

ADOPTING THE *SPONGE CITY* APPROACH IN EL SALVADOR TO REDUCE RISKS OF FLOODING

[In El Salvador the approach of *Sponge City* is being adopted](#) to reduce the risk of flooding in the capital city of San Salvador by restoring the Arenal Monserrat watershed to be used as sponge and improving the connectivity of green areas in the city.

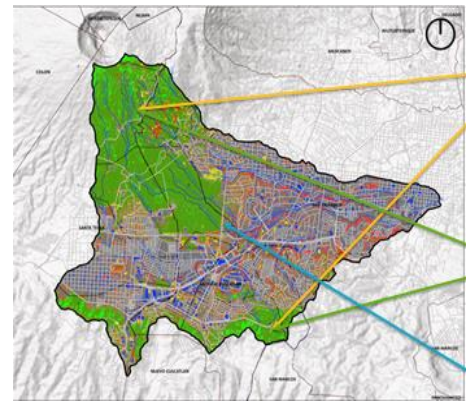
The CityAdapt project in San Salvador, launched in 2020, is realized by El Salvador's Ministry of Environment and Natural Resources, with the support of the [United Nations Environment Programme](#) and the [CityAdapt initiative](#) funded by the GEF-Global Environment Facility. The project's activities are executed with the support of the San Salvador municipality, researchers and universities, organizations such as the Association of Community Projects of El Salvador (Procomes) and FUNDASAL (Salvadoran Foundation for Development and Minimum Housing).

The term *Sponge City* is used to describe an urban area that is creating green spaces to tackle flooding. The project was inspired by the premise that the ground loses its permeability when vegetation is replaced with concrete. Trees and other vegetation can be used as sponges, drawing enormous quantities of water into the earth, preventing erosion, limiting floods, and recharging groundwater supplies for times of drought.

The Metropolitan Area of San Salvador includes 14 municipalities, an urbanized area where almost 30% of the country's total population lives. The Arenal Monserrat watershed is located on part of the territory of San Salvador, with a population of 115,500 inhabitants, and it covers an area of 54.98 km². This area has historically been dedicated to coffee plantations, an important activity for El Salvador's economy, before a decline in production over the last 10 years. A report by the [International Food Policy Research Institute](#) estimates that by 2050, climate change could hit El Salvador's coffee sector more than any other country in the world.

In recent years, climate change has made extreme storms more common in El Salvador. They are especially devastating around the capital, where rampant construction and road paving have created a concrete barrier that prevents rainfall from being absorbed into the ground. In June 2020, Tropical Storm Amanda struck with force the city of San Salvador, with winds and torrential rains which triggered more than 150 landslides and 20 major floods, tearing apart roads, electrical lines, and almost 30,000 homes.

In 2020 the CityAdapt project was designed to revive San Salvador's ability to absorb rainfall by restoring the ecosystem services of the Arenal Monserrat watershed.



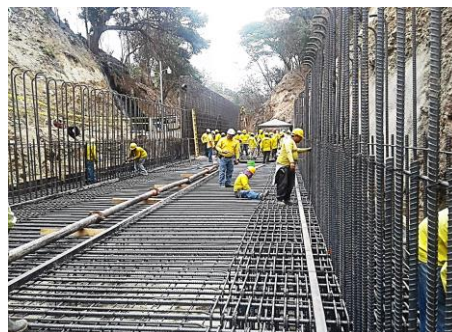
The [Citydapt website](#) resumes the main components of this innovative project and the results achieved:

- *Vegetative Infiltration Ditches.* These ditches imitate the drainage services that streams and rivers provide naturally. Technical characteristics of the works: increased water infiltration, increased soil moisture, decreased erosion on the slopes, and at the same time, improved crop productivity and reduced risks from landslides. Results to date: 34,217 linear meters of infiltration trench and 4,790 m³ of water infiltrated in the ditches.
- *Restoring riparian vegetation.* Riparian vegetation stabilizes the water flow in the ravines' slopes, while reducing the risk of floods in the city downstream. The works included the construction of terraces and living barriers. Technical characteristics of the works: improved water flow and ravines' slopes stabilization, and at the same time, reduced risk of flooding and improved connectivity of green areas in the city. Results to date: 432 hectares restored on 35 coffee farms; 5,183 linear meters of ravines restored and 49,875 plants between forest, coffee and fruit trees replanted.
- *Building a Storm-water detention pond.* Technical characteristics of the grey infrastructure: rain drainage system in La Laguna, in the metropolitan area of San Salvador, to slow the violent flow of water, generating a more uniform flow of rain water. The most important result of this work is that the rebound effect is eliminated, thus avoiding the ordinary destruction during rains in the lower areas of the city. The main component is the seal work, where the water conveying structure, which is the dam itself, is surrounded by additional works on the perimeter. The detention pond is a closed structure, with a height of 19 meters and a length of 1,079 meters, and the reservoir has a capacity of 220,000 cubic meters.

By adopting an approach of *Sponge City* and integrating nature-based solutions, the project allowed to achieve the following structural results: each linear kilometre with infiltration trench allows 140m³ of water to infiltrate into the ground; with only 50% of the coffee farms in the upper part of the Arenal Monserrat watershed restored with infiltration ditches, at least 107,380m³ of water can be infiltrated into the soils; this equates to 50% of the reservoir capacity of La Laguna, ensuring the reservoir's ability to slow the violent flow of water and reduce peak flow increases, while preserving soils and improving the livelihoods of coffee growers and inhabitants.

The project is still ongoing and its goal is to further increase the capacity of green areas to absorb rainwater, thereby reducing the risks of flooding in the city of San Salvador. The project also aims to expand the activities that bring direct benefits to the 115,000 inhabitants living in the area of Monserrat, by improving the production chain of coffee crops. With the results achieved in two years of work, the project in San Salvador is demonstrating the effectiveness of the approach adopted working in the potential areas of water infiltration and aquifer recharge in order to ensure their ecosystem services and generating in the meantime a significant impact on the local economies and living conditions of the communities.

In Latin America other [CityAdapt](#) projects are being developed in Xalapa, Mexico and Kingston, Jamaica. [Funded by the Global Environment Facility \(GEF\)](#), these projects are executed by the Regional Office for Latin America and the Caribbean of UNEP, together with the authorities in charge of the environmental issues in each country. [UNEP is helping governments around the world](#) to build climate resilience with over 45 *Ecosystem-based adaptation projects*, where over 113,000 hectares of ecosystems are being restored.



To know more

[Arenal Monserrat, San Salvador: Soluciones basadas en la naturaleza in arcgis.com](#)

[CityAdapt in UNEP website](#)

[CityAdapt San Salvador in UNEP website](#)

[Sponge City: San Salvador uses nature to fight floods in thegef.org](#)

[FUNDASAL 2020 Estudio vulnerabilidad Microcuenca Arenal Monserrat](#)

[CityAdapt San Salvador brochure](#)

[Tropical Storm Amanda - El Salvador in ReliefWeb website](#)

[San Salvador Project in Urban Nature Atlas website](#)

[San Salvador se vuelve esponja para amortiguar los deslizamientos in ReliefWeb](#)

[Proyecto San Salvador in ipsnoticias.net](#)

[San Salvador quiere ser una ciudad esponja in riosycuencas.com](#)

[CityAdapt website](#)

[CityAdapt publications](#)

