Francia Street Rain Gardens: SuDS Implementation

The Municipality of General San Martín (MGSM), Buenos Aires, led a project to build linear Rain Gardens (RGs) along Francia Street as part of a Sustainable Urban Drainage System (SuDS) to manage stormwater. As a novel technology for the region, the RGs proved to be cost-effective and socially profitable.

1506m³ water retained
21% of the total runoff

173m² green area
13 planted + **19** spontaneous
flora species

Social Return on Investment:
13% Internal rate of return (IRR)

Nature-based Solutions Benefits

Human Wellbeing

Resilience

Challenges

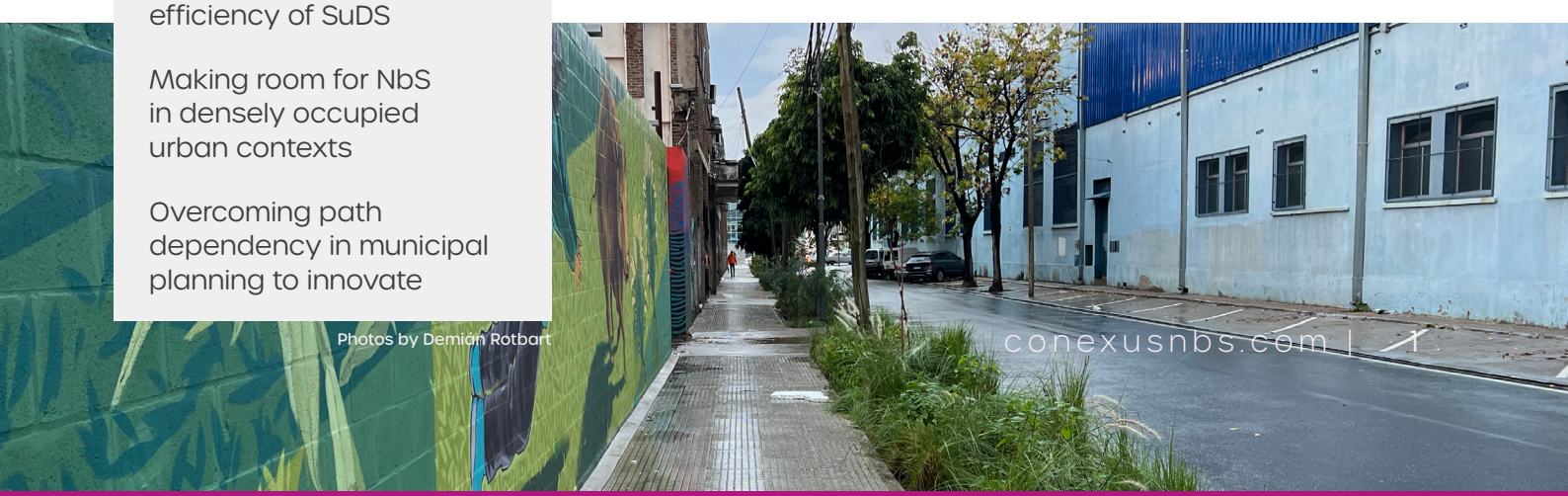
Demonstrating the efficiency of SuDS

Making room for NbS in densely occupied urban contexts

Overcoming path dependency in municipal planning to innovate

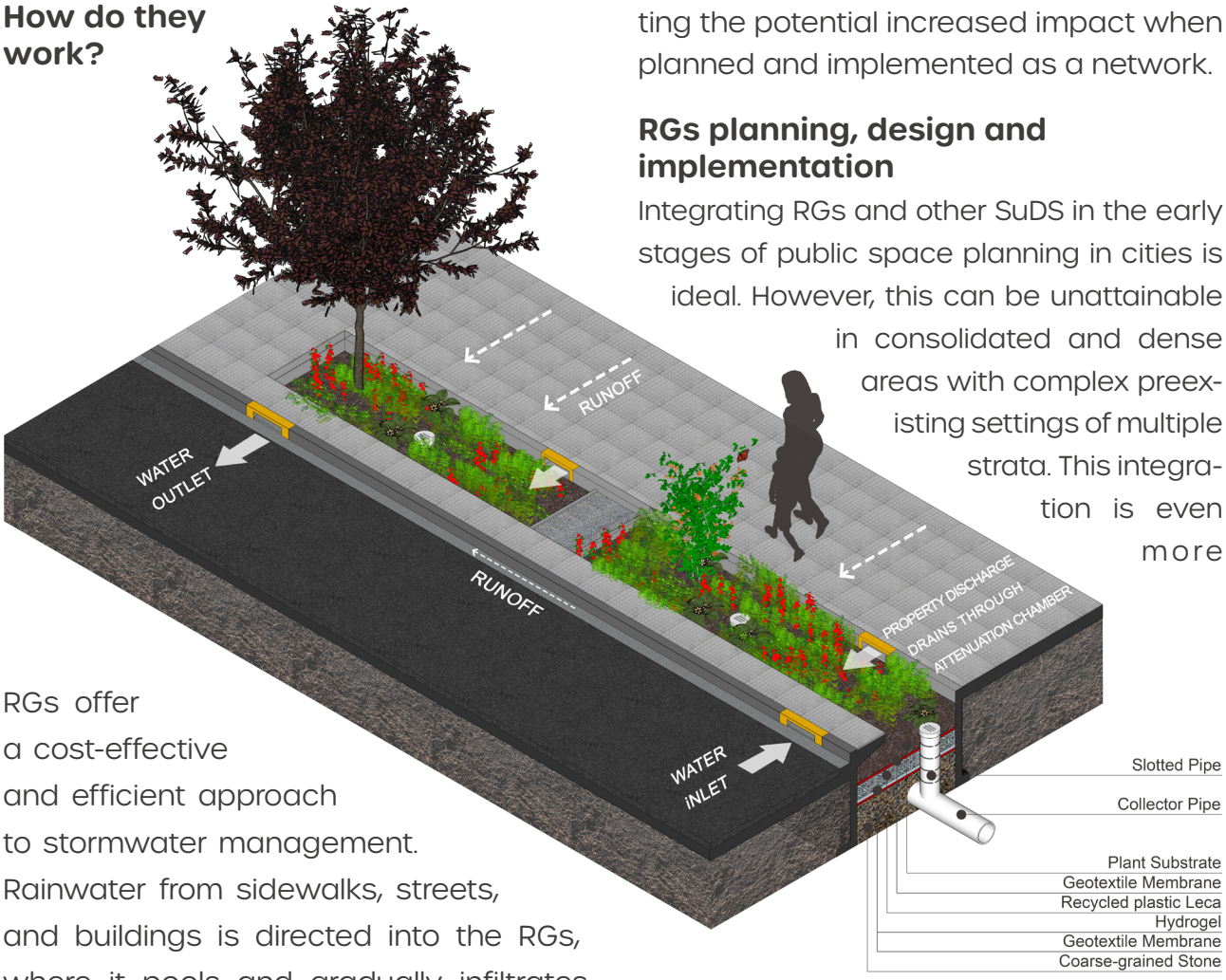
Background

This pioneering Sustainable Urban Drainage System (SuDS) project is located in the Medrano Stream Basin, within the Municipality of General San Martín (MGSM) in the Buenos Aires Metropolitan Region. This basin has highly impervious soil and is prone to flooding. Francia Street, located in an industrial area with a nearby informal settlement, is a key axis connecting a public transport corridor with the National University of San Martín (UNSAM). It is used by residents, workers, and the UNSAM community. As part of the SuDS, RGs are developed to manage stormwater, reduce drainage system pressure, and improve water quality by decreasing pollutant loads. They replicate the natural water cycle through retention, accumulation, evapotranspiration, and filtration. Additionally, the project enhances amenities, bringing new vitality to the area.



Photos by Demian Rotbart

Francia Street Rain Gardens: How do they work?



RGs offer a cost-effective and efficient approach to stormwater management. 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 discharged into the Medrano Stream.

Francia Street's RGs play a crucial role in initiating a blue and green NbS network in MGSM, marking the region's first intervention of this kind. They provide a tangible example and practical demonstration to validate nature-based technology, enabling assessment and critical studies. This pilot raises awareness about the role of SuDS in water management, showcasing their benefits and highlighting the potential increased impact when planned and implemented as a network.

