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Buenos Aires Life Lab: Rain gardens in the Municipality of San Martín

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Task: **T5.3**

Background (Step 1)

San Martín city faces environmental challenges related to water management in a highly built environment. One-third of the territory lies in the Medrano stream basin, which is characterised by having 74% impermeable land. This reduces water retention and increases flood risks. Insufficient stormwater drainage and green infrastructure worsen these issues, and as well intensifies the urban heat island effect in San Martín.

A hotspot area, the Francia Street, is located in an industrial area, where underinvestment in public spaces and infrastructure in the last decades, along with a lack of resident engagement, have significantly degraded the urban environment.

Given Francia Street's role as a crucial link between the National University of San Martín and General San Martín Avenue, a comprehensive revitalisation of this area is essential.

Core Vision Statement (Step 2)

By 2024, the Municipality of San Martín aims to enhance urban liveability, alleviate drainage issues and reduce water contamination. The specific intervention carefully chosen incorporates Sustainable Urban Drainage Systems (SUDS) in public space for runoff management and biodiversity integration.

NbS details (Step 3)

Rain gardens (RGs) are designed to manage stormwater, alleviate pressure on the drainage system, and enhance water quality by reducing its pollution load by replicating the natural water cycle.

Rainwater from sidewalks, streets, and buildings is directed into the RGs, where it pools and gradually infiltrates the soil through various substrate layers. Excess water is redirected to the drainage system. The substrate layers and plant roots retain contaminants, improving the quality of the water, which is discharged into the nearby Medrano Stream.

Francia Street's RGs play a crucial role in initiating a Blue-Green Infrastructure (BGI) network in Municipaloty of San Martín. This approach is novel to the area and helps raise awareness about the role RGs and SUDS can play in water management, bringing additional benefits when compared with traditional grey infrastructure (e.g., stormwater drains).

Business Model Canvas (Step 4-5-6)

Value Proposition

- A 25.25% attenuation and a 4-minute delay of peak flow, leading to decreased flood risk
- Improvement of the water quality reaching the underground aquifers and the Medrano stream
- Integration of 13 planted and 19 spontaneous vegetation species (plus attraction of insects), to enhance urban biodiversity and restore ecosystem services for climate regulation
- Improving urban liveability by fostering nature interaction, enhancing mental well-being, and enabling learning opportunities
- Improve aesthetic appeal, fostering social interaction spaces within the community and enhancing the appreciation of the surroundings for the passersby

Key Activities

- Community participation for social engagement and consent
- Construction of RGs, with pervious bottom and filter beds for infiltration
- Adaptation to existing storm water system and redirection of roof storm water drains to the rain gardens
- Plantation of vegetation
- Incorporation of explanatory signage

Key Resources

- External consultancy with specialists: civil engineers, urban planners, landscape designers
- Municipal employees from different departments
- Material supply: plants, composted soil, recycled plastic lightweight aggregate, hydrogel, geotextile membrane, coarse-grained stone, PVC pipes and accessories
- Necessary tools

Key Partners

- National and international researchers (UBA/ CONICET-CONEXUS), and other experts
- Other departments of the Municipality not directly involved in the project, such as Public Communication

Key Beneficiaries

- Direct beneficiaries: Factory owners and workers, University students, Passersby
- Indirect beneficiaries: Surrounding streets' residents, primarily those living in an informal settlement and small local businesses in the vicinity

Governance

Collaborative work among various departments of the Municipality, and with technical experts:

- General Direction of Urban Planning: general coordination, project design and budget management.
- General Direction of Urban Maintenance for implementation and maintenance.
- Experts and researchers: technical expertise, monitoring and evaluation.

Cost Structure

- Planning costs: Personnel for site pre-existing conditions assessment, community engagement activities, technical external consultancy and project design.
- Capital investment costs: Personnel and material costs for construction of basins and drainage pipes installation, filter bed disposition and planting. Explanatory signage design and installation.
- Operation costs: Personnel and material costs for general maintenance (irrigation, fumigation, pruning, and replacement of vegetation), as well as urban cleaning staff.

Cost Reduction

The implementation of RGs relies on both readily available materials, tools, as well as easily attainable and executable techniques. These interventions hold a significant advantage in terms of their considerably low costs, particularly when compared to conventional drainage systems. Personnel involved in capital investment and operation cost stages can be internal municipal employees already engaged in tasks related to public space and landscaping.

A reduction in costs stemming from the impact of extreme events, which are occurring more frequently.

