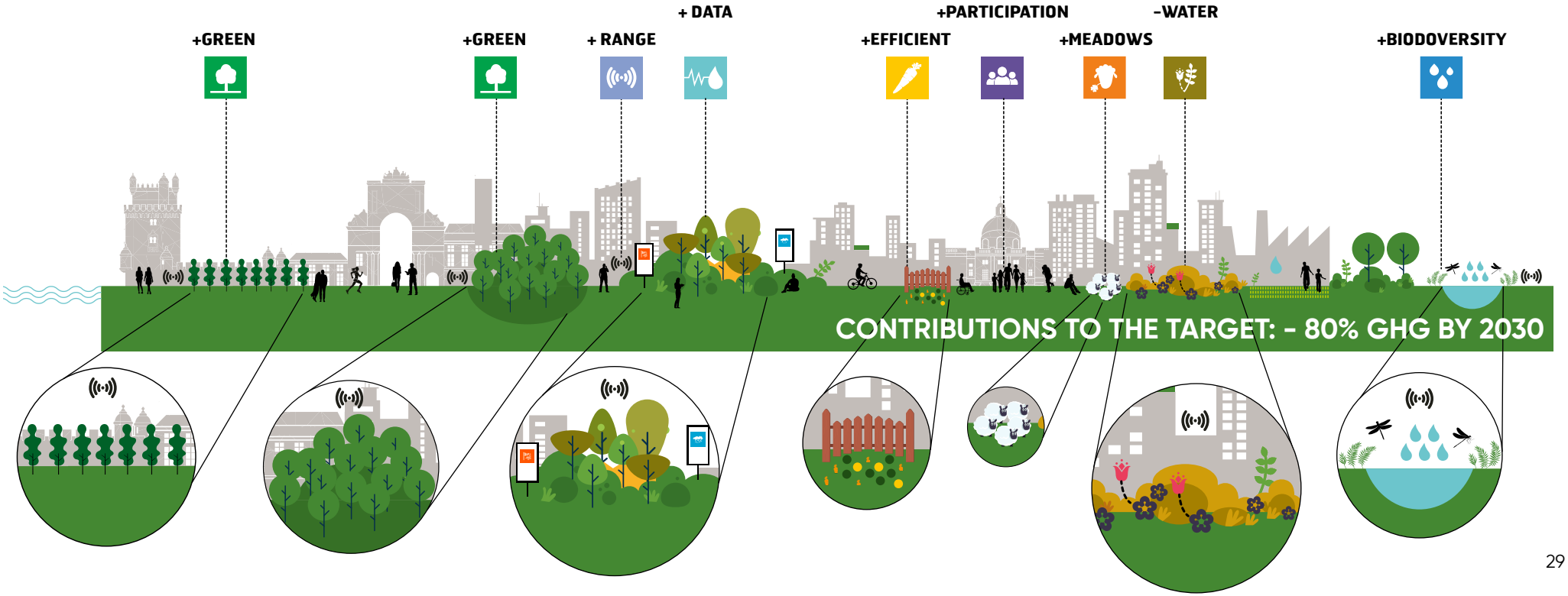
4. FINAL CONSIDERATIONS

Through the implementation of a diverse set of technical and intelligent solutions *in situ*, the LIFE LUNGS project has contributed significantly to the strengthening of the climate adaptation strategy of the city of Lisbon.

The following aspects stand out:

- The increase, reinforcement, consolidation and enhancement of the green area, with parks and gardens, woods and forests, meadows and vegetable gardens and the redefinition of more efficient forms of maintenance;
- Strengthening the adaptive capacity of the green cover in the face of extreme events, drought and rising temperatures, through the combination of more resilient species;
- The promotion of water efficiency, with the implementation of solutions that lead to the reduction of water consumption;
- Real-time environmental monitoring;
- The promotion of a participatory and responsible citizenship, with the involvement of "ALL" in changing behaviours.
- The strengthening of partnerships and the replication of good practices with scientific validation.

Most of the results achieved already allow us to concretely value the importance of the investment made in Lisbon in the implementation and monitoring of Nature-based Solutions (NbS), with direct and immediate impact, but also with relevant effects in the medium and long term, benefiting not only the current population, but also future generations.



5. RECOMMENDATIONS AND FUTURE DEVELOPMENTS

Lisbon has demonstrated a strong commitment to climate action, supported by the implementation of concrete measures, among which the actions developed under the LIFE LUNGS project stand out.

Contributing to mitigating the impacts of extreme weather events, strengthening the city's resilience and improving the quality of life of the population requires joint and immediate action. The mobilization of European, national and private funds has been decisive in positioning Lisbon as a reference point in European climate leadership.

