



MAR-MOVIE MANAGED AQUIFER RECHARGE DOCUMENTARY

From the earliest of times, water has been a constant concern for man, considered to be a gift from the gods. Present in various cultures and religions: Inca, Egyptian or Greek, in which Ganymede, the water bearer to the gods, was immortalised in the constellation of Aquarius. The use of water appears in war and in agriculture, ideas represented by the Etruscans as Maris and subsequently MAR-s

Managed
Aquifer
Recharge

"Managed Aquifer Recharge"

It is an ancient technique with biblical reviews.

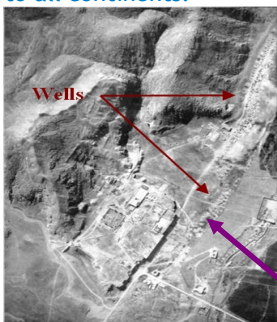
Back in the 12th century the Moors in the Alpujarras, in the southern foothills of Sierra Nevada, were already striving to store the water from the thaw in the aquifers, so that water would be available months later in fountains and wells "downstream", this being an example of integral water management known as "careo" canals.



Careo by derivations of the channel Los Llanillos, Sierra Nevada (Spain).

The Inca civilisation also used water from the thaw in the Andes for irrigation in a similar way, another pre-Columbian water management system known as "amunas".

Other ancient civilisations have used drainage tunnels to capture water and recharge aquifers, known as "qanats" (word whose origin is Iranian), the use of which has spread to all continents.



Qanat in Carbonero el Mayor, Segovia (Spain).

Qanat in Persepolis (Iran).



Today, managed aquifer recharge is a widespread practice for increasing the availability of water resources and improving their quality, although its level of implementation varies considerably from one country to another.

Advantages of the MAR technique

- Alleviating fluctuations in the resources available and reducing the loss through evaporation
- Reusing and managing the regenerated water, improving its quality
- Increasing the reserves available
- Combating salt water intrusion by means of positive hydraulic barriers



Recharge channel in Santiuste, Segovia (Spain).



Dam for MAR on the river Pirón, Shire of Carracillo, Segovia (Spain).

- Water regeneration or the regeneration of wetlands.



National Park of Tablas de Daimiel, Ciudad Real (Spain).



Laguna de la Iglesia wetland, Segovia (Spain).

- Other proven uses are the prevention of geotechnical problems, irrigation, water supply, energy production, mitigate the effects of the "gota fría" phenomenon and flooding, mine drainage and alleviate some of the effects of climate change.

- Increased water infiltration in urban areas is obtained by applying Sustainable Urban Drainage Systems or SUDS.

- Etc.



SUDS in Gomeznarro Park, Madrid (Spain).

Disadvantages of the MAR technique

- The need for detailed studies in order to prevent any potential repercussions.
- Effects on the unsaturated zone of aquifers such as an increase in the concentration of air, swelling, collapse, etc.
- Socio-economic and political problems that can lead to conflict.
- Etc.

Within this context, there are international initiatives for promoting this technique, with a view to achieving the UN Millennium Goals.



The MAR-NET projects (IAH-UNESCO), which includes DINA-MAR, are indicative of the adequacy of the managed aquifer recharge to alleviate the problem of water supply

MAR-NET

MAR-NET was designed to raise awareness of the advantages and disadvantages of the MAR technique, to support initiatives and promote technical support, the dissemination and transfer of technology, with a particular focus on developing countries.

A dissemination strategy was created for this purpose. Some of its key messages aimed at different groups of people are:

- MAR: A feasible, cheap and simple solution to alleviate the problem of the lack of water.
- It is a technique with low environmental impact and which alleviates the effects of climate change.
- Recharged aquifers: a supply solution for the future.
- Another method of storage is possible.



Nuestro compromiso,
el tuyo,
el de todos.

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Demonstration sites

Certain “demonstration sites” have been proposed to UNESCO as places that are examples of this technique, with a view to dissemination. One example are the devices at Santiuste and Carracillo in Segovia, through which “hydrogeological routes” called “Caminitos de agua” (little paths of water) run, enabling the theoretical knowledge of the technique to be complemented with various practical examples of devices.



Informative panel / Field guide “Caminitos de Agua”

In short:

- It is a complementary water management technique that fits in well with the integral management schemes, offering more advantages than disadvantages and constituting the only feasible technique for certain sectors; it can be implemented easily in numerous aquifers, especially in developing countries.
- It is also a “driving force” in influencing the quantity and quality of water masses.
- Alleviating the effects of climate change appropriate for environmental purposes.
- Leaves room for innovation and for the development of R&D&i projects.
- Enables people to become involved in water management through a shared responsibility approach.
- The technique alone is not capable of solving certain problems of water management, but it does reduce their consequences as it is being implemented.

“The key is storage”, for the sake of future generations!!

