WATER AND CLIMATE

European Public Water Operators' commitment to water resources protection

Aqua publica europea
EUROPEAN ASSOCIATION OF PUBLIC WATER OPERATORS

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INTRODUCTION

Ensuring the sustainable use of natural resources is probably the most important challenge that the world will have to face in this century. Delegates scheduled to meet in Paris for the UN Climate Change Conference have a crucial task and a clear responsibility. However, even if a robust and convincing agreement is reached—as everyone hopes—the challenge will continue immediately afterwards with concrete implementation of the plan. And the agreement's implementation will, of course, be everyone's responsibility.

Among the natural resources in need of responsible management and protection, water clearly requires special attention. While significant progress has been made in recent years regarding universal access to water, around 800 million people throughout the world still lack access to safe drinking water. And the progress made so far is far from secure if—as predicted by recent UN estimates—water demand will increase by 55% by 2050, while the world may face a 40% shortfall in water supply in just 15 years.

These risks obviously do not only concern developing countries; Europe will also be deeply affected. Over the past 20 years, the European legislation on water has achieved significant improvements in water resources management overall; on both a qualitative and quantitative scale. However, there are still many challenges that will be faced in the future due to a mix of climate change-related phenomena and increasing anthropic pressure, as the European Commission's Blueprint for Water clearly pointed out.

Public water operators are aware of these challenges and are fully committed to ensuring high quality water resources and their availability by adopting preventive measures and innovative techniques.

This document covers a series of APE members' best practices with regard to water resources protection. As we will see, these initiatives include different approaches and priorities; this is expected since, as we all know, water resources management is particularly influenced by and responds to localised geographical characteristics and socio-economic factors. However, despite such differences, they all share one important aspect: they show that public water utilities are playing an increasingly proactive role in their region.

In other words, publicly-owned water companies across Europe are no longer simple providers of a public service; they are becoming real local players, which are fully involved in socio-political networks and governance mechanisms with the ultimate goal of ensuring effective protection of water resources. This

growing dynamism is certainly also related to one of the distinguishing characteristics of public water operators: the fact that they are deeply involved with and highly representative of the region in which they operate.

Firstly, public water operators act under direct mandates and are in constant contact with local policymakers, thus ensuring a strong connection between political priorities and the operators' mission. Secondly, within this framework, they actively promote and develop relationships with other stakeholders, which may have a role or are affected by decisions related to water resources management.

The water sector and the various stakeholders interact on a wide variety of activities: promoting voluntary approaches with farmers' associations to reduce groundwater pollution; advising and cooperating with public authorities regarding land-use decisions; promoting water quality awareness campaigns among citizens, farmers and industries. More generally, public water operators' activities goin creasingly beyond traditional industrial tasks to embrace new functions and responsibilities in response to the local community's needs and expectations. These new functions include providing monitoring and analytical capacities, acting as an information hub for other stakeholders, supporting public authorities' planning activities and promoting stakeholders' engagement initiatives.

In short, public water operators play an active role in the efforts of local communities to tackle common water protection-related challenges by making a rich and growing base of know-how and expertise available. What is more, due to the fact that they are publicly owned, they are well positioned to propose long-term solutions that respond to the general interest.

As mentioned, the role of public water operators is interpreted differently according to the local context, but some commonalities can be found across Europe. Drawing on the following best practices, the main lines of intervention are summed up below. We are certain that an analysis of both the achievements and challenges encountered within the context of these initiatives would be of interest to policymakers at different levels, and may help them suggest useful policy developments.

Identification and protection of abstraction areas

Most water operators collaborate actively with local political authorities and regional planners regarding the identification of abstraction areas. This function normally relies on thorough data collection and analysis activities concerning water quality. The information generated through such activities is then directed to policymakers and judiciary authorities to help them in their decisions regarding issues such as land-use.

In some cases (Eaux de Grenoble, VIVAQUA), clear and robust decisions regarding the protection of water abstraction areas have been made. In other cases (De Watergroep, CILE, Eau de Paris, Scottish Water), the role of water operators as specific advisors on land-use decisions has been formally (or semi-formally) recognised. Some operators (De Watergroep, Etra) are developing water safety plans based on a risk-based

approach in order to improve and make more efficient the monitoring of water quality status, and to better tackle specific pollution threats (this can also be carried out in cooperation with other local authorities in terms of monitoring activity and specific training programmes).

The identification and protection of abstraction areas is clearly a crucial part of ensuring good quality water resources. However, decisions regarding the degree of protection of such areas can conflict with other legitimate economic interests. For this reason, a good information base may be not enough to ensure adequate protection; a clear legislative and governance framework (especially regarding the entities entitled to make decisions on this matter) also plays a crucial role.

Voluntary approaches

In some contexts, for a complex set of reasons (conflicting needs, institutional uncertainty, geomorphological characteristics, etc.), it may be difficult to ensure adequate protection of water abstraction zones.

This is often the case with diffused pollution resulting from intense farming activity. While a greater and better implementation of the "Polluter Pays Principle" is certainly needed, voluntary approaches can also successfully accompany economic instruments in reducing pollution or pressures related to agricultural or industrial activities. Some operators and operators' associations (Eau de Paris, Aggerverband, CILE, Aquawal, SDEA, Scottish Water) have been successfully implementing voluntary approaches for some time now with farmers and their associations in order to reduce the use of pollutants and pesticides or to promote a shift towards more sustainable farming practices (for example through economic incentives and ad hoc training).

The protection of water resources through voluntary initiatives is obviously beneficial to other economic activitiessuch as electricity production. Finding common objectives with electricity providers and establishing a structured partnership to protect common resources is a win-win approach that is also used by operators (SIERG).

However, in order for these strategies to realise their full potential, strong political support and coherence between different areas of legislation are essential: in particular, the structure of incentives for agriculture and environmental objectives should be better aligned (also within EU legislation).

Water conservation and efficiency

Data collection, analysis and monitoring certainly play a fundamental role with regard to quantitative aspects. Sophisticated modelling methodologies are increasingly used (CILE, Acquedotto Pugliese, De Wategroep, SMAT, CAP Holding, MM) to predict future trends in water consumption and availability, and to prepare response in cases of extreme climatic events. In addition, more efforts are being made—including through innovative technologies—to detect leakages and improve the performance of the water network. Important economic resources are also being mobilised to build new assets and ensure water security.

An appropriate pricing policy and sound financial conditions clearly represent two important aspects of implementing these initiatives. However, once again, a coherent and effective institutional framework also plays a key role in ensuring access to long-term financing (from the EU level as well).

Information and innovation

There are two additional areas of activity that are becoming more and more important for public water operators and that some how tie in with the previous elements.

One is innovation. Public water operators are developing more frequent partnerships with universities and employing innovation-oriented public talent in order to identify and develop innovative solutions that tackle common challenges. Innovative efforts can range from new approaches designed to reduce sludge from wastewater treatment and increase energy efficiency (Promedio, Aggerverband) to new leak-detection techniques and instruments (SMAT, Acquedotto Pugliese, MM) or smart meters (CAP Holding).

External communication is also playing a more important role in water operators' overall development strategy. To a certain extent, the chances of success of voluntary agreements or water conservation strategies, for example, clearly depend on the capacity of engaging stakeholders and the ability to include them in a common project. At the same time, ensuring that end users receive adequate information on water quality, or long-term investment choices, is also key in creating fruitful collaboration between citizens, associations, policymakers and operators.

That is why many public water operators are investing in new communication tools and ad hoc strategies to improve the flow of information to end users and to increase their 'interactive capacity' with other stakeholders. As part of this, and again, due to the fact that they are publicly owned, some operators (Eau de Paris, Eau de Grenoble) have also successfully implemented advanced participatory governance approaches.

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To conclude, public water operators are increasing their efforts to swiftly adjust to social and environmental changes, in order to ensure adequate protection of water resources for current and future generations. And they are doing so through constant dialogue with the local community, to which they are fundamentally and deeply connected.

