Bosco Limite - Reforestation in Veneto, Italy

Year of issue

2026

Summary

Sponge Scapes case study 12 IT

Bosco Limite is a reforestation research project launched in 2013 by Etifor and a private landowner in the Po Valley (Italy) upstream of a groundwater abstraction area for Venice, Vicenza and other towns. The project transformed a former maize field into a multifunctional lowland forest which provides a wide range of goods and services, such as groundwater recharge, CO2 fixation, biodiversity safeguard, production of high quality wood and biomass for energetic purposes, and recreational-touristic services.

The project was implemented in an area previously used for intensive agriculture with high economic returns. Therefore, the main challenge of the project was to find alternative sources of income for landowners who made their land available for reforestation. The establishment of PES schemes for a variety of services (water provision, carbon sequestration, production of wood and biomass for energetic purposes, biodiversity safeguard and environmental education including recreational-touristic services) was key for the success of the project.

On its initial 2.5 hectares, Bosco Limite now hosts more than 2,300 trees belonging to native lowland forest species, as well as over 20 animal species including hares, roe deer, birds, and pollinators.

It is the largest Infiltration Forest Area (AFI) in Veneto, where a system of canals stretching over 1 km enables more than 1 million m^3 of water per year to seep into the soil and recharge the aquifer. Tree roots and soil microorganisms naturally purify the water, improving quality before it reaches the aqueduct.

Over the years, the forest has faced challenges such as droughts and a tornado in 2021. To strengthen its resilience, between 2024 and 2026, species more tolerant of dry conditions like new English oaks, sessile oaks, and hornbeams are being planted, along with extraordinary maintenance of canals and vegetation.

In 2025, the Laghi di Bosco Limite expansion added another 2.5 hectares, featuring:

- an infiltration basin capable of recharging up to 645,000 m^3 of water per year;

- a multifunctional wetland to enhance biodiversity, improve water quality, and serve as an emergency irrigation reserve;

- the planting of 1,400 native trees and shrubs, together with hedgerows, flowering meadows, and vegetated strips;

- light recreational infrastructure such as trails, rest areas, observation points, and educational paths.

This expansion transforms Bosco Limite into an even richer landscape, combining ecological restoration with public access and educational opportunities.

Photo Gallery



Location

45.66, 11.685

Project

SpongeScapes

National ID

Italy_03

Sector

Forest

Installation Date

2012-12

Implementation status

Ongoing

Contact

Etifor- etifor@etifor.com

Overview

Location of the project

Bosco Limite is located in the middle basin of the Brenta river, in the northwestern part of the Po valley (Veneto Region, Italy).
The forest of Bosco Limite is based on a hydraulic system, made of canals and wells, whose function is to infiltrate water into the gravelly soil in situations of water “surplus” (i.e., high meteorological input or low irrigation demand). Given the favourable location of the area, the average water storage capacity of Bosco Limite is estimated to be about 1 million m3/ha/year, and it influences groundwater level in an area of 10 km radius.

Country

Italy

NUTS2 Code

Veneto

Sponge measures implemented in the case study

Afforestation

Objectives

Environmental and social objectives of the Forested Infiltration Area of Bosco Limite are:
- Promote water conservation by saving, approximately, 12,000 m3 of water per year, also improving adaptation to droughts and water scarcity impacts of climate change;
- Increase the biodiversity by encouraging the settlement of autochthonous plants and animals of the region;
- Protect the landscape by introducing a new oak-hornbeam forest, which is typical of the Po Valley, re-establishing an historic landscape that has almost disappeared;
- Capture 50 t of carbon dioxide per year in 30 years;
- Introduce a new source of renewable energy provided by wood biomass for domestic use;
- Improve the area by restoring its natural value and offering environmental education initiatives to schools and local associations; and
- Improve the quality of life for the local population through the creation of new green areas.

Involved partners

Authority type	Authority name	Authority role	Comments	Authority responsibility

Research institute / University	Etifor	Initiation of the measure	Etifor is a spin-off company of the University of Padova, Italy	Responsible
Private property owners	—	Other	—	Supporting
Other	Municipality of Carmignano di Brenta	Other	—	Responsible
Local water authority	Consiglio di Bacino Brenta	Monitoring	—	Responsible
Other	Veneto Agricoltura	Other	Veneto Agency for Innovation in the Primary Sector, an executive body of the Veneto Region	Supporting
Local water authority	Veneto acque	—	—	Supporting
Other	Consorzio di Bonifica Brenta	Other	Consorzio di Bonifica Brenta	Supporting

Site Information

Climate Zone

Warm temperate moist

Precipitation

1000.00 mm

Temperature (°C)

13.00 °C

Slope range

0-1%

Vegetation class

Permanent lowland forest

Design and Implementation

Project scale specifications

Meso-scale

Project area

2,5

Project area specifications

The forest of Bosco Limite is based on a hydraulic system, made of canals and wells, whose function is to infiltrate water into the gravelly soil in situations of water “surplus” (i.e., high meteorological input or low irrigation demand). Given the favourable location of the area, the average water storage capacity of Bosco Limite is estimated to be about 1 million m3/ha/year, and it influences groundwater level in an area of 10 km radius.

