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Effects of 50-years unmanaged water resource in Southern Tuscany coastal plains (Italy)

R. Rossetto, M. Debolini, M.A. Galli, and E. Bonari
Scuola Superiore Sant'Anna, Land Lab, Pisa, Italy (r.rossetto@sssup.it)

Southern Tuscany coastal plains show favorable conditions from the agro-pedoclimatic point of view and are characterized by a relevant touristic flux, being one of the most popular seaside resort. In such conditions, water resource is one of the main assets: disregarded water management may then lead to severe consequences for the development and growth of the socio-economic system and agro-ecosystem maintenance.

During the 1960 decade, *ante*-II World War projects for hydropower production (i.e. the Farma-Merse scheme) were rearranged in favor of irrigation and the enhancement of crop production. Storage of about 110 Mm^3 was thought to provide water for about 35000 Ha.

At the end of the 70's, mass tourism began to take place in coastal areas giving rise to water access conflicts between agriculture and the touristic infrastructure. Being none of these projects realized, the increasing demand for drinking water was satisfied by tapping the Mount Amiata aquifer for 70% of the annual demand, and the remaining 30% coming from local aquifers. Due to the absence of rainfall and then of surface water flow in streams at the end of the spring and during the summer period, irrigation requirements were also satisfied by means of groundwater withdrawals. As a consequence of overdraft, aquifer salinisation started in most of the coastal areas (Regione Toscana, 1995; Bianchi et al., 2011; Scuola Superiore Sant'Anna, 2011). All this happened in the completely absence of controls on groundwater abstractions.

In the early 90's, the Commissione Leon (Regione Toscana, 1991) re-analyzed the largest dam projects and presented as feasible a conjunctive use of surface water stored in artificial basins (to be built) and by planned and controlled local aquifers. Anyway, political issues and environmental concerns halted any kind of realization, so that today the largest basin in the area is private, it dates back to 1930, and it shows a reduced capacity of about 1.8 Mm^3, instead than the original 4 Mm^3.

Having a reduced access to water resources, most of the farms during the 90's moved to more efficient water uses (drip irrigation) to save crops from leaf burns or switched to less-water-demanding, but less profitable crops. As a consequence, less competitive areas in the production-distribution chain suffered aquifer' salinisation and were progressively abandoned. As far as drinking water supply, the area is facing water scarcity during the summer period; desalination plants are planned. In one of the plain the water utility pumps out salinised groundwater that is then desalinized with an obvious increase in energy consumption.

Although water management needs have grown during the last 50 years and several studies outlined the importance of planning this resource, conflicts among stakeholders and political issues make such problems of difficult solution. Today large dam building seems to be quite unreliable both because of the construction time and the financial issues related. At the same time feasible projects, driven also by innovative and more profitable agricultural development, call for wastewater reuse and artificial aquifer recharge starting at least from pilot tests in priority areas.

References

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