At the same time, public water operators are aware that the challenges that lie ahead cannot be solved at the local level alone. This drives public water operators to become involved with international networks, in order to learn from others' best practices and to make an active contribution to the identification of technical and policy-related solutions. In this context, Aqua Publica Europea's members wish to propose a series of policy recommendations to international policymakers at the end of this document, in order to spark debate and to demonstrate their commitment to overcoming common challenges.

http://www.aqp.it/portal/page/portal/MYAQP

acquedotto pugliese
l'acqua, bene comune

KEY FIGURES

- Over 4 million people served
- 230 million m^3 distributed/year
- 44,80 % groundwater
- 55,20 % surface water

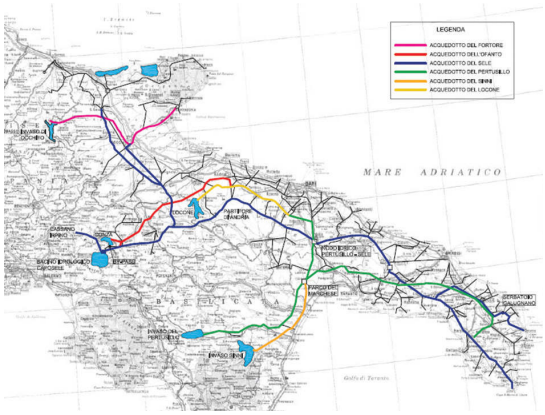
ITALY

ACQUEDOTTO PUGLIESE SPA

TECHNOLOGICAL INNOVATION FOR A RELIABLE AND SUSTAINABLE MANAGEMENT OF WATER RESOURCES

ACQUEDOTTO PUGLIESE SPA (AQP) is in charge of water supply to a large area consisting of the regions of Puglia, Basilicata and Campania, in southern Italy. AQP manages the abstraction, treatment and transport of water through aninterregional distribution network of 4 732 km, which allows for the transfer of a large quantity of water coming from different sources (springs, reservoirs and wells). AQP also manages the distribution of water to 250 municipalities through a network of 14 640 km of pipes, as well as the treatment and collection of wastewater through 11 425 km of pipes (not considering customer connections).

In such a context, in order to ensure the sustainability of water abstraction and to protect areas from which water is abstracted, a programme has been developed with all relevant partners to regulate water transfers, and to reconcile the environmental protection requirements with the need for water supply. This programme is based on agreements between the relevant regional authorities of the entire southern Apennine basin. Through these agreements, public authorities act on the qualitative component through binding measures, while ACQUEDOTTO PUGLIESE focuses its work on protecting



FOCUS ON AN EXEMPLARY ACTION

Project to reduce water loss in 95 municipalities of Puglia

Following a strategy of water loss reduction in the framework of a sustainable and novel management of water resources, ACQUEDOTTO PUGLIESE is carrying out a large project for the rehabilitation of more than 4 000 km of old distribution pipes in 95 municipalities. This project is based on the active control of pressure in order to reduce and control water losses, lowering as well the natural occurrence rate of new leaks. The project includes the creation of District Metered Areas (DMAs) based on hydraulic modelling and simulations and the installation of hundreds of pressure sensors and automatic pressure reducing valves (PRVs), along with the location and replacement of the oldest pipes. Some PRVs will be operated at the "critical point" of pressure in the network, which today is the most advanced approach for the active control of pressure and leakages in water distribution systems.

quality and guaranteeing the reliable and sustainable management of water resources.

Among the actions carried out to minimise abstraction and ensure the sustainability of distribution, AQPmonitors and controls its networks to minimise leaks. In particular, a remote control system integrated into the transmission and distribution system improves management and allows for a better monitoring of any need for intervention. With this same objective, AQP has developed, together with the University of Palermo, a large supply networks simulation model for optimal planning of water supply and transport and for evaluating crisis scenarios.

Furthermore, in order to reduce technical leakages in connection with maintenance activities of large supply systems, ACQUEDOTTO PUGLIESE has experience with the use of a remotely-operated vehicle operated inside the water transport network, which allows the condition of the water works to

> ***Climate change puts the Puglia region at risk of desertification. Thus, the protection of water resources, both in the mid and long term, is of vital importance.***

www.aggerverband.de

KEY FIGURES

- 500 000 people served
- 22 million m^3 distributed/year
- 100 % surface water

GERMANY

Aggerverband (Association of water operators of North Rhine-Westphalia)

Member of Allianz der öffentlichenWasserwirtschafte.V.(Aöw)

A HOLISTIC APPROACH TO WATER MANAGEMENT

Aggerverband covers the entire range of water management.Drinking water resources in the coverage area originate mainly from two drinking water reservoirs: Wiehl and Genkel. The catchment basins of these two dams are protected by important regulatory measures that keep them free from contamination. This ensures that the water in these reservoirs is of very good quality. The zones immediately adjacent to the two dams are closed to the public.

Within a broader scope, the protection of catchment basins is based on broad cooperation with farmers, which began several decades ago. This cooperation involves financial compensation for farmers who are constrained in the use of their farmland because of the need to preserve water resources. In addition, Aggerverband is a member of the working group "Agriculture, water and soil in the Rhein-Sieg". This association, gathering water suppliers, farmers and the Chamber of Agriculture finances an agricultural consultant who provides advice to farmers, horticulturists and horseback riding schools, among others.

For over 25 years, through self-control and the exchange of experiences, it has been possible to limit the use of fertilisers and pesticides in a smart way. Soil samples are taken each year and subjected to multiple tests. The results of these tests and the suggestions for improvement are discussed at each field visit. This working group allows new practices to emerge, such as the use of additional slurry tanks for smarter spreading.

The water supply is abstracted from the deep layers of the Aggerverband dam reservoirs. The water is chemically and microbiologically tested every day,

FOCUS ON AN EXEMPLARY ACTION

Construction of a flood retention basin in Gummersbach-Vollmerhausen

In 2014 the Aggerverband, in cooperation with the city of Gummersbach and the Department for road construction of the Land of North-Rhine Westphalia, built a retention basin in the Rospe stream between the West tangent and the railway line RB 25. The heavy rainfall in recent years, and especially the floods in 2001, have led to more frequently occurring floods in the district of Vollmerhausen. The flood risk studies of the regional government of Cologne from 2013 showed that the Rospe stream was considered at risk of flooding and that a retention basin was needed. Thanks to this study, it was possible to obtain funding from the Land in order to finance those flood protection measures. The final building has a stowage volume of 39 000 m^3, a jam length of 650 m, a storage width of 30 m and a dam height of 10 m.

following German regulations. About 25 000 tests are performed each year in the Association's laboratory, with special attention paid to the transfer points between Aggerverband and the municipal water utilities. The Association's laboratoryalso accompanies and controls all other stages of the water cycle, from raw dam water to treated drinking water and the treatment of wastewater.

For Aggerverband, nothing is lost. The sludge produced by the treatment of wastewateris transformed into methane by a digester, and feeds the Aggerverband's own cogeneration plant and thus covers part of its own power requirements.

The association also manages and develops nearly 3 000 km of waterways. The maintenance of river beds improves water drainage and ensures the security of river banks. All of these measures allow river basins and landscapes to recover natural conditions that are favourable to flora and fauna, as shown by the reintroduction of salmon.

> ***The future lies in the power of the sun, wind and water. The Aggerverband uses hydroelectric power since 1930 and since recently also operates with power coming from its own photovoltaic systems.***

http://www.aquawal.be/fr/index.html?IDC=467

KEY FIGURES

- 3,3 million people served
- 237 million m^3 distributed/year
- 80% groundwater
- 20% surface water

BELGIUM

AQUAWAL – Effective Approaches to control at source

WALLONIA UNION OF PUBLIC WATER CYCLE OPERATORS

Aquawal is a professional union of public water cycle operators comprised of Wallonia's leading drinking water producers and distributors, all of the area's certified sanitation agencies and the public water management company, SPGE.

Aquawal's mission is to encourage dialogue and the sharing of information between the various drinking water production and distribution companies and Wallonia's certified sanitation agencies, to represent these companies on the various regional, federal, European and international levels, to conduct scientific and socioeconomic studies on behalf of policymakers, administrators and their members, and to ensure that information reaches the general public and professional circles.

Aquawal takes part in various projects, including those that deal with the protection of the resource. Indeed, it is essential to not only act in compliance with legal regulations regarding water quality, but to also minimise the cost of treatment and above all preserve the availability of the resource in the long term. These are common objectives fully shared by Wallonia's operators.

