SANTIAGO

PILOT 2. Restoration of the ecosystem of an abandoned public space, Miyawaki Forest

CONEXUS

Urban nature connects us
Conectados por la naturaleza urbana
Conectados pela natureza urbana

conexusnbs.com

SANTIAGO

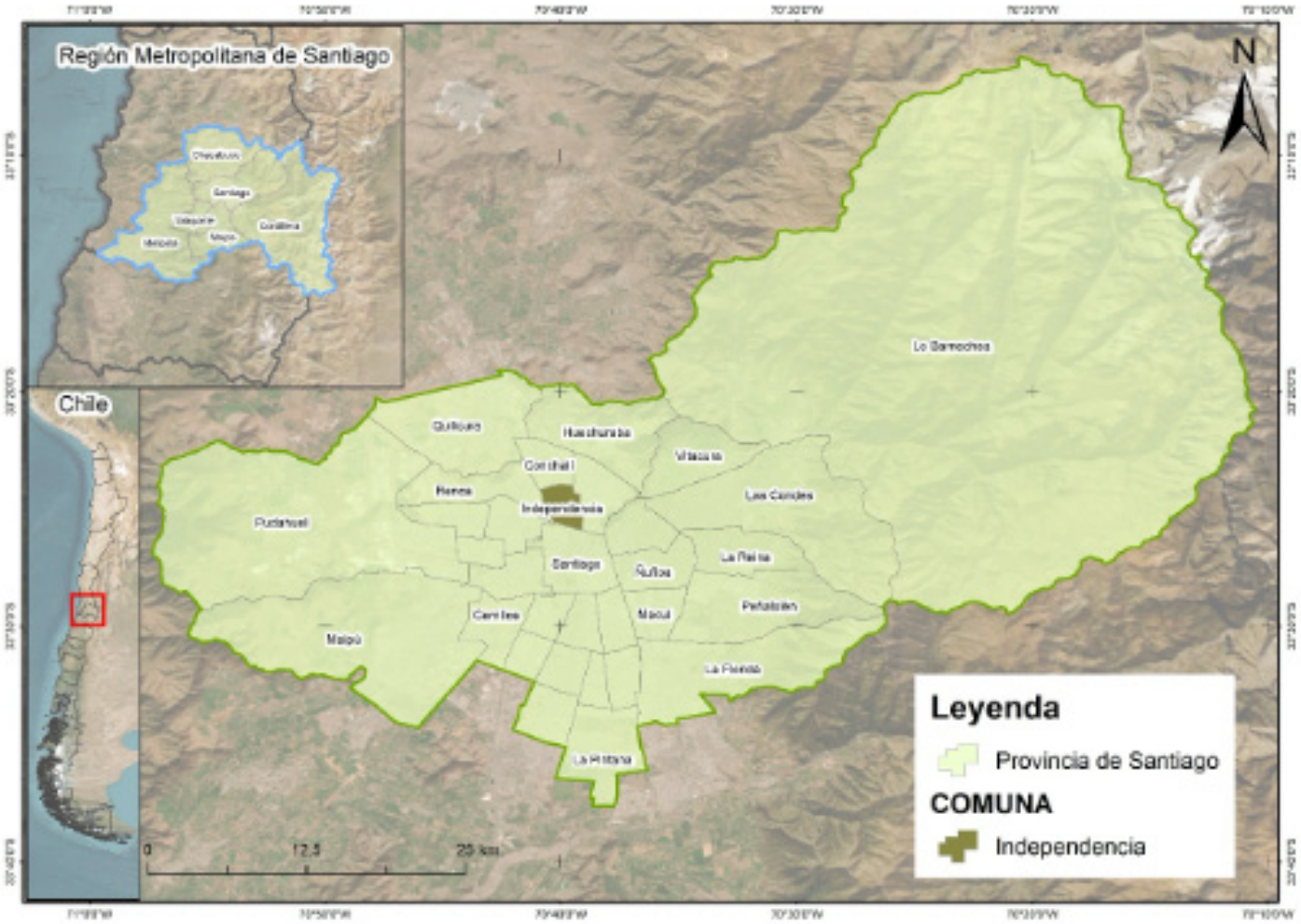
PILOT 2. Restoration of the ecosystem of an abandoned public space, Miyawaki Forest

Start date: July 2023 **End date:** September 2024

What and Where?

Location:	Comuna de Independencia.
NBS type, and habitat/s to be created or restored:	Ecosystem restoration in disused public space.
Ecosystem services:	Temperature regulation, increased carbon sequestration, increased pollination, increased biodiversity, nutrient cycling support services, soil erosion control, soil moisture control, and, in addition, cultural and recreational activities.
Management & maintenance:	

Map



Santiago Metropolitan Region

Why?

Repurposing an abandoned public space in a socially segregated municipal district. The public space is located adjacent to the educational centre, the Environmental Practice Center (EPC), which serves as a hub for the community, promoting sustainable activities such as developing community gardens and composting using organic waste contributed by the community's residents.

The pilot involved developing the Miyawaki forest, which benefits from having a specialised environmental centre responsible for its ongoing maintenance. The centre also welcomes students and residents who are interested in learning about conservation and restoration and are guided by its staff. The participants also have free access to the Miyawaki forest as part of the Municipality environmental education activities of Independencia.

The forest will be accessible to the community after two years of maintenance and temporary closure. This period of protection, monitoring, and restricted access is designed to ensure the forest achieves proper growth. This means the plant species develop deeper roots and vigorous vegetative growth, making them more resilient to long-term adverse conditions. During this time, the regional government has overseen the adequacy of the pilot project.

How?

