

## 13. Araucárias Square: rain garden and pocket forest



**Type:** bottom-up (grass-roots initiative)

**Region:** southeast

**State:** São Paulo

**Biome:** Atlantic Rainforest, cerrado  
(Brazilian savannah)

### City of São Paulo

**Population:** 12 176 866 (estimated 2018)

**Area:** 1528.5 km<sup>2</sup>

**Elevation:** 760 m

**Coordinates:** 23.557386 S / 46.737778 W

**HDI:** 0.805 (2010) <sup>117</sup>

### Context

The climate in São Paulo has changed <sup>118</sup> from light rain and cool year-round, to mostly dry and hot. The city is vulnerable to urban heat-island effect and recurrent severe floods with the strong storms caused by land-cover change. The waters are contaminated by sewage discharge and diffuse pollution <sup>119</sup> caused by storm-water run-off.

### Challenges

In São Paulo, with urban growth and consequent landscape change, about 3 000 km of watercourses disappeared from the landscape,

which leads to constant floods. This square is located about 50 m from the larger, mainly paved Batata's <sup>120</sup> Square. Before the car-oriented urban development, the neighbourhood was calm and walkable, with

<sup>117</sup> <https://cidades.ibge.gov.br/brasil/sp/sao-paulo/panorama>, accessed: 8.11.2018.

<sup>118</sup> Lima, G. N. and Rueda, V. O. M. (2018), 'The urban growth of the metropolitan area of São Paulo and its impact on the climate', *Weather and Climate Extremes*, Vol. 21, pp. 17-26, available at: <https://www.sciencedirect.com/science/article/pii/S2212094718300082>

<sup>119</sup> Vivacqua, M. C. R. 'Qualidade da água de escoamento superficial urbano — Revisão visando o uso local' (master's thesis), Escola Politécnica da Universidade de São Paulo, 2005 (in Portuguese).

<sup>120</sup> Batata means potato in Portuguese. <http://largodabatata.com.br/>, accessed: 30.1.2018.

mixed uses (residences, shops and services), and social life happening in the former square in front of the local church. The area was severely impacted by the opening of large streets, with negligible consideration for residents, users and pedestrians.

## Objectives

- Recover ecological functions.
- Introduce native biodiversity.
- Manage storm water to avoid floods.
- Provide urban public spaces.

## Actions

The urban polygon is around 650 m<sup>2</sup>. The first thing that was done was to take the fences out, remove 10 full truckloads of debris and waste, and remove four men who informally lived inside. Social assistants from the Social Assistance Agency took care of them and relocated them to a more adequate place. Then the company that had built the three petrol tanks underground was hired to remove them, and during the excavation process two more illegal tanks were discovered. The area went through a decontamination process. Under the debris they discovered fertile soil from the Pinheiros river floodplain. The river was rectified and channelised and is now located 650 m to the west.

The design was made on-site, due to the unique conditions and financial constraints. Benches were strategically located to provide resting places for users.

The area was a petrol station that was deactivated to open a new high-traffic street, which divided the lot into two separated spaces. Then the lot was fenced and abandoned for years following the demolition of the petrol station. It was used as a rubbish dump site.



Figure 65. Before, the area was fenced and derelict.



Figure 66. After the transformation with planting of native species.

The vegetation selected for planting is autochthonous, with small patches of three different ecosystems: forest, cerrado (Brazilian Savannah), and wetlands. Among the forest trees there is a rare species, *Ficus organensis*, in addition to the *Araucaria angustifolia* pine trees and palms that were present in the riparian forest along the Pinheiros river before urbanisation took place. Herbaceous native and edible plants were also planted; many seedlings and seeds were also brought by the participants in the planting.

## Stakeholder involvement

There was active participation by residents and leaders of the grass-roots movements to transform this remnant derelict piece of land and the triangle-shaped lot across the road. The grass-roots movements involved are: A Batata precisa de você <sup>121</sup> (the potato square needs you), Florestas de Bolso de São Paulo <sup>122</sup> (pocket forests of São Paulo) and Novas Árvores por Aí <sup>123</sup> (new trees all over).

The planting of the pocket forest was carried out in June, and the rain garden in December 2017. Social media is being used to invite and motivate volunteers to participate in the collective efforts to plant pocket forests in small plots of land in a few



Figure 67. After the transformation with planting of native species.

hours. It is a social experience, with people of all ages coming from various districts to actively contribute to reintroducing nature in the city.

The city, represented by the district mayor (sub-prefeito de Pinheiros), gave the authorisation to implement the project, once the process was done.

## Implementation

The project was implemented in June and December 2017.

A resident committed to contributing to the neighbourhood funded the project and adopted the area to maintain and protect the new pocket park. Other leaders worked voluntarily and an engineer was hired to develop the run-off collection and drainage system.



Figure 68. After the planting, storm water of 1 000 m<sup>2</sup> of paved surface was conducted to the rain garden and infiltrated, avoiding recurrent floods in the region.

121. <http://largodabatata.com.br/a-batata-precisa-de-voce/>

122. <https://arvoresdesaopaulo.wordpress.com/florestasdebolso/>

123. <https://novasarvoresporai.wordpress.com/>

## Outcomes

Araucárias <sup>124</sup> Square is a pioneer public rain garden in São Paulo city that collects, filters and infiltrates the run-off <sup>125</sup> of impervious land cover, and has become an example that can be implemented in other public and private spaces.

The rain gardens are being monitored by the team who led the planning, design and implementation. On 21 January 2018, a storm led to 67 mm of rainfall in 45 minutes. The rain garden collected the run-off of approximately 900 m<sup>2</sup>, and in 4 hours the water had already percolated underground. The plants grew fast; 10 months later the biodiversity is blooming with flowers, butterflies and trees, offering multiple benefits:

- milder temperatures with shaded paths for pedestrians;
- mitigation of floods in the area;
- areas for people relax and enjoy nature in the heart of the metropolis;
- the disappearance of the rats that were abundant in the area.

Rubbish being brought to the area remains a problem. People are helping to keep it clean.

## Success factors

- The confluence of active citizens' activities enables the transformation of the urban landscape.
- A local resident that has the financial capacity to fund the project, and the vision of the crucial role of NBS.
- Two activists that have been advocating and implementing NBS at local level and have a passion and knowledge about indigenous ecosystems.
- An engineer that has been developing NBS at local level.
- Public engagement and participation in the project's implementation.

124. Araucaria angustifolia is the only native conifer in Brazil. The square was named after it because it was part of the Atlantic Rainforest ecosystem that previously existed there and that is now being restored.

125. <http://fluxus.eco.br/portfolio/jardim-de-chuva-largo-das-araucarias/#toggle-id-2>, accessed: 30.1.2018.

## Limiting factors and risks

This is a personal investment of a resident, so it is dependent on his continuous effort to maintain the space that now belongs to the public.

## Lessons learnt

This is the first rain garden implemented in a Brazilian city with the involvement of joint grass-roots movements. The rain garden collects 100 % of the run-off of 900 m<sup>2</sup> that would otherwise go directly to the drainage system that used to flood lower areas. The storm water is detained and filtered and infiltrates to the underground water table that flows to the Green river. Ten months after its implementation the vegetation is thriving, and the run-off provides nutrients.

The garden is blooming well even in the dry season (100 days without rain in 2018). The area is also booming because of the proximity to the metro stations and new building developments. The shops located in front of the square have been renovated and a building that was empty for a long time now houses a medical clinic. Rubbish is the most relevant problem that affects the square.

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## Selected references

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Figure 69. Araticum (*Annona sp.*), an example of a native fruit tree planted in the Araucaria square.