There are many projects and programmes in place for the protection of water resources:

- Demarcation of prevention areas surrounding water abstraction points. This involves three major zoning components (water intake, prevention, monitoring) that help distinguish the protective measures that apply.

- The "Programme de Gestion Durable de l'Azoteen agriculture" (Sustainable Nitrogen Management in Agriculture Programme, PGDA) was put in place to implement the Nitrates Directive in Wallonia. It aims to eliminate groundwater and surface water pollution

FOCUS ON AN EXEMPLARY ACTION

Nitrawal is a structure that helps Wallonia's farmers implement the Sustainable Nitrogen Management in Agriculture Programme and accompanies them in their efforts to protect water resources from nitrate contamination. This is achieved through outreach, advocacy and supervision of farmers. Moreover, Nitrawal coordinates "catchment activities" in the areas surrounding water catchment basins that are primarily used for agricultural purposes and which are considered to be in poor condition. Outreach programmes and supervision of the farmers involved are then put in place in cooperation with the water operator that owns the catchment basin. Nitrawal also carried out supervision activities and scientific analyses to track the evolution of nitrates in the water.

by introducing a series of obligations on farmers to manage nitrogenous fertilizing and ensure water quality.

- The "Programme Wallon de Réduction des Pesticides" (Walloon Plan for the Reduction of Pesticides, PWRP) particularly focuses on managing public areas without the use of plant protection products, and since June 2019, has worked to protect surface and groundwater against pesticide contamination by specifically focusing on those public areas that are most vulnerable pesticides.

- Certain contracts regarding water catchment basins that are exposed to high levels of nitrates and/or pesticides may be concluded locally between voluntary farmers and producers of the water concerned. Awareness and detailed follow-up plans are then introduced.

These programmes, however, involve the mobilisation of substantial resources, which poses the specific question of funding for the protection of the resource. In this context, the highest demand is made on individual households whereas the "Polluter/Payer" principle should shift the burden to farmers and manufacturers.

www.gruppocap.it

KEY FIGURES

- 2 million people served
- 235 million m^3 distributed/year
- 100% groundwater

ITALY

CAP HOLDING – Milano

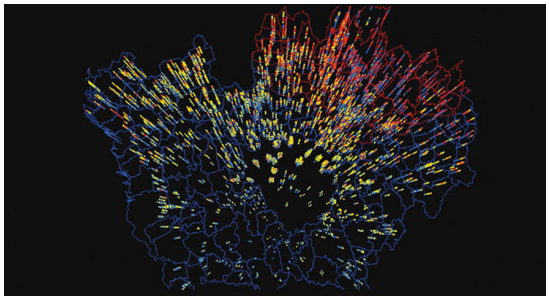
A WATER MANAGEMENT APPROACH BASED ON THE CONCEPT OF CIRCULAR ECONOMY

CAP Holding Group manages water services for the provinces of Milano, Monza and Brianza, Pavia, Varese and Como. It follows the principle of integrated public management and transparency through accountability and participation.

Managing the entire water cycle means acting in tune with natural resources and their immediate environmental context. The water cycle is a perfect illustration of what a circular economy is: for CAP, it means maintaining a balance between the use of the resources and their protection. Protecting water resources is a comprehensive strategy for CAP and is based on some structuring projects, explained hereafter.

The Infrastructure Plan (PIA) responds to information on the morphology and hydrodynamic conditions of the subsoil due to an exclusive one-dimensional and two-dimensional approach. The creation of a specific database that collects all geological, stratigraphic, hydrogeological, geophysical and hydrochemical data available represents a critical first step in creating a valid conceptual model of the subsoil. The PIA was established to support strategic decisions on groundwater resources management and related collection systems.

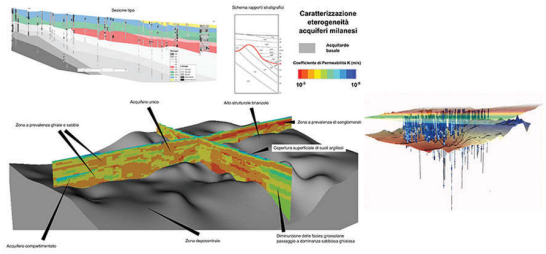
The PIA project consists of a three-dimensional model of the underground, which allows for testing of aquifer production capacity in relation to the situation of stratified sedimentary bodies and system networks and facilities, compared and analysed according to a



FOCUS ON AN EXEMPLARY ACTION

A kick to waste: wells from the first aquifer

The project “A kick to waste” helps Municipalities in constructing wells which draw water from the layer that is closest to the surface in order to irrigate a football field with non-potable water. In this way, CAP Holding avoids the use of tap water for activities that do not require it, which avoidsthe exploitation of deep water resources and contributesto the active protection of deep aquifers.



> *As a public company, water protection is part of our DNA.*

layered approach. The plan is a dynamic management tool designed to optimise operations and reduce leakages. It can also be modified based not only on the changing needs of the community served by CAP, but also on environmental changes that may jeopardise the operation of the facilities. Moreover, the PIA will allow for a detailed characterisation of contaminated sites and therefore the design of targeted decontamination works.

Another point concerns the development of "smart meters". In order to limit loss and energy consumption, and to optimise the service to users, a project involving pressure control systems will complement the existing remote control system in order to reduce network losses. These "smart metres" should enable an integrated and precise control of production and consumption. The preliminary feasibility study of the pilot project involves the installation of instruments that measure pressure and network control systems for leakages, as well as counting and data collection systems.

http://www.cile.be/frame.html

KEY FIGURES

- 564 000 people served
- Nearly 28 million m³ distributed/year
- 80% groundwater
- 20% surface water (dam reservoirs)

BELGIUM

CILE - Compagnie Intercommunale Liègeoise des Eaux

FOR A COMPREHENSIVE AND COORDINATED VIEW OF RISKS

The CILE operates two major groundwater catchment areas in the Liège region, one in the limestone of the Néblon river basin and the other in the Cretaceous chalky aquifer of Hesbaye, producing 10 and 20 million m³ per year respectively. The soils there are also very fertile and the population is very dense.

This means that the region of Liège has three special resources: very pure groundwater, a solid tradition of high-quality agriculture and a vibrant, knowledgeable population whose expertise is forged by a long industrial and academic tradition. In addition, the strategy of the CILE is to safeguard the availability and quality of water resources by ensuring the balanced co-existence and development of all activities. This is a global, coordinated vision that should be encouraged.

In addition to the regulatory actions of the public authorities, the company has incorporated "cultural" actions that focus on better understanding of the risks and on bringing about change to local practices. The company oversees human activities, in particular the information and outreach activities of all private actors, institutions or authorities. This includes:

- Analysis of the risks associated with the various activities: housing, commerce, industry, agriculture, transport (motorways, railways and airports).

> *While the theories about climate change are more concrete, the effects on our regions remain unclear. It is likely that the regular distribution of rainfall will give way to more marked seasonal episodes that promote runoff at the expense of aquifer recharge.*

FOCUS ON AN EXEMPLARY ACTION

NITRAWAL – An original and exemplary action

Along with other operators and agricultural federations, CILE is one of the founders of the Nitrawal association (Asbl). It consists of a consulting and coaching structure that helps farmers rethink their fertilising practices based on soil testing. It is distinct in that it controls the amount of potentially leaching nitrogen in the soil and compares the results with reference farms to avoid bias (weather, etc.). The favourable evolution of these data, which are always available, makes it possible to envisage a gradual improvement in the status of water bodies. In terms of its catchments, the CILE intends to organise a continuous dialogue with farmers through a catchment agreement that is under development.

- Communication and sharing of information with stakeholders.

- In coordination with other agencies, consulting and promotion of the environmental management practices of companies or sustainable management of green spaces in the catchment areas that favour biodiversity and can serve as an example for the adoption of good environmental practices.

The CILE is associated with scientific studies and innovation projects designed in particular to anticipate the effects of global warming on its resources. It multiplies exchanges with other operators or organisations abroad.

https://www.dewatergroep.be/

KEY FIGURES

- 2,8 million people served
- 160 million m^3 distributed/year
- 70% groundwater
- 30% surface water

BELGIUM

DE WATERGROEP

PUTTING THE PROTECTION OF RESOURCES AT THE HEART OF ITS WORK

De Watergroep is the biggest public water utility in the Belgian region of Flanders. It delivers water to 2,8 million people in 175 municipalities spread across West and East Flanders, the Flemish Brabant and Limburg.