Area subject to Land use change or Management/Practice change (ha)

2.50 ha

Size

2.50

Size unit

ha

Financing

Total cost information

An estimation could be made by calculating the total NPV of investment costs + yearly maintenance costs up to 2042 - However, the choice of a correct discount rate could be debated

Costs investment

24000.00 €

Costs investment information

The planting cost was of 24000 €, with a contribution of the 80% from LIFE+ funds.

Costs operation maintenance

2100.00 €

Costs operation maintenance information

estimation of the costs for the period 2012-2042

Economic costs, income loss

1749.00

Economic costs, income loss - unit

€/ha

Information on Economic costs - income loss

The area was previoulsly maize-cultivated, with a net gain of 4599 € in 2005-2010 period. Since the prevision for the net gains from the forest is of 2850, the loss of incomes is 1749 €/ha/year.

Policy and Governance

Policy description

The environmental problem that led to the implementation of project is represented by the fact that water reserves of Veneto High Plans hydrogeological system are decreasing slowly but progressively. (approximately -3,8 cm/year, which correspond in a diminution of 1,30 m in 35 years)

Land ownership

Private landowner

Policy targets

Groundwater Recharge

Increase Water Storage

Improved Biodiversity

Oher Societal Benefits

Part of a wider plan

No

Public consultation

No

Has contractual arrangements

No

Contractual arrangements

Name

the action is involved in the European founded LIFE+ project "Aquor"

Impacts and Monitoring

Monitoring System

Monitoring parameters

Etifor has supported Bosco Limite since its inception, providing scientific and technical consultancy for forest design and management. Today, they continue to oversee maintenance activities – from canal cleaning to enrichment planting – and to guide both the landowner and public/private partners in ensuring the long-term sustainability of the forest.
Through WOWnature, citizens and companies can take part in the care and expansion of Bosco Limite. All activities are certified according to the international FSC® standard, ensuring sustainable management and positive impacts on ecosystem services.
Data recorded: 2022-present (infiltration rates, soil parameters).

Impact Assessment Methodology

Performance impact assessment method

Unknown

Socio-economic Impacts

Benefits and co-benefits

Other co-benefits in terms of ecosystem services (certified with the FSC® standard) are provided by the area: carbon sequestration, biodiversity conservation, food production, soil maintenance, etc.

Direct benefits

2850 euros in direct benefits

Direct benefits information

The expected benefits are of 2850 euros in the period 2012-2042, with a net loss of 1749 euros (compared to the previous maize cultivation).

Ancillary benefits information

It is estimated a positive impact from the constitution of the forest for the recreational and educational value of the forest and the local biodiversity, but there is no economic evaluation of the benefits.

Biophysical impacts: Hydrology

Retained water

518.40

Retained water unit

m3/day

Information on retained water

Information not available

Information on increased water storage

Information not available

Information on runoff reduction

Information not available

Biophysical impacts: Biodiversity

Improved biodiversity

Yes

Information on improved biodiversity

The constitution of a lowland forest provides habitat for 55 indigenous plant species, of which 15 tree species. Moreover, the forest constitutes habitat for at least 20 bird species.

Biophysical impacts: Water & Soil Quality

Water quality overall improvements

N/A info

Soil quality overall improvements

N/A info

Biophysical impacts: Others

Ecosystem impact climate regulation

Impact on GHGs (net emissions and storage) including soil carbon

Information on ecosystem impact climate regulation

Bosco Limite will stock an average quantity of 50 tons of CO2 per year, the equivalent emission of 7 Italian citizens

Lessons Learned

Key lessons

The site is located upstream of a captage area, where aqueducts abstract water for Venice, Vicenza and other towns: there is thus a demand for increased groundwater recharge and water purification. In addition, Bosco Limite provides a wide range of good and services, such as groundwater recharge, CO2 fixation, biodiversity safeguard, production of high quality wood and biomass for energetic purposes, and recreational-touristic services. The measure was implemented in an area previously used for intensive agriculture, and activities with high economic returns. Therefore, the main challenge of the project was to find alternative, competitive sources of income for landowners who made their land available for reforestation. The establishment of PES schemes for a variety of services (water provision, carbon sequestration, biodiversity and environmental education) was key for the success of the project.

Barriers

Barrier type	Comments
Other	The main challenge of the project was to find alternative, competitive sources of income for landowners who made their land available for reforestation.

Drivers

Driver type	Comments
Other	The site is located upstream of a captage area, where aqueducts abstract water for Venice, Vicenza and other towns: there is thus a demand for increased groundwater recharge and water purification.

Success factors

Success factor type	Comments

Financing possibilities	Bosco Limite provides a wide range of good and services, such as groundwater recharge, CO2 fixation, biodiversity safeguard, production of high quality wood and biomass for energetic purposes, and recreational-touristic services. The measure was implemented in an area previously used for intensive agriculture, activities with high economic returns. Therefore, the main challenge of the project was to find alternative, competitive sources of income for landowners who made their land available for reforestation. The establishment of PES schemes for a variety of services (water provision, carbon sequestration, biodiversity and environmental education) was key for the success of the project.

Sources

Sources

Bosco Limite

Progetto "Il bosco Limite di Camazzole"

Phone interview