The design of the urban forest using the Miyawaki technique was carried out in collaboration with a specialist consultancy firm, which incorporated the following parameters:

- Zoning of the space before planting, differentiating types of forests based on the orientation of species (greater or lesser solar radiation) and land topography, listing of species by type of forest, which were divided into xerophilic forest (species with lower water requirements), mesophilic forest (species with moderate water requirements), and hydrophilic forest (species with higher water requirements).
- During implementation, the main technical aspects were considered, such as Preparing and improving the soil before starting planting, installing a drip irrigation system, using tutors for each planted species, incorporating organic mulch over the entire planting surface, protecting the soil from moisture loss through evapotranspiration, and protecting the planting perimeter with the installation of a fence.

Key social aspects considered in this initiative:

- During the planting phase, the local and regional government engaged the local community, inviting many local actors, including community leaders, representatives from Indigenous communities, and neighbours. This participatory process reinforced a sense of belonging and commitment.
- The engagement of the environmental practice centre, EPC, was key in the process. They were trained on the Miyawaki technique and its maintenance.
- Additionally, educational workshops and guided tours were conducted with the local community to showcase the forest's fast growth and provide participatory environmental education.

During the maintenance and monitoring phase, relevant aspects were detected:

- The municipality, along with the regional government, agreed with the community EPC that they would be in charge of monitoring the forest for two years from the planting stage.
- The recorded indicators are (1) survival percentage, (2) average height of three species predominating in the forest, (3) identification of species in the forest listed under conservation, (4) Flora biodiversity, calculated using the Shannon index, and (5) air and soil temperature inside the forest versus pavement temperature.






So what?

The initial results from the environmental indicators were recorded in February 2024, six months after the intervention began. Key findings include:

1. **Plant survival rate: 84%**
2. **Heights of dominant species in the forest:**

Species (Científic name and common name)	Height measured after 6 months
2.1. Psoralea glandulosa (Culén)	3,6 mt height
2.2. Prosopis chilensis (Algarrobo)	2,10 mt
2.3. Senna candolleana (Quebracho)	1,8 mt

3. **Identification of species in the forest listed under conservation categories:**

Species (Científic name)	Species (common name)	Conservation category
3.1. Citronella mucronata	Naranjillo	VU (Vulnerable)
3.2. Lithrea caustica	Litre	LC (Preocupación menor)
3.3. Prosopis chilensis	Algarrobo	VU (Vulnerable)
3.4. Schinus latifolius	Molle	VU (Vulnerable)
3.5. Schinus polygamus	Huingán	LC (Preocupación menor)
3.6. Cordia decandra	Carbonillo o Carbón	NT (Casi Amenazada)
3.7. Monttea chilensis	Uvillo	EN (En Peligro)
3.8. Porlieri chilensis	Guayacán	VU (Vulnerable)

4. **Flora biodiversity was calculated using the Shannon index, which reflects the heterogeneity of a community based on species richness and relative abundance.** The index ranges from 0.5 to 5, with values under 2 indicating low biodiversity, values between 2 and 3 representing a normal range, and values over 3 indicating high biodiversity. The Shannon Index for the Miyawaki pilot forest is 3.7, indicating high biodiversity.

5 **Air and soil temperature records (inside the plantation and on the adjacent pavement) showed the following indicators:**

*Measurements were made in all three types of forests, xerophytic forest, mesophilic forest, and hydrophilic forest, for this indicator.

	Average air temperature	Average soil temperature
Xerophytic forest	28,3 °C	24,7°C
Mesophilic forest	27,7°C	23,3°C
Hydrophilic forest	27,3°C	22,7°C
Pavement right in the forest	32,3°C	35°C

These initial results suggest that the pilot project mitigated some of climate change's negative effects.

Furthermore, encouraged by the success of the results, the Santiago Government is promoting the development of Nature-based Solutions (NbS) in various ways:

1. Update the GS sustainability guide to incorporate the NBS approach for all public space investment projects funded by the Regional Government. This includes multidisciplinary participatory workshops to educate about NbS and integrate diverse perspectives from planning and evaluation teams.
2. Develop a program to build urban forests using the Miyawaki technique. Specifically, the Program **"33 Pocket Forests for 33 Municipalities of the Metropolitan Region."**
3. Incorporating the NBS concept and criteria into the two most important planning instruments at the regional level, i.e., the Regional Development Strategy 2035 (ERD) recently approved and the Santiago Regional Master Plan update (PRMS 2050 in progress).

Project Partners

University of Sheffield · SLU · oppla · ICLEI Local Governments for Sustainability · Pontificia Universidad Javeriana Colombia · Università degli Studi Firenze

Instituto Humboldt Colombia · Lisboa Câmara Municipal · ICS Instituto de Ciências Sociais · Universidad de Chile · Technische Universität München · USP

CONICET · Universidad de Buenos Aires · .UBA Universidad de Buenos Aires · EUKN · Living Cities and Communities · Wageningen University & Research

BR Barcelona Regional Agência Desenvolupament Urbà · CREAF · BA Buenos Aires Ciudad · Cidade de São Paulo Verde e Meio Ambiente · Food and Agriculture Organization of the United Nations · ciudad viva

Universidad Mayor para espíritus emprendedores · USC Universidade de Santiago de Compostela · indsoft · GS Gobierno de Santiago · San Martín · Città di Torino

Grupo Verde Urbanismo Ambiental Arquitectura del Paisaje · LALI Iniciativa Latinoamericana del Paisaje · Ministerium für Umwelt, Naturschutz und Verkehr des Landes Nordrhein-Westfalen · Programa Cidades Sustentáveis · Torino Urban Lab

CONEXUS
Urban nature connects us

instagram.com/conexusnbs

twitter.com/conexusnbs

conexusnbs.com

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no. 867564