For De Watergroep, protecting water resources is at the heart of the work of sustainable water services, and requires measures to preserve both the present and the future quality and quality. That is a challenge that requires new initiatives: the existing, and known, risks are not always easy to manage. In addition, new challenges appear with issues such as emerging pollutants.

Public awareness is still not sufficient. That is particularly due to the fact that diffuse pollution of water resources is not a visible problem, albeit being the most important one. The link between the ecological status of water bodies (regulated by the EU Water Framework Directive) and the qualitative targets for drinking water is not clear enough.

De Watergroep leads many actions for the protection of water resources. Those are based on a risk based approach for the protection of ground and surface waters used for drinking water as part of the water safety plans. De Watergroep has also implemented a continuous and dynamic monitoring programme of the source waters and a 5-yearly evaluation of the qualitative and quantitative status of the source waters and of their feeding areas.

> *For us, protecting the water resources means taking all actions and measures needed to prevent water quality and quantity to deteriorate or to improve present qualitative and quantitative status with a view to a sustainable drinking water supply.*

FOCUS ON AN EXEMPLARY ACTION

"Source Files" to protect water catchments

A risk based approach for the protection of the drinking water supply has been implemented by means of "source files" for each water catchment. These files are a digital collection of all information needed to perform the risk analysis. They contain technical data on the water abstraction, on the qualitative and quantitative status of the water body and on the actual land use in the water catchment and are made in close collaboration with the authorities. Thanks to this, the water supply company is in a position to give advice during the procedure of building and environmental permits in order to protect the resources.

The operational management is based on a database for water quality, piezometric levels and pumped volumes, the implementation of a groundwater drought indicator and groundwater modelling for the estimation of the cone of depression and the capture area.

The issue of resource protection is a long-term issue, which should be based on a clear division of responsibilities and the coordination between different stakeholders. De Watergroep is engaged in a partnership with the stakeholders involved in the protection of water resources at all levels, including local, regional and national authorities, as well as the Flemish Environmental Agency and farmer organisations. It also provides advice on the construction and environmental permits for projects in the immediate vicinity of the water extraction areas.

More generally, De Watergroep cooperates intensively with the Flemish government on all matters related to the protection of drinking water, including the design of legislation, communication and the steering and monitoring of research studies on the protection of the water resource. It is also a partner to the Flemish sanitation agency (OVAM), with which it exchanges data on polluted sites and cooperates on projects concerning groundwater.

https://www.eaudegrenoble.fr/

KEY FIGURES

- 174 000 people served
- 14 million m^3 distributed/year
- 100% groundwater

FRANCE

Eaux de Grenoble Alpes – Société publique locale

PRESERVING A NATURALLY EXCEPTIONAL QUALITY OF THE WATER

SPL Eaux de Grenoble Alpes, previously Régie des Eaux de Grenoble, has managed the protection of catchments for the City of Grenoble since 1882.

The exceptional quality of Grenoble's water resources, which flow from the alluvial bed of the Drac river, is the result of protective measures put in place in 1967 to protect the exploited water table, as well as technical measures initiated by the City of Grenoble, regular monitoring of the quality of the water produced and distributed by the health authority and the self-monitoring programme exercised by the Production department of SPL Eaux de Grenoble Alpes.

The protected area, which consists of 2 329 hectares, is spread over six towns and includes six zones that are covered by distinct protective measures and obligations, ranging

FOCUS ON AN EXEMPLARY ACTION

Hydraulic barrier device for the protection of groundwater

Part of the catchment works are carried out south of the left bank of the Drac, downstream of its confluence with the Romanche, where the water quality is questionable due to sanitation problems and the presence of historical or present-day sources of industrial pollution. Shortly after the installation of catchment basins in the 70s, it was deemed necessary to install an artificial water bed recharge channel between the catchment basins and the left bank of the Drac in order to create a hydraulic barrier between the alluvial aquifer of the Drac coming from the south where drinking water is sourced and the potentially polluted water table is fed by the Drac from the north. This channel, regularly treated to guarantee the permeability of its bed, allows for water infiltration from an EDF outlet canal, transporting quality water from the Drac upstream.

from complete protection to special obligations, particularly with regard to industrial activities. Thus, regular human supervision of the catchment protection areas is ensured around the clock. This strategy of physically protecting the areas is indispensable in the case of EDG insofar as the water is distributed without being treated, given its original quality. EdGA also ensures constant supervision of all projects that could have an impact on the resources of this sector, particularly in the context of the local water commission.

For the EdGA, the main issue regarding protection of the resource involves reconciling the different uses and objectives, which sometimes conflict, in order to maintain water bodies, surface and groundwater in good condition. This implies close cooperation between actors, upstream to downstream, and requires constant mobilisation of teams. Users are also involved as active partners of the local public corporation. Their power is important, insofar as they are influential opinion leaders with regard to all actors involved.

On 1 January 2015, drinking water authority and ownership of resources and works were transferred to the City of Grenoble, which now assumes organising authority over a territory of 49 municipalities. The SPL EdGA, the former operator, now includes 68 municipalities, including the City of Grenoble, and manages the two main resources of the Grenoble Basin: the Romanche and the Drac water beds.

> ***Climate change, which may cause more intense and more frequent recurrence of flooding of rivers, could have a serious impact on the availability of the resource. We should also be alert to changes in users' practices, for example with the risk an increase in domestic wells...***

www.eaudeparis.fr

KEY FIGURES

- Nearly 3 million users
- 200 million m^3 distributed/year
- 50% groundwater
- 50% surface water

FRANCE

Eau de Paris

ADAPTING AGRICULTURAL MODELS TO REFLECT MORE VIRTUOUS PRACTICES

Drinking water consumed in Paris originates in part from mainly agricultural territories located in the Paris basin. To protect the resource and ensure a quality water supply in the long term, it is necessary to encourage the evolution of agriculture towards practices that use fewer chemicals and have less of an impact on the resource. Climate disruption, which could lead to episodes of more intense and more frequent drought, is an aggravating factor for the future of water resources, but also can be seen as an opportunity to develop agricultural systems.

In terms of catchment recharge areas, the objectives pursued by Eau de Paris to encourage these changes aim to:

- help evolve voluntary adaptation of farming practices towards systems that favour water quality (fewer pesticides and nitrates used): organic farming, agroforestry, low-input systems, etc. These changes bring about deep technical and economic questions, in a professional context that is more so directed towards "producing more" rather than "producing better."
- couple these changes in practices with land developments (hedges, natural filtering areas, grasslands, etc.) in order to limit transfer of the most problematic pollutants to the water.

To implement these objectives, Eau de Paris has taken a territorial approach within the catchment feed areas, based on a close partnership with local actors. Several levers are mobilised in this framework:

- technical consultation dedicated to action to provide technical and economic references justifying the feasibility of new sustainable and efficient agricultural practices that protect water, and support of farmers during these changes;

FOCUS ON AN EXEMPLARY ACTION

Supporting farmers

Nearly 140 farmers are working alongside Eau de Paris to preserve agricultural land, to cultivate it organically and to significantly reduce the amount of nitrogen or pesticides used over a total of more than 10 000 hectares. These changes are effective in improving water quality: the sources of Voulzie and the Vanne valley have seen a visible reduction in pesticide levels for several years now.

- specific financial aid mainly through funding from the Agence de l'Eau;
- development of the sector, providing a guarantee to the farmer that his production will be valued.

Eau de Paris also leads a land acquisition policy that encourages the establishment of young farmers with projects that are favourable to water quality through signing of rural environmental leases. Agricultural lands acquired are thus made available to farmers who agree to respect demanding environmental clauses.

The combination of these different levers led, for example, to a significant increase of more than 2,000 ha in organic farming areas in 2015 in the recharge areas at the source of the Vanne valley located east of Sens. This represents almost 9% of the agricultural area (1% in 2008). In this sector, a national pilot site for the development of organic agriculture, Eau de Paris' strategy is targeted solely on developing these practices.

Agricultural systems that protect water resources are part of a strategy that also addresses climate issues. They make it possible to store more carbon, they may be more resilient to climatic disturbances, and they promote a relocation of sectors.

