

Side event. New sources: Wastewater reuse in the framework of sustainable management.

14 January 2015

Introduction

Studies regarding global risks in economic, geopolitical, technological or environmental aspects, like the one elaborated each year by the World Economic Forum, place a growing emphasis on environmental risks like climate change or the so called "water crisis". According to this report, both risks are among the top four in greatest probability and greatest impact. The global risk of "water crisis" is determined by very different factors, some related to climate change and all related to world population increase. Water is necessary for this growing population, and attention should be given to how the population is distributed. Half of humanity lives in cities, and within two decades, almost 60% of the world population (5 billion people) will live in urban areas. The explosive growth of urban population poses unprecedented challenges.

Keeping the depletion of conventional resources in mind, new water supply sources are desalination (with over 100% growth in the last decade), reuse (with close to 200% growth during the same period), and savings. Right now, 0.18% of water demand in the world is covered by reused water, and the possibilities of expansion are enormous. Although examples of reusing treated wastewater are growing (Namibia; Singapore, California, etc.) except for some social resistance, urban wastewater can have very different uses.

Last January 14th, the side event "New sources: Water reuse in the framework of sustainable management" was held in Zaragoza, framed in the 2015 UN-Water Annual International Zaragoza Conference. The seminar was organized by the Institute IMDEA Water, the University of Alcalá and the Consolider Tragua Network (TRAGUANET).

Reclaimed water as a new source of water resources

Rafael Mujeriego. President of the Spanish Association for Sustainable Water Reuse (ASERSA) provided a global view of the possibilities for wastewater as a resource.

In a world where we have finite water resources to feed a growing world population and increasingly concentrated in urban areas, we face major challenges in water supply, disposal of treated effluent and environmental protection of aquatic environments. In addition, climate models anticipate greater uncertainty (irregularity) rainfall, an uncertainty that affects the geographical and seasonal rainfall patterns, with more intense and longer droughts, and with special emphasis in our latitudes. Thus, the main challenge is the regularity of flows, having to face the risks of both meteorological and hydrological drought.

In this situation, reclaimed water is seen as a new source of water resources, unconventional and alternative, with a reliability far superior to that of conventional sources. Moreover, this water quality exceeds the quality of many conventional sources, and it can be set depending on the needs.

Regeneration and water reuse appear as a new strategy, complementary to the already used ones, to attend to the water demands. But reuse strategy is complex and has multiple dimensions (technical, public health, economic and financial, regulatory, institutional management,

environmental, territorial planning, industrial, public perception and policy on integrated management of resources).

On the other hand, it can be said that regeneration of water has two motivations. The first is to provide new supply sources of local character, so that self-sufficiency is favored. The second motivation is to facilitate the management of treated water, offering alternatives to discharge to the environment, and even enabling the "zero discharge".

In relation to the uses of reclaimed water, the range is very wide:

- Agricultural irrigation and gardening
- Urban uses: toilets, fire, street cleaning, car washing
- Industrial uses: refrigeration, processes
- Recreational uses: ornamental lakes
- Preservation and environmental improvement: wetlands
- Groundwater recharge: infiltration and injection
- Improvement of water supply reservoirs
- Increased water supply



Despite this promising future, water reuse is facing various challenges, such as the adoption of consistent terminology (regenerate / reuse / recycle) and the development of specific legislation to complement and improve the Royal Decree 1620/2007.

Other challenges that the reutilization must overcome are to assure its sustainability, the adoption of a quality brand and to incorporate it into the integrated management. Furthermore, it is necessary to add the importance of achieving public acceptance through information and participation.

Many of these challenges will be overcome by offering a quality of reclaimed water equal to or greater than that of water for public consumption (ensuring the perception and acceptance of users), adopting a total quality control similar to purification, promoting demonstration projects and risk assessments and promoting national and international collaboration.

Practical examples of reuse

During the seminar, different practical examples of reuse were presented and other possibilities to recover contaminated substances (organic material, phosphorus, nitrogen) were examined.

Successful projects to reuse water were set as practical examples in entertainment, industry, and aquifer recharge:

- Reuse as "source" of water in Madrid, by Pedro Miguel Catalinas. Madrid City Council. He described the Plan for Water Reuse in the center of the city (with a capacity of 37,600 m³ / day), indicating the design criteria regarding water quality required reused and the composition of the distribution network.
- Direct water reuse in Windhoek (Namibia), by Joan Sanz. Veolia. A only case of direct potable reuse in the Goreangab Water Reuse Plant, in Windhoek, Namibia.
- Injection barrier at the Llobregat delta, by Lucila Candela. Polytechnic University of Catalonia. The hydraulic barrier scheme consists of injecting municipal treated water

through wells to conform a pressure ridge along the coast, therefore stopping the seawater from entering the aquifer.

- Irrigation of golf courses in Gran Canaria, by M^a del Carmen Cabrera. University of Las Palmas de Gran Canaria. This golf course is irrigated with reclaimed water for over thirty years. Researchers conducted a multidisciplinary study of the affection of this irrigation to the soil, to the non-saturated zone and to the aquiferous.
- Water reuse in the paper industry, by Ángeles Blanco. Complutense University of Madrid. This research team, in collaboration with the Canal de Isabel II Gestión and a paper company, conducted a pilot study in a WWTP to treat the effluent through a system of multi-barrier membranes, obtaining a suitable reclaimed water for consumption as fresh water in the paper mill.
- Water reuse in combined cycle plants, by David de la Fuente. Gas Natural. This company recycle (in the combined cycle plants) the equivalent to the production of urban waste water of a population of 141.000 people.

Conclusions

The reclaimed water is a new resource, unconventional, with a reliability higher than conventional sources. Compared to many conventional sources, the quality of reclaimed water is higher, and can be set according to the needs, since that it can be used for various uses (agricultural and landscape irrigation, industrial, urban and recreational uses; for environmental preservation, aquifer recharge, etc.).

On the other hand, reuse faces various challenges such as improving specific regulations, adopting a quality mark, ensuring sustainability, incorporating it into the integrated management and achieving public acceptance.

Consolider Tragua Network: TRAGUANET

The seminar was attended by members of the Consolider Tragua Network (TRAGUANET). This network is funded by the MINECO in the last call for Networks of Excellence Consolider. After attending the seminar, the first meeting of the Network was held. For two years, TRAGUANET allow communication and collaboration among 24 groups throughout Spain which were part of the Consolider Tragua project. This project approached in an integrated way the water reuse during more than 5 years.

More information <http://www.consolider-traqua.com/>

Session photos:

