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Managed Aquifer Recharge in Italy: present and prospects.

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On October the 3^{rd} 2014, a one-day Workshop on Managed Aquifer Recharge (MAR) experiences in Italy took place at the GEOFLUID fair in Piacenza. It was organized within the framework of the EIP AG 128 - MAR Solutions - Managed Aquifer Recharge Strategies and Actions and the EU FPVII MARSOL. The event aimed at showcasing present experiences on MAR in Italy while at the same time starting a network among all the Institutions involved. In this contribution, we discuss the state of MAR application in Italy and summarize the outcomes of that event.

In Italy aquifer recharge is traditionally applied unintentionally, by increasing riverbank filtration or because of excess irrigation. A certain interest for artificial recharge of aquifers arose at the end of the '70s and the beginning of the '80s and tests have been carried out in Tuscany, Veneto and Friuli Venezia Giulia. During the last years some projects on aquifer recharge were co-financed by the European Commission mainly through the LIFE program. Nearly all of them use the terminology of artificial recharge instead of MAR. They are:

- TRUST (*Tool for regional - scale assessment of groundwater storage improvement in adaptation to climate change*, LIFE07 ENV/IT/000475; Marsala 2014);

- AQUOR (*Implementation of a water saving and artificial recharging participated strategy for the quantitative groundwater layer rebalance of the upper Vicenza's plain* - LIFE 2010 ENV/IT/380; Mezzalira et al. 2014);

- WARBO (*Water re-born - artificial recharge: innovative technologies for the sustainable management of water resources*, LIFE10 ENV/IT/000394; 2014).

While the TRUST project dealt in general with aquifer recharge, AQUOR and WARBO focused essentially on small scale demonstration plants.

Within the EU FPVII-ENV-2013 MARSOL project (Demonstrating Managed Aquifer Recharge as a Solution to Water Scarcity and Drought; 2014), a dedicated monitoring and decision support system is under development to manage recharge at a large scale riverbank filtration plant, worth 15 Mm^3/year in Lucca (Tuscany; Borsi et al. 2014). In 2014, the Regional Authority of Emilia Romagna started a pilot on the Marecchia River fan using a recharge basin to alleviate water scarcity in the Rimini area as results of drought periods (Severi et al. 2014).

To apply MAR techniques on a large scale is of particular interest the possibility to allow farmer's associations or drainage consortiums to play an important role in storing excess rainfall water in aquifers. Few hectares of land in rural areas may be dedicated to MAR plants, transforming a traditionally water consumer sector in one preserving it - opportunities are then linked to the provision of water related ecosystem services.

Aquifer recharge is allowed in Italy only since September 2013, but still a regulatory framework is missing. Hopefully, this regulatory scheme will benefit from previous and on-going experiences. Dissemination of MAR scientific findings and technical know-how among governing authorities and the general public is crucial for the application of MAR techniques. Fundings for setting up new MAR plants may be available at national level. At the same time, lack of knowledge at intermediate governing bodies level is preventing the application of these techniques (i.e. building of small dams is favored although less convenient by several points of view in respect of MAR plants). Finally, it is of outmost importance to define which are the financial instruments to sustain these water infrastructures, so to guarantee not only their set up, but also routinely operations, opening as such a new market in the water sector.

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