Protecting water resources requires an all-encompassing vision, one that aims to act as early as possible in the mid and long term, in accordance with the general interest and a sustainable vision that characterises the public company Eau de Paris. However, water operators cannot carry the burden alone; these issues deeply affect agricultural models and must be supported by the government, both at a national or European level.

> ***The consequences of climate change on water resources are both quantitative and qualitative. That's why protecting the resource is at the heart of the Eau de Paris strategy.***

https://www.etraspa.it

KEY FIGURES

- 245 000 people served
- 60 million m^3 distributed/year
- 100 % groundwater

ITALY

ETRA - Energia Territorio Risorse Ambientali

A RISK-BASED APPROACH TO MONITOR POLLUTING SUBSTANCES AND ASSURE LAW ENFORCEMENT

ETRA provides integrated water services to 75 municipalities of the Brenta river basin in north-eastern Italy, supplying water to 600 000 inhabitants through a network of nearly 5 000 km, which provides 60 million cubic metres of drinking water. The area served extends to mountain and flat regions and is rich in water of excellent quality, which is abstracted through many wells. Mountain regions are rich in pastures whereas flat areas are densely populated and intensively cultivated. In addition to water supply, ETRA also deals with sewage services and production of renewable energy.

In the Veneto Region, the safe zone for drinking water sources is currently defined with the geometric criterion, as the area of a 200 meter radius from the point of collection, which is totally inadequate for the protection of the water resources. On the mandate of the Brenta River Basin Council, ETRA has developed a project to identify and define areas of protection on the basis of hydrogeological and temporal criteria for all the water abstraction points managed by ETRA.Although those areas have not yet been formally established, ETRA, in collaboration with the Brenta river basin authority, is already promoting actions with Municipalities for the supervision and compliance of these areas.

ETRA also adopted a Water Safety Plan based on the general principle of risk assessment described in the WHO "Guidelines for Drinking-water Quality" and in the WHO "Water Safety Plan Manual". In this framework, chemical, bacteriological, physical and radiological contamination risks were assessed for each source. The exposure of aquifers to agricultural, industrial and urban pressures has also been integrated into the risk assessment. Following this assessment, a series of specific actions

FOCUS ON AN EXEMPLARY ACTION

Establishment of a set of "Water Safety Areas" following a risk-based approach

ETRA has developed a Water Safety Plan based on WHO guidelines, which sets up a comprehensive and integrated approach to deal with pollution risks coming from agriculture, industry and urban-related activities. The WSP revolves around the training of a multi-disciplinary team in charge of carrying out a risk assessment at each stage of the production process and the integration of monitoring, sanctions and interventions for decontamination with regional health authorities and the Regional Environmental Protection Agency.

have been identified and implemented:

- Incentives to farmers to reduce the use of pollutants.
- Specific training programmes for staff in charge of carrying out inspections and creation of a fast-track reporting system to authorities for immediate sanctions to be established in case of breaching of the rules.
- Setting up of an information system displaying the trends of the different parameters.
- Definition of specific monitoring plans together with health authorities and the Regional Environmental Protection Agency to monitor water resources located in areas affected by industrial pollution.
- Active participation in inter-institutional coordination procedures – as defined by Italian law – to implement decontamination procedures of polluted sites.

Finally, ETRA has also launched research activities in order to minimize drinking water leakages. These activities revolve around two work programmes:

- Integration of all the available information on network conditions in a GIS-based software.
- Employing advanced instrumentation and mathematical modelling for leakage detection and immediate repair (these activities are based on the methodologies defined by the International Water Association).

Our activity is closely linked to natural resources, and heavily influenced by meteorological events, which may also have significant economic impacts. In our region we expect periods of drought followed by periods of intense rainfall. In the short term, these events cause higher energy consumption due to the more intense use of the drinking water pumping network (which in turn involves significant costs), as well as problems in the sewage pumping network and waste water treatment plants. In the long term, these events lead to the depletion of the acquifer. This is why we are putting our energy in tackling these problems through modelling, hydraulic barriers, information campaigns and the reduction of energy demand.

http://www.metropolitanamilanese.it/

KEY FIGURES

- Nearly 2 million people served
- 220 million m^3 distributed/year
- 100% groundwater

ITALY

Metropolitana Milanese S.p.a.

A COMPREHENSIVE APPROCH TO THE SUSTAINABLE USE OF WATER RESOURCES

Metropolitana Milanese (MM) manages the integrated water services of the city of Milan. It is responsible for the abstraction, purification and distribution of water, collects the wastewater and coordinates its treatment before the water is again released into the environment. The service coverage of Metropolita Milanese covers the totality of the area served, with a network of around 2 400 km and a total volume of approximately 220 million m^3 of drinking water delivered per year.

Respecting the environment is a priority for Metropolitana Milanese. This is why, every day, the utility works to reduce its environmental impact and to improve the efficient use of resources.

MM promotes the sustainable use of water resources through the implementation of a management policy that pursues this goal; the constant monitoring of water quality (over 17 500 samples were analysed in 2014), of network loss and of the status of the plants, and through the promotion of the reuse of treated wastewater in agriculture. MM also works to improve energy efficiency through research and development of solutions that minimise the energy consumption resulting from the activities of treatment plants.

MM is also active in flood prevention measures on behalf of the city of Milan. It thus protects the territory in the event of overflows of rivers and streams and prevents the distribution system and underground sections of natural rivers from clogging. Through ordinary and extraordinary maintenance activities, MM ensures the full functionality of the water network and sewage system and avoids the risk of underground dispersion of wastewater, thus protecting the aquifer.

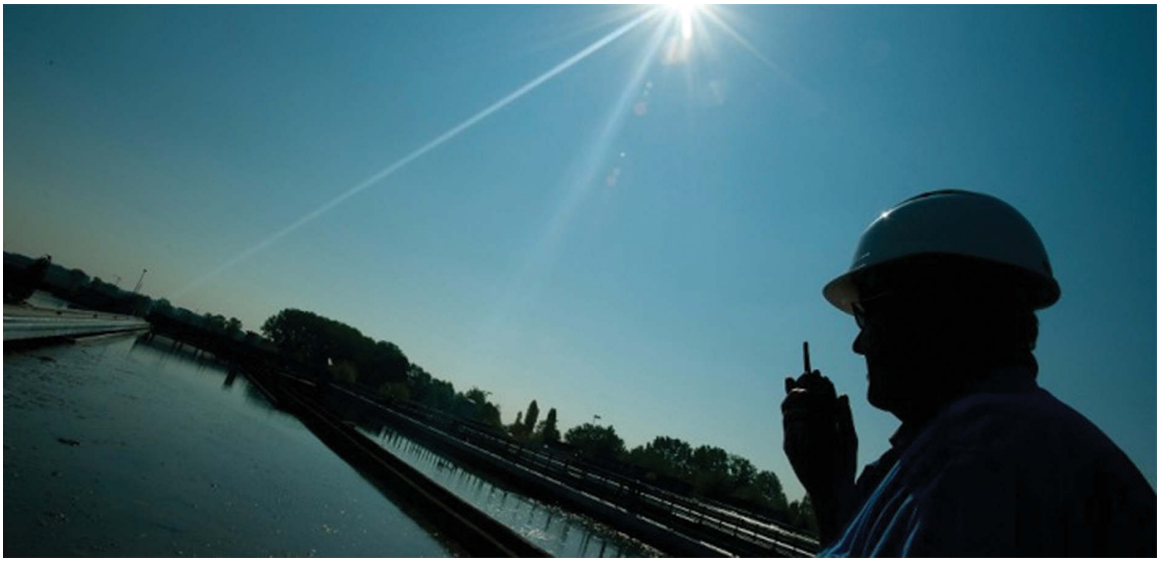
FOCUS ON AN EXEMPLARY ACTION

One of the projects through which MM promotes technological innovation in support of responsible management of water resources is the ICEWATER project, of which MM is a partner and for which it also runs a demonstration site. Icewater is a pilot project , funded within the EU 7th Framework Programme that aims at optimising the pumping system through the use of wireless sensors

Wireless sensors are used to monitor networks for water flow and provide a decision-making support tool for water utilities so that supply and demand patterns can be matched in real-time. As an additional benefit, leakage can be predicted with statistical methods so that water network damages can be mended even before they occur ("fix-before-break").

