

Democratizing spatial decision making in the water sector

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Summary: The ENI CBC Med funded AQUACYCLE project brings the opportunity to trial a bottom-up process to draw up wastewater reuse action plans. The active involvement of local communities is foreseen around the demonstration sites of the project's eco-innovative wastewater treatment technology in Lebanon, Spain and Tunisia. The ultimate aim is to bring about a much-needed paradigm shift in how the safe reuse of treated domestic wastewater should be looked at: All water is too precious to waste! The aspirations and testimonies of the local communities will feed a Mediterranean Charter for the safe and sustainable reuse of treated domestic wastewater

Keywords: Treated wastewater reuse action plans, Participatory GIS, Climate change adaptation, Mediterranean Charter.

The context

The ENI CBC Med funded project **AQUACYCLE** project is aimed at demonstrating the eco-innovative **APOC** wastewater treatment technology which consists of **Anaerobic digestion** and the **Photocatalytic Oxidization** in a solar raceway pond of the outflow of **Constructed wetlands**. Aside from the production of biogas and the recovery of nutrients from the sludge as fertilizer, solar disinfection will ensure the safe reuse of treated domestic wastewater with minimal investment and operating costs.

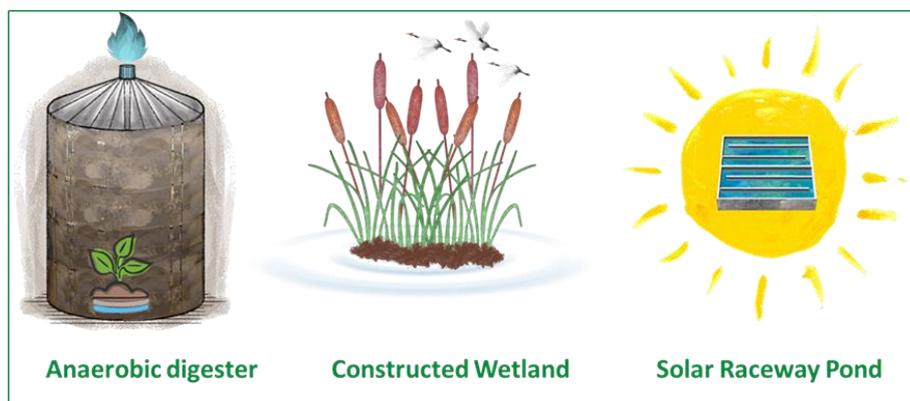


Fig. 1: The three components of the eco-innovative APOC wastewater treatment technology

The project is motivated by the disturbing reality that a substantial number of wastewater treatment plants installed in the Mediterranean region have proven unsuccessful copies of western-based treatment system concepts. Besides their high operational and maintenance costs, they are often unsuited to address the challenges of wastewater treatment in small to medium-sized communities.

The region's prevailing water scarcity is set to worsen as the impacts of climate change are being felt, not least in the agricultural sector which consumes an estimated 70% of available water supplies. As predictions of a decrease in rainfall by at least 10%, and increased evapotranspiration due to a rising temperature of around two degrees Celsius are manifesting themselves, the future of farming, one of the largest employment sectors in the region, looks exceedingly bleak. Clearly, not only water security but also food security in the region is at risk [1].

This brings the ambition to bring about a much-needed paradigm shift in how the safe reuse of treated domestic wastewater should be looked at: **All water is too precious to waste!**

EU Policy background - Why reuse treated wastewater?

Across the EU Member States about 1 billion cubic metres of treated urban wastewater is reused annually. In reality, this accounts for only just over 2% of the total treated urban wastewater effluent and less than 0.5% of annual freshwater withdrawals across the EU [2].

Introduced on 25 May 2020, the **EU regulation on the minimum requirements for water reuse** [3], augurs that treated wastewater can provide a reliable water supply, quite independent from seasonal drought and weather variability and able to cover peaks of water demand. Moreover, the European Commission calls for the appropriate consideration of nutrients in treated wastewater to reduce the use of additional fertilisers and thus result in savings for the environment, farmers and wastewater treatment itself [2].

