Agricultural Wastewater Reuse in Apulia: What’s going on.

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In Italy, an overall annual water inflow around 155 billions m$$^3$$ yields only 52 billions m$$^3$$ of resources actually exploitable. Because of the geographically uneven rainfalls distribution, in southern regions (e.g., Apulia, Sicily and Sardinia) such figures drastically decrease as rainfalls result much lower than the national average (980 mm/y). More recently, climate changes and extreme events (i.e., severe floods and long drought periods) have also worsened the situation in such regions thus calling for a more appropriate water management policy. Finally, it must be pointed out that, in the same regions, because of their out of date distribution systems, only part of the already scarce water resources can be actually utilized.

At national level, Apulia, a southern-eastern region extended for about 20,000 km$$^2$$ with 800 km of coasts and 4,500,000 inhabitants, owns the smallest amount (136 m$$^3$$/capita/y) of available water resources. Nevertheless, the economy of the region, mainly based on two water demanding activities: agriculture and tourism, is ranked as one of the best in southern Italy. This has been possible thanks to the Apulian aqueduct (AQP) that imports water from bordering regions such as Campania, Lucania and Molise. AQP is the largest European aqueduct, a complex multi-purposes and multi-reservoirs system, with 19,635 km of distribution networks, 4,623,349 inhabitants served and 309,416,113 m$$^3$$ of distributed water.

As for the current regional irrigation water consumes, more or less 800 Mm$$^3$$, it must be pointed out that, in spite of the presence of the AQP and six water-distribution consortia, about 75% of such consumes (i.e., 600 Mm$$^3$$) come from regional aquifers whose overexploitation, as expected, has caused their progressive salinization and depletion.

In this context, regional authorities have recently issued an update water resources management master plan in which the reuse of treated wastewater, in agriculture as well as in industry, is expected to play a relevant role.

This paper overviews and correlates the Apulia’s features (i.e., natural water resources availability, agricultural land use, local water demand, availability of reusable municipal wastewater, in force regulations, etc.) that all together constitute the rationale behind such a master plan. Moreover, it also outlines the results of recent researches locally carried out to test the effectiveness of advanced technologies for reusing municipal wastewater in agriculture.