More and more frequently, MM carries out the maintenance activities on its networks with trenchless technologies, so as to minimise the excavation works as well as significantly limiting the inconvenience caused to citizens.

Our goal: manage and preserve water for a more sustainable future



http://promedio.dip-badajoz.es/

KEY FIGURES

- Drinking water served to 81 050 people, wastewater treatment provided for 139 247 people
- 4,5million m^3 distributed/year
- 25% groundwater
- 75% surface water

SPAIN

Environmental management services of the province of Badajoz (Extremadura)

A QUALITY PUBLIC SERVICE TO ENSURE THE RIGHT TO WATER

In a region where certain sectors are still not covered by the public water supply system, the main challenge consists of ensuring a secure and good-quality water supply to 100% of the population as soon as possible. This core objective, however, does not stop Promedio from working towardssustainable management of the water resource, which requires technical measures such as the maintenance of natural reservoirs, and the awareness of all stakeholders.

In the absence of proper local legislation, qualitative actions are conducted proactively. Thus, Promedio ensures optimisation of the hydraulic performance of networks and protects catchment areas in order to maintain optimum quality. It has also taken actions to reduce its environmental footprint.

As a public company, Promedio works on raising public awareness about the value of water and the need to maintain a fair price and accessibility for all.

Environmental measures and key projects implemented include:

- Controls of industrial waste in small and medium-sized citiesthrough the provision of technical devices.

- Intelligent organic matter management systems based on the treatment of effluents, which helpachieve better

> *Until now, we have had no water availability problems. However, since 1995, we have begun to see more frequent episodes of drought, forcing us to better adapt to this pressure.*

FOCUS ON AN EXEMPLARY ACTION

Organic Matter Smart Control

An intelligent control system was implemented in the water treatment plant of La Albuera. A set of probes was installed to monitor the dissolved oxygen and redox profiles. A controller then decides when the organic matter must be oxidized or reduced, with the aim of improving nutrient removal by adjusting the duration of the aeration/non-aeration cycles. In the same way, the sludge retention time was also controlled by adjusting the waste sludge pumping. Nutrient removal was improved from 60 % to 90 % for total nitrogen and from 40 % to 70 % for total phosphorus. In addition, energy savings of 25 % were achieved.

sludge pumping and aeration system management.

- Shared management of excess sludge in small and medium-sized cities, which helps reduce waste management costs and develop alternative systems for the use of sludge in agriculture.

- Development of alternative energy, including photovoltaics, for the treatment of plants to reduce energy consumption.

To achieve these goals, Promediohas been working with the University of Extremadura under a partnership agreement since 2008, which involves four water cycle researchers.

http://www.scottishwater.co.uk/

KEY FIGURES

- 5 million people served
- 150,000 business premises
- 1.34 billion litres distributed every day

SCOTLAND

Scottish Water

MAKING SCOTLAND AN HYDRO NATION

The Scottish Government is committed to its strategic vision of Scotland as the world's first 'Hydro Nation'–one which 'manages its water environment to the best advantage, employing its knowledge and expertise effectively at home and internationally'. The Water Resources (Scotland) Act places a statutory duty on Scottish Ministers to take steps to develop the monetary and non-monetary value of Scotland's water resources, a duty that extends to the single public water utility, Scottish Water.

While the vast majority of water taken from the environment in Scotland is unpolluted and, with treatment, meets very stringent drinking water quality standards, where water is of poor quality Scottish Water has been actively seeking new and alternative approaches to supplement the treatment of these supplies through sustainable land management. This offers the opportunity to enhance and maintain a high-quality supply of drinking water, providing even greater value for money for customers while also delivering real environmental improvements.

Due to the high associated costs for action required to protect drinking water sources an Incentive Scheme has been established to provide assistance in financing measures for Land Managers aimed at contributing to the improvement and protection of water sources in the catchment, where these go beyond the expected regulatory compliance.

The Scottish SLM Incentive Scheme targets specific areas within drinking water catchments in Scotland. Scottish Water has identified these areas as ones where diffuse pollution is affecting the quality of source waters. They are also areas where Scottish Water considers that partnership working with land managers is likely to produce the greatest benefits. The priority areas included within the SLM Incentive Scheme are monitored for water quality. Data is regularly reviewed and boundary areas may be revised

FOCUS ON AN EXEMPLARY ACTION

Sustainable Land Management Incentive Scheme

Land use such as farming practices, large and small scale construction and forest activities can affect the quality of the source water. If risks are not properly assessed then the quality of the source water can be impacted which in turn increases the energy and chemical use for water treatment. Scottish Water have therefore established an extensive catchment management programme working with land users to protect drinking water sources and enhance the environment.

when water quality shows a long-term improvement. Additional areas may also be added into the SLM Incentive Scheme if it is thought that a partnership approach may benefit water quality.

To ensure financing is targeted for maximum benefit, applications to the scheme are prioritised according to their ability to improve drinking water quality within the sub-catchment.

> ***Scottish Water have an extensive catchment management programme working with land users to protect drinking water sources and enhance the environment. A programme of renewable energy generation, energy efficiency and leakage controls all contribute to reduced carbon footprint and good use of water as a key resource.***

http://www.sdea.fr/

KEY FIGURES

- 810 000 people served
- 30 million m³ produced/year
- 100% of groundwater

FRANCE

SDEA – Syndicat des Eaux et de l'Assainissement de l'Alsace-Moselle

CONSTANTLY EVOLVING ACTIONS

The SDEA is involved in the production, treatment and distribution of drinking water on the one hand, and the collection, transportation and treatment of wastewater and rainwater on the other, in its territory covering 500 member communities.

Alsace has a rich water heritage, with a Rhine water table of 2 800 km2 (35 to 50 billion m³), numerous other lower volume groundwater resources and 6 200 km of rivers, streams and canals.

The water table of the Alsace plain is a major economic and ecological asset, satisfying nearly 80% of drinking water needs and over 50% of industrial water needs with good quality water. Similarly, other water tables, including the waters of the Sundgau aquifers or the Haguenau water table, also constitute a natural heritage to be preserved.

However, the state of these resources has worsened overall due to intense human activity, lack of natural protection from soil and permanent exchanges with watercourses. The 2 main pollutants are nitrates and pesticides.
For the SDEA, the conservation of resources goes through two levels of action: immediate action to protect water catchments and mid/long-term actions.

Immediate actions are primarily focused on the direct protection of all catchments: implementation and review by DPU, physical protection, etc.

FOCUS ON AN EXEMPLARY ACTION

Water officers have developed actions over time that are adapted to each part of the public: training on the use of phytosanitary products for professionals (2 400 farmers sensitised in three years), targeted communication and circulation of more than 39 000 "water letters" for informational purposes to the general public in 2014, deployment of the "Gardeners charter" with more than 43 establishments offering alternatives to phytosanitary products. One of the flagship initiatives is the "Alternatives to Pesticides Week" for individuals and professionals, which is structured around lectures/workshops/fun activities and has grown over the years, with 80 events now attracting nearly 6 000 people annually.

In the mid and long term, actions are more focused on substantive work to change the behaviour of the various partners. This work is done by a water officer, a new profession established in 2002 within the SDEA. The three water officers are in charge of:

- Raising the general public's awareness in agricultural areas (nitrates and pesticides issues) and non-agricultural areas (pesticides issue)
- Accompanying changes in practices
- Acquiring technical references and knowledge on the evolution of the quality of groundwater through experiments (e.g. ramialchipped wood) or hydrogeological studies.
- Leading of the COPIL of Grenelle's priority catchments (development and monitoring of action plans).

The reward received by the water officers in 2012 at the Trophées de l'Eau du bassinRhin Meuse (Rhine Meuse Water Awards) was a solid recognition of the fundamental work that had been carried out over the long term and on a pilot basis.

In addition, the outreach programme carried out to date was reinforced by a policy of encouraging change in agricultural sectors on the perimeters of protection through contact with storage agencies and potential customers to develop low-input channels or organic farming. A job of land moderator was also recently established to improve exploitation of land located in areas of water resource protection.