While these aspirations are in line with the circular economy concept that underpins the **APOC** technology, the question remains as to why the use of the treated wastewater continues to be almost insignificant. Notwithstanding the fact that safety and health concerns obviously do need to properly looked at, the authors opine that far too often, largely insufficient consideration is given in the planning process to properly assess the demand side of the reuse potential of treated wastewater.

Guiding a bottom-up process to build up wastewater reuse action plans

The participatory-driven process to be rolled out in **AQUACYCLE**, will invite local communities, made up of farmers, environmental NGOs and a widest range of community representatives to come together to draw up proposed wastewater reuse action plans.

To start with, an easy-to-use online canvas constructed with [google.com/mymaps](https://www.google.com/mymaps) will enable the collection of 'bottom up' inputs provided by the local communities around the planned demonstration sites in Lebanon, Spain and Tunisia.



Fig. 2: The demonstration sites of the eco-innovative APOC wastewater treatment technology

Prior to the presentation of the plans to local, regional and national water management entities, all proposed reuse applications will undergo a rigorous and systematic screening. This will be aimed at ensuring that the final reuse action plans will bring not only the most cost-effective solution with maximum environmental benefits, but also deliver the desired social benefits to the communities as a whole.

To this effect, the screening process will take due consideration that, where relevant, a certain volume of treated effluent will be discharged into the local stream or river network to ensure environmental minimum flows are observed throughout the year [4]. Also, the greening of open spaces for the well-being of society will be given due importance as part of potential reuse applications.

Building on earlier successful achievements...

While the authors have been actively engaged in EU funded research that dealt with optimum water and irrigation management through the use of satellite imagery interpretation and GIS based spatial analysis, **AQUACYCLE** brings the opportunity for the authors to build further on their successful demonstration of how **local communities** can – and **should** – **be engaged in all planning decisions** that may have an impact on their well-being. Indeed, in the precursor ENPI CBC Med funded project, **MARE NOSTRUM**, which dealt with coastal zone management, the local communities around Malta's Grand Harbour joined a similarly participatory GIS (PGIS) driven process to draw eco-heritage trails for their locality. Eventually, this led to the production of a **Local Communities' Charter on Safeguarding Open Spaces around Malta's Grand Harbour** [5].



Fig. 3: Her Excellency, Marie-Louise Coleiro Preca, President of Malta, signing the Local Communities' Charter, © IRMCo

... to produce a Charter with a difference ...

Inspired by these earlier successful achievements, in **AQUACYCLE**, the authors will oversee the production of a **Mediterranean Charter** for the **safe and sustainable reuse of treated domestic wastewater**. This effort is clearly not meant to duplicate already existing charters on water and sanitation, such as the Lisbon Charter [6], nor similar efforts such as the United Nations' Global Wastewater Initiative, which promotes good wastewater management practices and works towards having wastewater viewed as a potentially valuable resource instead of as a waste product [7].

Instead, the Charter will bring the voices and aspirations of local communities who will be contributing to drawing up of the treated wastewater reuse action plans. Even if many people around the world have become accustomed to the use of online navigation tools, such as Google Earth and OpenStreetMap, every effort will be made to adopt an all-inclusive approach. To this effect, also printed copies of maps and satellite imagery (*pictured on right*) will be available for participants to simply draw their proposed reuse applications. These drawings will then be digitized for inclusion in the set of georeferenced 'bottom up' inputs.



... and action plans targeting the reuse of 900,000 m³ of treated domestic wastewater

The authors are confident that the PGIS approach will bring a novel means to achieve the above reuse target which is set by the 'Water efficiency' Priority of the 'Environmental protection, climate change adaptation and mitigation' Thematic Objective of the ENI CBC Med Programme.

References

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