

Protecting Ground Water (PGW) In Malaga

In the County of Malaga, the project focuses on the municipalities of Alameda, Almargen, Antequera, Archidona, Campillos, Cuevas Bajas, Sierra de Yeguas and Villanueva de Tapia, located in the region-district of Antequera, which has a great importance from the standpoint of agriculture. Antequera also presents a rich cultural and environmental heritage, with natural areas of outstanding interest.



The main sources of pollution of aquifers in these municipalities are mainly related to agricultural activity, due to the use of fertilizers and pesticides, and livestock, due to their generated waste. Accordingly, the most notable groundwater pollution is high rates of nitrates, sulfates and iron. Those pollutants threaten municipal water supplies.

The project aims to empower the participating municipalities to upgrade their important role in protecting groundwater resources, by improving their technical and administrative skills to implement best practices for this purpose. One of the basic pillars in the project development is the identification and assessment of groundwater vulnerability and the pollution hazards in the affected aquifers. These include an adapted GIS platform, whose final objective is the elimination of all hazards from safeguarded areas of groundwater bodies, and water catchments. In those protected catchments, which supply drinking water, municipalities would apply even more careful land planning and regulations for the management of hazardous activities.

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Who is behind the project

The project is led by Friends of the Earth Middle East (FoEME), together with the Council of Malaga County, (Spain, Andalucía) and WEDO (Water and Environment Development Organization; Palestinian Authority). The project is funded by the European Commission's ENPI CBC MED program (European Neighborhood and Partnership Instrument, Cross Border Cooperation in the Mediterranean); Project Director: Dr. Youval Arbel; youval@foeme.org; info@foeme.org



Protecting Ground Water

Project Introduction and Background

Groundwater is the world's most important source of freshwater, constituting 97% of the earth's freshwater reserves. In many parts of the Mediterranean region, this resource is increasingly being polluted by human activities, causing some aquifers to become endangered and undermining groundwater as a resource for future generations.

Given the large role local authorities play in overseeing infrastructure, industries, solid waste, sewage treatment and other hazard polluting activities in their jurisdictions, local governments can in fact become significant actors in efforts to protect shared groundwater resources.

This project aims to empower Mediterranean municipalities with the technical and administrative skills to alleviate sources of groundwater pollution in their jurisdiction as well as enhancing cooperation across Mediterranean Basin municipalities to protect common natural heritage. The 30 communities participating in this pilot initiative belong to the cross-border project Good Water Neighbors, in Israel Jordan and Palestine Authority as well from the province of Malaga, Spain.

Many of these communities live above vulnerable groundwater. Dolomite and Limestone possess higher permeability due to the cracking and karst processes, which create preferential flow routes in the aquifer.

The 'Mountain Aquifer', the best and most important source of water for both Israelis and for Palestinians, is also a Carbonate Aquifer, which makes it vulnerable to pollution hazards. The Mt. Aquifer can supply an average of ~620 MCM of freshwater a year. It is a trans-boundary aquifer: located under the West Bank and Israel, and the only available source of water for the West Bank; although since 1995 water sharing is subject to the Oslo interim agreement. Israel uses ~80% of this Aquifer, which leaves Palestinians with a non-equitable share of water. For many years, total water abstractions were above the natural recharge, which led to lower water tables, a decline in natural discharge of the major springs and in some cases, an increase of water salinity.

The hazards - communities in the Jordan Valley, Palestinian Authority and in some communities in Israel lack the necessary sewage treatment facilities. Pollution hazards include cesspits, unregulated dumping sites and gasoline stations, as well as untreated domestic and industrial sewage that are released into streams channels. Malaga County in Andalucía, Spain struggles with discharges of pollution from agriculture (e. g. Olive mill wastewater, over fertilization of fields and animal farms sewage). All those pollutions sources might percolate/seep to the ground water.

The lack of awareness and lack of capacity to deal with the sources of pollution to groundwater are the main challenges of this project. To address this need, the project partners have set up a collaborative training program for municipal staff from selected Mediterranean Basin municipalities.

Objectives:

- The over arching goal is promoting sustainable water resources management in the Mediterranean Basin, and alleviate pollution of groundwater, that include:
 - Prevention and reduction of hazards to ground water and the environment and enhancement of natural common heritage.
 - Improving technical and administrative skills at the municipal level, to implement best practices for the protection of groundwater resources.
 - Building a broad and collaborative network of Mediterranean Basin municipal staff, who can share knowledge and experiences on the protection and management of natural groundwater sources.
 - Creating commitment within the selected Mediterranean Basin municipalities to improve environmental performance within their jurisdictions using best practice guidelines
 - Promoting joint awareness campaigns on common challenges regarding the pollution of groundwater across the Mediterranean Basin



Photo: Galia Peled

Activities:

- **Courses:** Training of local authorities staff and volunteers in the following subjects: Using GIS (Geographical Information Systems), Hazards prevention, by local enforcement of environmental laws and by following state-of-the-art planning practices, Geo-Hydrology and Ground water sensitivity, Waste water treatment, Safe reuse of treated water and Guidelines for Ecologic agriculture. All are key subjects in the project, although each country emphasizes what is more appropriate for its needs.
- **Joint Study Tours and Workshops,** in Malaga, Israel, Palestine and Jordan, presenting specific and relevant environmental problems in each location. The tours create a special opportunity for representatives from different governmental and local authorities as well as other stakeholders - Palestinians, Israelis, Spanish and Jordanians - to meet and discuss activities for alleviation of mutual environmental hazards. For more details see our website.
- **Mapping Ground water sensitivity (vulnerability):** A spatial hydrological model, which calculates the expected risk of a soluble pollutant to reach Ground Water, and the risk of dispersion of the contamination in the aquifer.
 - By consultations with the best local Geo-Hydrologist, each partner used one of the most popular modeling systems of Ground water vulnerability - DRASTIC or COST 620.
 - Karst in Carbonated Aquifers: Dolomite & limestone posses higher water permeability due to the cracking and karst processes which create preferential flow route through the rock to the groundwater.
- **GIS – Interface** - Project partners are activating the module by mapping and characterizing the hazards in the different municipalities. In cooperation with GIS experts, GIS interfaces were developed for each of the partners. The evaluated risk from each hazard is being calculated based on the COST 620 model. For more details see our website



Expected results

- Hazard Reduction and Prevention Guidelines
- Memorandum of Understandings signed by each participating municipality
- Trained municipal workers
- Interactive, GIS map and model of environmental hazards and pollution risk as key stone of the planning and enforcement processes in the local governments.
- Mediterranean network of skilled municipal workers
- Municipal hazards audit report and implementation report
- Enhanced public awareness through dissemination of the initiative and involvement of citizens in reporting of environmental hazards to the GIS interface

Protecting Ground Water (PGW) In Israel

Municipalities in Israel are responsible for many practical aspects of our lives, such as sanitary services and solid waste disposal. Conflicting interests between hazard reduction and local industrial and agricultural development pose obstacles for efficient and transparent hazard reduction policy. Still, many municipalities show more and more will and openness for further establishing advanced environmental policy which brands them as relatively “green” and helps them to attract strong and established populations.



Clearly, the process of addressing hazard reduction and prevention as major issues in the municipalities agenda is difficult and gradual. In order to assist this process, PGW aims to advance transparent, efficient and sustainable development, which will serve the current generation while conserve our natural resources for the future. In Israel, we launched together with

municipalities personnel and Taldor Company, an interactive user friendly web-based GIS platform. The platform is open for the public, who is able to report on new hazards and view the treatment status of existing hazards. Using this platform, communities will be able to put pressure on decision makers to alleviate substantial hazards by better environmental planning, improved law enforcement and by initiating advanced environmental projects.

Participating Communities: Jordan Valley R.C., Beit Shean, Gilboa R.C., Hof Carmel, Baqa el-Garbia, Emek Hefer R.C., Soreq Environmental Unit, Mate Yehuda and Tamar R.C.; Israel Project Coordinator: Ido Aviani.

Protecting Ground Water (PGW) In Palestine

Palestinian communities face a crucial daily shortage of water resources for household, municipal, agricultural, and industrial uses. Part of the deficiency arises from pollution of local aquifers and springs. This problem could be solved by implementation of hazards reduction and prevention guidelines as being developed in this project. The main objective is the prevention



of all untreated wastewater discharges to the local Wadis (streams) from Palestinian communities, and Israeli settlements in the West Bank.



The PGW project creates an opportunity for municipalities’ staff to network with each other and with colleagues in Jordan, Israel and Spain. Municipality staff is also trained in GIS, Hydrology, Waste water treatment and Safe reuse in agriculture. The courses are being held in the Auja Eco-center, which demonstrates the benefits of environmental commitment similar to the work in their communities.

PGW with the GIS/Hydro-geologist consulting company maps the severity and risks of different hazards to the West Bank aquifers. They do so through FoEME Field Staff and municipal staff, who collect data, and learn how to monitor and evaluate the severity of different types of hazards and pollutants.

Protecting Ground Water (PGW) In Jordan

Communities in the Jordan Valley completely lack sewage treatment facilities. Contaminants from cesspits and other sources seep into the aquifer and pollute groundwater, which subsequently flows into and pollutes important natural sites of Jordan River and the Dead Sea.



The municipalities in the Jordan Valley are the poorest in the country and have very limited resources to develop and maintain the level of services provided to their communities. Seven municipalities from the Jordan Valley, covering a vast area from the Northern Valley to the Southern Dead Sea are taking part in the project (in geographical order from North to South): Himma; Muath Bin Jabal; Sharhabil Bin Hasneh; Tabket Fahel; Deir Alla; South Shuneh and South Ghour.

Project figures

Total budget - € 1.6 million for 30 months.
 Target groups – Municipal (local governments) staff from 30 municipalities of Israel, Jordan, Palestinian Authority and Spain, Water professionals and environmental activists
 Final beneficiaries: local populations from the municipalities participating in the project (1,440,000 residents);
 All other residents in Israel, Jordan Palestine and Spain who consume water from the same water sources.