In this context, new challenges arise on several strategic fronts:

- **City adaptation to climate change**
  Strengthen, expand and improve green infrastructure
  Renaturalise spaces and water lines
  Increase in permeable areas
  Improve rainwater management

- **Inspiration and technological innovation**
  Involvement of experts, universities and research centres

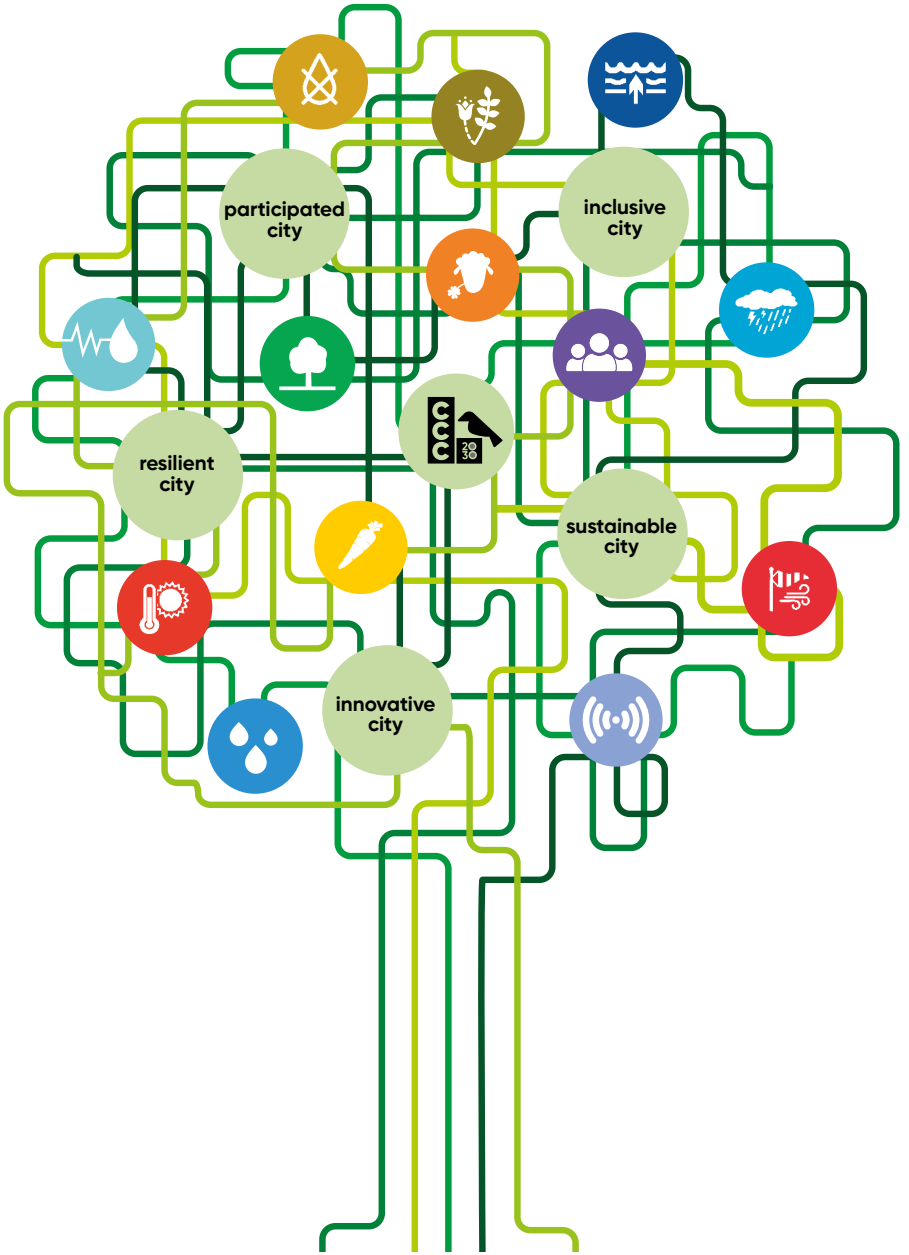
- **Environmental education for all**
  Focus on building a shared vision of Lisbon as a sustainable city

- **Participatory process**
  Strategic axis for an active, informed and continuous involvement of the citizens

- **Intermunicipal and international collaboration**
  Reinforcement of the municipality's technical and partnership

- **Strategic communication**
  Development of a municipal programme aimed at different audiences

- **Continuous real-time monitoring**
  Regular assessment of environmental, heritage, social and economic indicators



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Climate change requires a priority and joint effort.

Lisbon needs everyone.

Coordination:

LISBOA CÂMARA MUNICIPAL

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LCCC 2030 LISBON CLIMATE CITY CONTRACT

European Project:

life LUNGS

Partners:

Ciudad de Málaga | Área de Sostenibilidad Medioambiental

Gerencia Municipal de Urbanismo