RGs planning, design and implementation

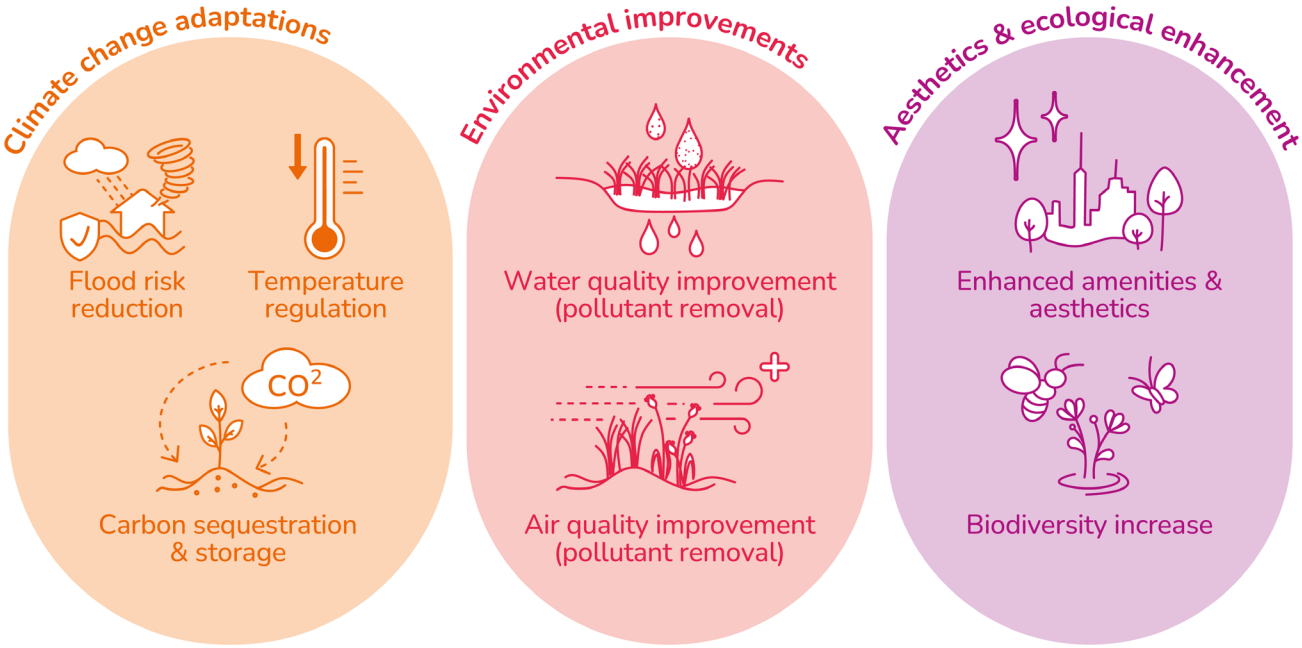
Integrating RGs and other SuDS in the early stages of public space planning in cities is ideal. However, this can be unattainable in consolidated and dense areas with complex preexisting settings of multiple strata. This integration is even more challenging in low- and middle-income cities due to unexpected interferences caused by irregular infrastructure connections, which are common in Latin America. Such difficulties imply higher costs of retrofitting and require innovative, adaptable design and management tailored to local contexts and specific site conditions, ensuring that existing infrastructure and land uses are not disrupted. The careful planning of SuDS and adaptable strategies during the execution stage are essential to navigate these complexities. Pilot projects can help test and refine approaches before broader adoption, ensuring the RGs are effectively implemented in suitable locations.

Cost Benefit Analysis

The benefits provided by RGs were measured and valued through a Cost-Benefit Analysis (CBA), demonstrating their significant long-term economic advantages. The CBA for this pilot used construction costs reported by *MGSM*, projected maintenance costs, and the benefits of the ecosystem services provided by the project. Benefits were measured using defined indicators and case-specific value equations. When specific data were lacking, parametric methods were used to account for the benefits, which refers to using equations and prices calculated in other studies and applying them to the present case, while considering the context differences between both cases for adaptation).

The socioeconomic performance of the RGs was evaluated using Net Present Value (NPV) and Internal Rate of Return (IRR) tools. NPV assesses the value of a project by comparing the present value of expected benefits to the costs, determining if the project's benefits outweigh its costs. A negative NPV suggests the project may not be worth pursuing. IRR is a metric that estimates the annual rate of return a project is expected to generate, given its cash flow. If the IRR is higher than the discount rate for the project, it can be considered socially profitable. These tools allow the comparison of various costs and benefits while comparing the social performance or yield of alternative projects. Considering the combined costs and benefits of the RGs, the NPV was calculated as €61,499, indicating social profitability (positive NPV) for the discount rate used (5%). The project's IRR is 13%. That means the discount rate could be increased to 13% while ensuring the project is financially feasible and socially viable.

Rain Gardens bring extra benefits compared to traditional stormwater infrastructure, and proved to be cost-effective and socially profitable.



Francia Street Rain Gardens: Benefits identified

Challenges to scaling up SuDS

The aim of upscaling RGs into a larger network can contribute to more resilient cities and enhance the potential of urban water management to mitigate flooding, reduce water pollution, and improve urban green spaces. The challenge lies in coordinating efforts across various stakeholders, and overcoming technical, institutional, and logistical barriers.

To improve NbS implementation, there needs to be more supportive policies and an enabling decision-making environment. The lack of supporting policies can impact the implementation process in several ways. Uncertainty about regulatory requirements and approval processes is common without clear policies, leading to delays in project initiation and increased implementation costs. Additionally, securing adequate funding can be challenging without supportive policies. Therefore, establishing policies and regulations that support and promote NbS can facilitate the widespread adoption of SuDS in urban planning and water management policies.

Related Projects

Factsheet - Valdocco Vivibile
www.conexusnbs.com/life-labs/turin

Factsheet - Wetland Lugano
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Lessons learned

1. RGs are an effective tool for managing urban drainage, particularly in terms of improving the quality of the water discharged to receiving water bodies.
2. Even in dense urban areas, it is possible to make room for NbS.
3. The cost-benefit analysis demonstrates that RGs are socially profitable.

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City Partners

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October 2024. Texts by Arq. Demián Rotbart (MGSM/UBA), Dra. Mariana Giusti (US/UBA), Dr. Daniel Kozak (CONICET/UBA) and Dra. Hayley Henderson (ANU/UBA). Figures by Natalia Felder. Edition by M. van Lierop and K. Enu, design and layout by S. Chan, TUM.