> ***There are several solutions for regaining water quality. Above all, the SDEA is convinced that the approach must be comprehensive and regionalised. Agriculture, provided that it favours short-circuit and "low-input" production, will be able to meet the dual objectives of preservation of water resources and minimisation of the impact on global warming.***

http://www.sierg.org/

Sierg
Syndicat Intercommunal des Eaux de la Région Grenobloise

KEY FIGURES

- 220 000 people served (Romanche)
- 15,3 million m^3 distributed/year
- 100% groundwater

FRANCE

SIERG - Syndicat intercommunal des eaux de la région grenobloise

MUNICIPAL WATER ASSOCIATION OF THE GRENOBLE REGION

Since the French territorial reform law, the SIERG production and supply union, covering a territory of 33 municipalities, was reduced to seven towns (Allemont, Bernini, Crolles, Le Versoud, Oz-en-Oisans, Saint-Martin d'Uriage and Villard-Bonnot). Ownership of the catchments fed by groundwater from the BasseRomanche was transferred to the new City of Grenoble. The pumping facilities are now managed and operated by SPL Eaux de Grenoble Alpes.

In its previous configuration (33 municipalities before 1/1/15), the SIERG exploited water from the groundwater table accompanying the Romanche, which still supplies untreated, naturally pure, water today to about 220 000 inhabitants. There is also a right to one cubic meter/second of water on the Eau d'Olle water table, currently untapped and protected for future generations.

The history of the SIERG is closely related to the first hydropower projects in

FOCUS ON AN EXEMPLARY ACTION

As part of the rehabilitation of the Romanche dykes, riprap was set up in the bed of the Romanche on the top of the water table. To restore the aquifer as quickly as possible to its filtration capacity, particularly in relation to potential bacteriological contamination, the gaps between the stones were artificially percolated during work using equivalent materials to those naturally in place.

This innovative approach proved to be very effective.

France. Given that electricity production activities impact water resources, SIERG signed two agreements with the electricity producer EDF.

Among other things, these agreements guarantee immediate response in case of pollution of the Romanche or the water tables (groundwater feed from the water of Lac Mort issued from the hydroelectric plant with the same name), the securing of supply to the water table, the development of new measuring stations, rapid circulation of information in case of exceptional events that may affect water quality and operation of hydroelectric facilities in compliance with technical requirements related to safety issues and groundwater quality.

To protect the banks and catchments from floods, including the centennial flood of the Romanche, they were rehabilitated. Through this work, which lasted three years, SPL Eaux de Grenoble Alpes, in continuation of the former SIERG, can again guarantee naturally pure water that requires no treatment to towns and their citizens.

> ***As a result of climate change, changing precipitation patterns and a decrease in the volume of snow stored in the catchment will alter the structure of the Romanche, which directly supplies the exploited water table: post-summer flooding may be more pronounced and longer.***

http://www.sig-ge.ch

KEY FIGURES

- 487 000 people served
- Nearly 52 million m^3 distributed/year
- 20% groundwater
- 80% of water originating from the lake

SWITZERLAND

SIG Eau potable – Service Industriel de Genève

A NATURAL HERITAGE TO BE PRESERVED AND PROTECTED

Eighty per cent of the Geneva basin is supplied by Lake Geneva and 20% by groundwater. The waters of the lake are under the surveillance of various institutions, such as the Commission internationale pour la protection des eaux du lac Léman (International Commission for the Protection of the waters of Lake Geneva (CIPEL) and the Association pour la sauvegarde du lac Léman (Association for the Protection of Lake Geneva (ASL). In addition, as a border region, management of water resources is subject to both Swiss and French legislations. Raw water catchments placed several tens of metres into the ground, which ensures a relatively constant temperature and effective protection against surface pollutants.

The waters of the water table are very good quality and naturally protected by a thick soil matrix that protects the aquifer. The quality, which is heavily monitored, is stable over time. However, the volume was quickly exhausted in the past and led to the establishment, through a Franco-Swiss partnership, of a water table recharge device using waters collected in the Arve.

Climate change is expected to generate droughts and more intense precipitation, which could lead to more frequent flooding.

> *The diversification of resources is a very important point in the management of our raw materials. Depending on weather conditions and the growing risks of contamination of raw water, not putting all of our eggs in one basket is becoming.*

FOCUS ON AN EXEMPLARY ACTION

On average, the southern canton of Geneva and the communities of the communes north of Salève draw 16 million m3 of water in the water table. The natural supply capacity of the aquifer (floods of the Arve and precipitation) is 50%. Over time, the drawdown of the water table due to overuse became disturbing and required more pumping costs. To preserve this very well protected resource, the Swiss and French authorities decided to build a recharge station in Switzerland. The idea consists of taking water from the Arve, mechanically treating (clarifying) it, then injecting the filtered water in the soil through inverted drains. Filtration serves only to avoid clogging the gap of the sub-soil. The qualitative side is assured through the self-purifying capacity of the ground.

Potentially contaminated water then infiltrates into water tables and alters the quality of the groundwater resource. As for the lake resource, it could most likely experience phases of increased temperature, modifying its biological balance. Current water treatment lines may no longer be sufficient, which would have an economic and environmental impact in terms of energy consumption, for example.

Although not directly confronted with the issue of protecting water resources, with the quality and quantity sufficiently handled, SIG is a company that is committed to the continuous improvement of its environmental performance through the use innovative technologies, compliance with legal requirements and prevention of pollution.

http://www.smatorino.it/

KEY FIGURES

- Nearly 2,3 million people served
- 190 million m^3 distributed/year
- 81% ground water
- 19% surface water

ITALY

SMAT - Società Metropolitana Acque Torino S.p.A.

UNIFYING THE PRECAUTIONARY PRINCIPLE AND A LIFE-CYCLE APPROACH IN WATER MANAGEMENT

SMAT has always considered environmental issues, such as the availability and quality of water,to be key issues. . Thus, all SMAT activities are carried out in accordance with the "precautionary principle" adopted at the Rio conference in 1992. SMAT applies this principle to both technological innovation and technical activities, going beyond what is required by legislation.

> *Increasing efficiency and reducing water leakage will be the key actions of the future for water resource and supply management*

The resource protection strategy has several components:

- The establishment of protection infrastructure for catchment areas
- The implementation of an integrated approach: "from the source to the tap"
- Reduction of the environmental impact of its own activities through innovation

Through a constant commitment in all of these areas, SMAT has obtained significant results over the past few years. These achievements include the adoption of appropriate treatment processes to improve the reuse of treated wastewater and reduce the amount of residual sludge, to control water leaks in the distribution network, to increase the production of renewable energy on its real estate and to promote "kilometre zero water", thanks to the installation of public water points.

FOCUS ON AN EXEMPLARY ACTION

Construction of a new water supply system bringing water from a dam to 18 municipalities

The system will be able to integrate local water production from wells and springs and to generate electricity through hydraulic turbines. In order to optimise energy production and instantaneously deal with local water shortages, a complex mathematical model will be used.

SMAT manages a total of 1,738 abstraction sites, favouring groundwater rather than surface water, as it has a better quality and reduced vulnerability. This resource requires fewer purification procedures, and thus generates fewer costs. In addition, the diversity of sources of supply is a good hedge against climate change risks. SMAT also ensures quantitative protection of surface and groundwaterby systematically avoiding withdrawals beyond the regeneration capacity of the basin.

Regarding the protection of water resources, SMAT launched an extensive evaluation process to redefine the protection zones of abstraction areas. All water intake requires consistentauthorisation, which determines the amount of water that can be abstracted according to the hydrogeological characteristics of the aquifer. This ensures a balance between consumption and regeneration.

A similar approach is adopted for surface water, where a "minimum environmental flow" is calculated to establish the maximum amount of water that can be abstracted to protect the environmental balance of the river.

In this area, SMAT has been controlling its main source of surface water, the river Po – which supplies 45 million m^3 of water each year to serve 200,000 inhabitants – for 30 years. This responsibility involves real-time monitoring of the water quality (biological, physical and chemical parametersthrough instruments such as bio-sensors).

https://www.sw-augsburg.de/

swa
Energie Wasser Verkehr

KEY FIGURES

- 322 000 people served
- 17 million m³ distributed/year
- 100% groundwater

GERMANY

SWA Wasser GmbH — Stadtwerke Augsburg

A RESULT-ORIENTED APPROACH TO DECREASE THE IMPACT OF AGRICULTURE ON WATER QUALITY

SWA Wasser GmbH is the public water supply operator of the city of Augsburg, Bavaria (Germany). Every year, it supplies 17 millionm³ of drinking water from groundwater sources to around 322 000 people.