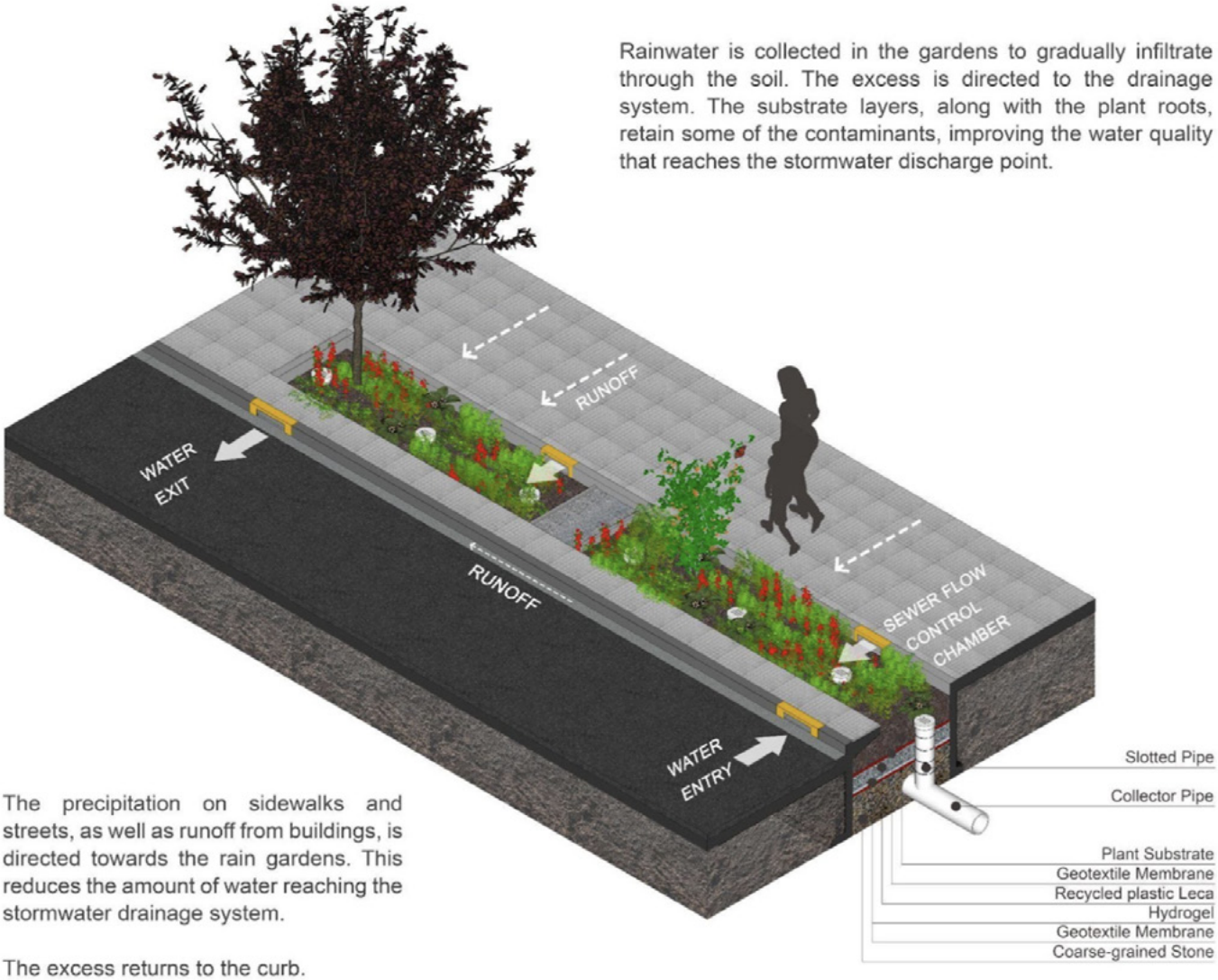
Capturing Value

- Avoided costs, as a reduction of infrastructure damage is expected.
- Species inventory to record spontaneous flora on the site, and assessing the biodiversity enhancement.
- Perception analysis through a social survey, assessed through contingent valuation to establish the willingness to pay for the maintenance of the system.

How do rain gardens work?

These are Nature-Based Solutions designed to manage stormwater, alleviating pressure on the drainage system, as well as reducing its pollution.

Rainwater is collected in the gardens to gradually infiltrate through the soil. The excess is directed to the drainage system. The substrate layers, along with the plant roots, retain some of the contaminants, improving the water quality that reaches the stormwater discharge point.



The precipitation on sidewalks and streets, as well as runoff from buildings, is directed towards the rain gardens. This reduces the amount of water reaching the stormwater drainage system.

The excess returns to the curb.

Lessons Learned:

- The main lesson learned concerns the **feasibility of implementing Nature-Based Solutions** (NbS). The guide 'Capturing the Values and Making the Business Case for Nature-Based Solutions" serves as a highly valuable tool for making these interventions more accessible, as as it offers a variety of tools at each step that gradually help users understand and adopt the implementation process.. These tools span from facilitating the compilation and synthesis of gathered information to aiding in the technical delineation and ensuring the proper implementation of NbS. This explanatory approach, which introduces key concepts, is particularly crucial for promoting NbS, which remain not yet widely disseminated in many parts of the world and are often perceived as complex or less essential compared to more immediate needs.
- The fact that the guide proposes interpreting the intervention within its context enhances a comprehensive understanding, crucial for the entire implementation process. It highlights the importance of thinking in a coherent and interconnected manner, not only across planning components but particularly from a pragmatic perspective.

  For instance, when addressing stakeholders, it provides a starting point for considering their engagement and defining the contributions they must make, while also aligning these considerations with an analysis of existing resources and those required for implementation, taking into account the question of governance. The included Business Model Canvas serves as a concise and invaluable tool in this regard, offering a synthetic overview that enhances strategic planning.
- Another key lesson learned during the implementation of the guide is **the importance of transcending the technical discipline.** The guide continuously invites feedback on definitions with a wide range of data —social, economic, and health-related— as well as insights into institutional processes. This approach goes beyond the requirements of NbS to precisely define and determine how NbS can be effectively implemented.

  Furthermore, it encourages consideration of the comprehensive value that these interventions generate, recognising that their benefits extend beyond economic value to encompass social well-being. This broad understanding allows for a holistic appreciation of the benefits, providing stakeholders with the necessary tools to promote these interventions effectively.

This case study applies the valorization framework outlined in the guide "Capturing the Values and Making the Business Case for Nature-Based Solutions" (Konijnendijk et al., 2024). Tested in Turin, Barcelona, Lisbon, Lima, and Buenos Aires, the methodology provides a systematic approach to assess, communicate, and leverage the environmental, economic, social, and health benefits of NbS, ultimately supporting their implementation.

Reference:

Konijnendijk, C., Di Cagno, F., Borelli, S., Wild, T. (2024). Capturing the Values and Making the Business Case for Nature-Based Solutions: A Step-by-Step Guide. Deliverable 5.3, H2020 CONEXUS project.

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