flowpath THIRD EDITION
3rd National Meeting on Hydrogeology
Cagliari, 14-16 June 2017

# THE SUSTAINABLE GROUNDWATER MANAGEMENT AND ITS CONTRIBUTION TO A MORE RESILIENT ROME

**Francesco LA VIGNA [1], Isidoro BONFÀ [1], Simona MARTELLI [1], Lucilla TICCONI [1]**

*[1] Roma Capitale, francesco.lavigna@comune.roma.it*

The largely invisible world of groundwater is involved in many aspects of a city life: water supply systems, sewage, surface-water features, the health of plants and trees, flood potential, and drought events. Recently, groundwater has been recognized as a cornerstone in the resilience of the cities (Tanner et al. 2009). Under this perspective, mapping and monitoring groundwater and surface water resources represents a fundamental step for optimizing the urban water system and minimizing water consumption and deterioration. In the city of Rome, even if at the beginning of its lifetime the local historical springs provided the water supply, nowadays most of drinking water supply derives from springs located far from the city, and is delivered to population through the aqueduct network. Even if, currently, there are not specific issues related to water quantity, however, the Rome municipality is dealing with many groundwater related problems. Some examples are: pollution (Ellis 1999), relationships between poor quality streams and aquifers, natural background levels of dissolved elements and compounds, differential settlements in streams valleys, subsidence and salinization (Manca et al. 2014) as well as groundwater flooding in the coastal aquifer. Consequently, the sustainable groundwater management in towns poses, not only scientific challenges, but also technical, socio-economic, cultural and ethical.

The knowledge base today is stronger in Rome, thanks to the new hydrogeological map (La Vigna and Mazza, 2015) and the new monitoring network implementation, and there are many advanced technologies not only for resources protection, but also for a correct management in a greater urban resilience perspective. This is particularly true when technologies like Managed Aquifer Recharge and Storage are considered to solve specific urban floods issues.

The impacts of groundwater within a specific urban area depend both on its geographical location and the economic status of the city or even the country. While for cities of developing countries the main interests are therefore water quantity and quality, in developed countries, urban groundwater is posed in economic and environmental terms. Use and managed recharge of groundwater may reduce pressure upon conventional freshwater supply sources. On the other hand, not using this groundwater may lead to flooding and structural damage to underground structures (underground railway systems, basements, underground parking areas, etc.).

## References

Ellis, B. (1999) Impacts of urban growth on surface water and groundwater quality. IAHS no. 259, IAHS, Wallingford, 437 pp.

La Vigna F., Mazza R. (ed) (2015) Carta Idrogeologica di Roma – Hydrogeological Map of Rome.

Manca, F., Capelli, G., La Vigna, F., Mazza, R., & Pascarella, A. (2014) Wind-induced salt-wedge intrusion in the Tiber river mouth (Rome-Central Italy). Environmental Earth Sciences, 72, 1083–1095. doi:10.1007/s12665-013-3024-5.

Tanner, T., Mitchell, T., Polack, E., & Guenther, B. (2009) Urban governance for adaptation: Assessing climate change resilience in ten Asian cities (IDS Working Papers). doi:10.1111/j.2040-0209.2009.00315_2.x.