AQUOR - Implementation of a water saving and artificial recharging participated strategy for the quantitative groundwater layer rebalance of the upper Vicenza's plain

LIFE10 ENV/IT/000380

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Project description:

Background

One of the negative impacts of climate change in Mediterranean countries is water shortage. Although only a minor reduction in the total amount of water reaching the ground from the atmosphere has been recorded in the past few decades, significant hydrological changes are already occurring. Weather events (such as rainstorms), for example, have shorter durations and are more extreme. There is therefore a need for action in water-stressed areas, such as the Po Valley in the Veneto Region, where natural water availability barely matches demand.

The Po Valley’s capacity for natural infiltration is compromised and changes in the way the river flows have become an environmental problem and a direct threat to public health. In particular, the slow depletion of water in the groundwater table of the upper Vicenza plain has resulted in a range of serious problems: water shortage, water conflicts, the outflow of the resurgences water system and an increase in investment costs for water supply. An immediate and joint effort to reverse this trend is imperative.

Objectives

The AQUOR project aimed to develop an adaptive strategy to climate change to facilitate the sustainable governance of the groundwater resource of the upper Vicenza. It planned to rebalance the area’s water budget, make better use of the water resource and improve infiltration processes. The project’s specific objectives were to:

- Create an integrated knowledge system on the hydro-geological and territorial system of the upper Vicenza plain using GIF;

- Alert all stakeholders to the importance of groundwater, water saving, and groundwater recharge;
- Demonstrate the technical feasibility, the economic benefit and the environmental sustainability of technical solutions for recharging groundwater layers; and
- Develop an integrated groundwater resource policy at a local level to ensure that experience collected from the project is transferred into a strategy for the governance of the territory with a special reference to safeguarding the groundwater resources as established by Directive 2000/60/EC, as well as to national and regional laws. The participatory process used during the project was to establish a process of shared decision-making and, at the same time, clarify the role of the different stakeholders and the way they effect the condition of the groundwater.

Results

AQUOR demonstrated the effectiveness of a model for the management of the groundwater system based both on the implementation of artificial recharging systems and on an awareness campaign aimed at reducing water uptake. The results and experience of AQUOR are being partially used by other existing LIFE projects.

The project results certainly pertain to long-term use after the end of the project. The set of planning and operative tools developed in the project will be used to sustainably manage the groundwater resources in the project area over the next 10 years. The tools are designed to be used by other bodies looking to restore the natural balance between groundwater recharge and uptake in their regions. In fact, all of the stakeholders using groundwater within the Vicenza Province now have a set of operative tools that enable them to implement a sustainable management strategy. In addition, the project partners agreed on a ten year action plan for groundwater management which takes into account all of the aspects necessary for the sustainable use of the groundwater in the Veneto region. It has been in operation since February 2015.

Four different recharging techniques (wells, recharging forests, recharging fields and river restoration) were tested during the project in seven different sites within the Vicenza area. The sites were chosen by a GIS software tool developed within the project that was based on a set of key parameters which enabled the team to quickly identify the most suitable areas to install recharging systems. A detailed cost-benefit analysis for the different recharging techniques created during the project shows that even the most expensive techniques have great potential to generate revenues that also make the infrastructure economically sustainable. These recharging systems will become a permanent part of the artificial recharging network.

Flow meters and piezometers were installed for each of the recharging systems used. They created quantitative and qualitative data on the infiltrated water, which was also monitored with a permanent network of bio-indicators (moss bags) located in the rivers supplying the infiltrated water. A monitoring protocol was developed by the team enabling them to assess the health of the resurgent water ecosystem. The monitoring is still being continued.

During the project the team realised that although technical and regulatory actions were fundamental to setting up the foreseen strategy, the best way to achieve the goal was actually to raise the awareness of stakeholders about the importance of the sustainable use of groundwater resources. The information campaign, therefore, did not always achieve the results expected and the communications activities need the most improvement over the coming years.

