GOTHAM

NEWSLETTER #3

APRIL 2022

Saving Mediterranean groundwater: Discover the GTool

The GTool is an innovative groundwater governance tool that is going to be co-designed by all water stakeholders (regulators, end-water users, water producers and suppliers). It will allow for a new groundwater management framework based on users (bottom-up approach) instead of the current top-to-down model in which the regulator establishes the enforcing rules on a (almost) single basis. This is considered to be the only way to reach a long-term sustainable management of aquifers tackling their complexity in terms of uncertainty (regarding resources, reservoirs or internal geometry, for instance) and of surveillance and control by administrations.

As the project is based on co-creation, an important stakeholder engagement process is being implemented during the project and involve relevant stakeholders, including water supply managers and regulators, environmental and conservation NGOs, farming groups and community groups from Spain, Lebanon and Jordan. Co-creation workshops have been organised in order to define the features of the GTool. Therefore, the GTool will be designed by the stakeholders and for the stakeholders.

The GTool is being deployed in three different use cases: Campo De Dalías, Spain; Iaat Baalbeck-Hermel, Lebanon; Azraq Basin-Zarqa, Jordan. These use cases will enable to test the GTool and to improve it iteratively.

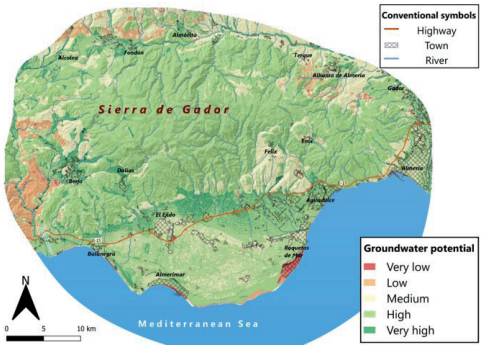
GOTHAM is part of the PRIMA Programme supported by the European Union. The PRIMA programme is supported under Horizon 2020 the European Union's Framework Programme for Research and Innovation. Grant Agreement number: 1922

Development

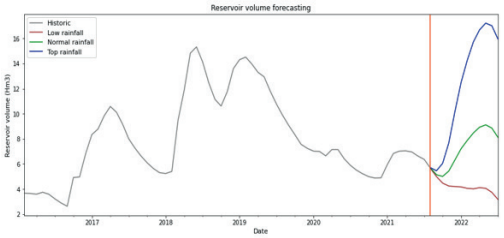
Developed by CETAQUA, the GTool uses a big data analytical system such as remote sensing, machine learning and other artificial intelligence technologies in order to carry out prediction of agricultural demand changes and evaluation of groundwater resources and quality. It includes six analytical modules: water balance and water quality dynamics module, water availability and demand forecasting module, Managed Aquifer Recharge (MAR) and aquifer remediation module, agro-economic module, user's engagement module, and groundwater response module.

The main capabilities of the modules developed and integrated onto GTool are the following:

- Recommend the most suitable method for assessing groundwater recharge
- Identify the areas with higher potential to find groundwater and to carry out managed aquifer recharge
- Predict groundwater quantity and quality, and the most probable groundwater status
- Predict reservoirs' water storage
- Drought monitoring and early warning system
- Estimate water demand for irrigation
- Recommend the most suitable aquifer remediation tool among a selection of methods



Groundwater Potential Mapping



Streamflow & stored water forecasting

Application

After the merging of the different layers integrating the GTool (Data, Analytics and Service layers), the tool will be deployed on a cloud infrastructure and tested in the Spanish use case in order to ensure robustness and scalability. During this process, the GTool will be adapted to the specific circumstances of the two replication use cases (Lebanon and Jordan), in particular regarding the available data sources, the specific stakeholders participating in groundwater management, and the identified water users. This replication phase will be conducted simultaneously in both sites and will last for approximately one year.
For more information on GTool characteristics and deployment, please visit **the project website.**

Future

The next steps of GOTHAM project are the finalisation of the GTool and the integration of the different modules that integrates it. Then, the first GTool prototype will be tested in the Spanish use case and, simultaneously, it will be adapted to the local circumstances of the two replication sites located in Jordan and Lebanon. The results of this replication phase as well as the environmental, social and economic impact assessment of GOTHAM project will provide the necessary data and inputs to define a specific business model for GTool.

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