Supplying consumers with natural (untreated) drinking water has been a political goal for the city of Augsburg for over 130 years. In the 1980s, more intensive farming resulted in increasing levels of nitrates and in initial findings of pesticides in groundwater. To counter these pressures on the quality of water, the water supply company of the city of Augsburg started a comprehensive groundwater protection programme. This programme included:

- The delimitation and control of drinking water protection areas (DWPA).
- The acquisition of farm and industrial land.

- Provision of advice and establishment of mandatory and incentive contracts with farmers. Farmers working within and near the management zones must sign an agreement with SWA Wasser GmbH. This agreement asks that they respect the relevant environmental standards and provides them with compensation (also for lower yields). On the contrary, voluntary incentive contracts provide remuneration for farmers respecting stricter regulations regarding fertilisation and plant protection practices.

- Public relations activities involving information for clients and the public living within the groundwater protection area.

FOCUS ON AN EXEMPLARY ACTION

Contracts with farmers to improve the protection of water resources

SWA Wasser GmbH has signed contracts for 650 ha farmland in the water-protection area; every year the farmers get 60 to 700€/ha, depending on the severity of the restrictions, the price for the crops and the autumn concentrations of nitrate in soil.

Climate change and,in particular, heavier rainfall, has an impact on the capacity of the soil to filter the water. This means that water has to be abstracted from more deep-lying aquifers, which in turn requires investments. These are however necessary to maintain the quality of the Augsburg drinking water, a privilege we want to maintain for our users.

http://www.vivaqua.be/

VIVAQUA

KEY FIGURES

- 2,25 million people served
- 132 million m^3 of drinking water produced/year
- 2/3 groundwater and 1/3 surface water

BELGIUM

VIVAQUA

RESOURCE MANAGEMENT: MORE THAN AN OBLIGATION, A COMPANY CULTURE

Vivaqua is in charge of supplying the city of Brussels and part of the Flemish and Walloon regions with drinking water.

The water is abstracted from 26 major sites in Belgium. Since its beginnings, and almost a hundred years before the setting up of any legislation on the matter, VIVAQUA has bought large areas of land around the catchment areas and created prevention zones in order to preserve the water resources it is drawing from them. These areas have been continuously extended since then, which makes VIVAQUA one of the largest landowners in Belgium. Today, VIVAQUA permanently controls 1,500 ha.

Very quickly, VIVAQUA has set up a team of workers called "cantonniers", whose role, in addition to checking water quality daily, was to manage a surveillance zone (public and private spaces) in order to anticipate risks by engaging in dialogue with all residents (individuals, farmers, public authorities, etc.) and highlighting good practices. Today, all of these practices are governed by legislation.
In all of the areas it owns, VIVAQUA conducted reforestation of the lots as well as sealing or deviation of rivers.

> *It is now largely accepted that the climate is out of balance. The most plausible change consists of an intensification of precipitation events and more frequent droughts. Indeed, more intense runoff that may occur could lead to higher concentrations of pollutants in water tables but could also cause infiltration, which results in no recharge of the water table. The water tables have been monitored for decades by VIVAQUA, will continue to be and already, certain solutions are being discussed.*

FOCUS ON AN EXEMPLARY ACTION

Differentiated management(or the Zero Pesticides objective):

In June 2019, a Belgian law was introduced that completely prohibited the use of pesticides. VIVAQUA decided to anticipate this legislation. VIVAQUA began testing a range of weed control methods that use no harmful products (thermal weeding by direct flame, hot air, hot water, hot foam, steam, mechanical brush weeding, sweeper weeding or using rotary harrowsm, and hand weeding). Through these actions, Vivaqua hopes to eradicate the use of these products on its land by 2017.

All catchments are monitored in terms of quantity (monitoring of water table height) and quality (testing frequency is much higher than what is imposed by legislation) in order to sustain the resource.

For both groundwater and surface water catchments, VIVAQUA takes part in any and all initiatives to protect the resource:

- The International Commission of Meuse, which has, among other things, set up a dynamic and instantaneous alert system to warn users of possible river pollution. Given that the Vivaqua drinking water treatment plant gets its water from the Meuse, it is well protected from pollution of the river.
- The International Commission of Escaut, which aims to ensure a common policy with all regions/countries that are part of this basin.
- VIVAQUA also participates in various river contracts (Dyle, Gette, etc.) that bring together users of the watercourses to find solutions to improve their quality.
- The non-profit association NITRAWAL, which aims to support farmers in their efforts to protect water resources from nitrate pollution. With farmers in Vieux Genappe, for example, VIVAQUA tries to optimise the amount of nitrogen used. In this context, nitrate levels are analysed several times a year to review the impact of this policy.
- VIVAQUA has also signed a catchment contract with the Phyteauwal association with the aim of encouraging individuals and farmers to minimise the use of pesticides; as for nitrates; regular monitoring of the quality of water catchments is done to determine if there is a decrease in the concentration of pesticides.
- Local contracts with farmers who use the land owned by Vivaquahave also been signed in order to raise awareness on the use of pesticides and to establish an information exchange system regarding the fertilisers and pesticides they use.

RECOMMENDATIONS

In the previous pages we have described a series of concrete actions carried out by public water operators to ensure the protection of water resources.

The cases reported in this publication cover a variety of initiatives, responding to different local priorities and conditions. Yet they all share a proactive and creative approach that aims to realise innovative solutions to common problems, often by promoting the active engagement of other stakeholders.

APE's members are thus aware of the great challenges lying ahead, and are committed to playing their part in ensuring the protection of water resources, relying on the values and long-term vision that characterise public water management. A coherent and conductive policy framework is essential for both water operators and other stakeholders when it comes to pursuing this mission.

In this framework,

APE's members call on the international community, and in particular European Institutions, to:

- ensure that water-related challenges remain a priority on the political agenda and that they are fully integrated across all relevant policy areas; all institutional levels, from local to international, need to be involved, starting with the COP21 Conference.

- increase efforts to ensure better cross-compliance between water and other policy areas, in particular agriculture: farmers need to receive consistent policy directives, enabling them to plan their activities on a long-term and sustainable scale.

- ensure a coherent governance framework: a clear definition of responsabilities among different stakeholders, and of the financial implications such responsabilities entail, is essential to ensure effective protection of water resources.

- promote equitable participation of different societal uses in the recovery of water management costs: while the Polluter-Pays Principle should be better applied and environmental costs should be better integrated into water pricing, ensuring full cost recovery and its fair repartition is also a matter of good governance and political willingness.

- ensure that the economic resources generated through the water management cycle are reinvested as a priority in the water cycle itself. This will help foster investments, facilitate access to long-term financing and ensure affordability.

- actively promote upstream/control at source approaches as a cost-effective solution to reduce pollution: while more could be done to promote the sharing of best practices and uptake in this field, the presence of a conducive governance framework and clear rules is an essential condition for the diffusion and effective implementation of voluntary agreements.

- promote non-profit cooperation among water operators to support knowledge sharing and the sharing of best practices.

- tackle emerging substances by progressively developing a specific policy framework that reconciles water safety requirements with other social consumption patterns and expectations.

- promote the development and diffusion of technological innovation that can help tackle new and old challenges, while keeping in mind that innovation must remain a means and not an end and that different options should always be considered in the framework of a proper cost-benefit analysis.

- support the diffusion of new devices, as well as awareness campaigns to promote water efficiency and conservation; ensure that consumers have adequate and comparable information both on tap water and other drinks available on the market.

We are at a turning point for the future of our environment. At present, the international community is expected to reach crucial political decisions: while the new Sustainable Development Goals have been recently adopted, delegates meeting in Paris for the UN Climate Change Conference are expected to reach a robust agreement on climate change mitigation. Important policy processes are also occurring in the EU. The presentation of the new legislative package on Circular Economy and the ongoing revision of several directives in the water domain, expected in the near future, are just some of them.

Policymakers thus have the crucial responsibility of adopting a consistent framework. However, its concrete implementation will be everyone's task. Public water operators are committed to taking on this responsibility and actively contributing to it.

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EUROPEAN ASSOCIATION
OF PUBLIC WATER OPERATORS