The long term environmental objective of the project is to reach equilibrium between (natural and artificial) recharge and uptake as was the case in the 1950's. The strategy will also provide benefits to the resurgent water ecosystems, to the quality of river water and to the restoration of the woods on the Vicenza plain.

The project team estimates that the project activities will have helped to reduce water consumption by between 10% and 30% in at least 50% of the families targeted by the awareness raising campaign. This in turn should reduce groundwater uptake by 0.5% and 2%. The installation of flow limiters on irrigation pipes (which took place in 2016 after the project had ended) should additionally reduce uptake by 1% to 3%. The few recharging systems that were set up have not contributed significantly to the volume of water being naturally infiltrated (around 1%). The contribution of artificial recharge to the water supply if the summer is particularly dry can, however, reach up to between 5% and 10%.

In regards to environmental policy, the project directly contributed to the implementation of the EU Water Framework Directive (2000/60/EC) both in terms of groundwater management and reduction of water use. The project results are also in line with what is requested in "The Blueprint to Safeguard Europe's Water resources - Communication from the Commission (COM(2012)673"; The EU Environmental Action Plan to 2020; and The Italian National Strategy for Adapting to Climate Change (SNAC).

Further information on the project can be found in the project's layman report and After-LIFE Communication Plan (see "Read more" section).

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Environmental issues addressed:

Themes

Water - Water management and supply
Water - Water scarcity and drought

Keywords

water shortage, decision making support, environmental awareness, water supply, groundwater, water resources management

Target EU Legislation

- Water
- Directive 2000/60 - Framework for Community action in the field of water policy (23.10.2000)
- COM(2012)673 -"A Blueprint to Safeguard Europe's Water Resources"

Natura 2000 sites

Not applicable

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Beneficiaries:

Coordinator	Provincia di Vicenza
Type of organisation	Local authority
Description	The Province of Vicenza is the local administration responsible for the management and protection of water resources (IT - D. Lgs. 267/2000).
Partners	Acque Vicentine SPa, Italy Alto Vicentino Servizi SPa, Italy Consorzio di Bonifica Alta Pianura Veneta, Italy Consorzio di Bonifica Pedemontano Brenta, Italy Centro Idrico Novoledo srl, Italy Veneto Agricoltura, Italy

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Administrative data:

Project reference	LIFE10 ENV/IT/000380
Duration	01-SEP-2011 to 01-MAY -2015
Total budget	1,814,548.00 €
EU contribution	693,348.00 €
Project location	Veneto(Italia)

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Read more:

Brochure	Title: "Il bilancio idrico" (4.39 MB) Editor: Provincia di Vicenza No of pages: 17

Leaflet	Title: "AQUOR: Abbiamo a cuore l'acqua" (1.02 MB) Editor: Provincia di Vicenza No of pages: 2
Leaflet	Title: "Abbiamo a cuore l'acqua" (1.63 MB) Editor: Provincia di Vicenza No of pages: 2
Project web site	Project's website
Publication: After-LIFE Communication Plan	Title: After-LIFE Communication Plan No of pages: 4
Publication: Layman report	Title: Layman report (Italian version) No of pages: 11
Publication: Layman report	Title: Layman report No of pages: 11
Publication: Pedagogical tool	Title: "Save the water" (5.16 MB) Editor: Provincia di Vicenza No of pages: 98
Publication: Technical report	Title: "Managed Aquifer Recharge (MAR) demonstrative techniques for the quantitative restoration of the groundwater balance in the Vicenza Upper Plain" (13 MB) Author: Loris Agostinetto, Fabiano Dalla Venezia Year: 2013 Editor: Veneto Agricoltura No of pages: 36
Publication: Technical report	Title: Project's Final technical report (Italian version, with English abstract) Year: 2015 Editor: Provincia di Vicenza No of pages: 60
Publication: Technical report	Title: "Techniche dimostrative di ricarica artificiale er il riequilibrio quantitativo della falda dell'alta pianura vicentina" (10.3 MB) Author: Loris Agostinetto, Fabiano Dalla Venezia Year: 2013 Editor: Veneto Agricoltura No of pages: 36
Video link	Project's presentation video (2')