

SUMMARY OF TECHNICAL SESSION OF DINA-MAR R&D. PROJECT FOR THE STUDY OF MANAGED AQUIFER RECHARGE IN THE FRAMEWORK OF THE SUSTAINABLE DEVELOPMENT

The session was held on June 30th 2008, with the aim of presenting the provisional results of the project of R+D+i within the stage of technology transference. There were eight speakers from Tragsa for a total of ten presentations, finishing with a highly successful open debate, which extended in almost one hour the estimated duration of the event.

Points to be highlighted:

- Managed Aquifer Recharge (MAR) is increasing its popularity at international level. It has acquired a strong innovation component over the last years, which is to a great extent owing to the introduction of new technologies and the Best Available Techniques.
- In Spain both the legal and the technical frames are perfectly suitable for the integration of more MAR devices within the integral hydric management schemes. Waters being of fluvial origin, approximately 15 % of the peninsular Spain and the Balearic islands is suitable for this technique to be implemented, taking into account environmental premises. In order to evaluate the environmental impact, six groups of basic environmental criteria have been established, namely: Sources of contamination, risks, conditioners, demands, tendencies and advantages.
- A suitable management of the new devices must go together with by the application of Soil and Aquifer Treatment Techniques (SATs) in order to improve the effectiveness of the process as well as of the already operating devices.
- In the forest scope, according to a number of projects developed in the Valencian community (east coast of Spain), it must be emphasized that the infiltration in the head of the river basins is enhanced in zones with some vegetation rather than in barren zones, despite the biomass water consumption. "Water calls water" even in the aquifers below forests.
- The safeguard of the environmental flow rates in rivers where MAR water is borrowed requires individualized studies, since standardising would be too risky.
- MAR schemes are suitable in the urban hydrogeology by means of applying Sustainable Drainage Urban Systems. However, this does not suffice. Further efforts are actually needed for the integral management of the water in the Edification, so as to increase artificial recharge under extended asphalted surfaces.

The debate took longer than expected and highly important subjects emerged:

- The importance of multidisciplinary research teams in MAR R&D projects was mentioned and remarked.
- The necessity for further research concerning the methodologies for the determination of ecological flow rates was also mentioned, the aim being to design a trustable tested product appropriate for commercialization.
- There was a certain degree of agreement about the fact that it is not possible to control extreme climatic conditions, such as "cold drop" by means of MAR schemes. An alternative was proposed, based on the fact that the management of this type of phenomena must apply to the entire river watersheds, from the head to the sea. The very peculiar climatic conditions of Spain need schemes *ad hoc*, since there are very few analogous sceneries in the world.
- As far as agrarian aspect is concerned, some participant pointed at the necessity of schemes of hydric management to be better distributed according to their use. Opportunity costs were specifically mentioned, as well as the necessity to involve the Communities of

Irrigators in MAR technique and its implantation, especially those who employ underground waters to irrigate their crops, since their control is lower than the one of those using superficial waters.

- The importance of improving not only the hydrogeological indicators but also the socioeconomic and the geopolitical ones in order to implant MAR structures was highlighted.

- The paradox was pointed out that MAR activities in Spain require a spill authorization despite the fact that most activities result in an improvement of groundwater quality.

- The importance was stressed of an integral the hydric management, applying to each particular area the most appropriate technique, either traditional or special.

- The fact was mentioned that however within some circles, MAR technique is considered "structural" or "more elegant" than dams it also does require some concrete material. Some participants argued that if it were a more expensive technique or if it required a greater amount of concrete, there would be more MAR devices implanted, since constructors would be more willing to build this type of facilities.

- The importance was emphasized of the spreading this technique in all fronts, especially where it is less known, so that society is better aware of the advantages and drawbacks of MAR, which is still fairly unknown in Spain. The audience agreed that this task is far from being easy.

In conclusion, it was a highly instructive and pleasant session. The great interest and good will of all participants made it possible to exchange ideas and opinions within a nice atmosphere.

Please find the program of the session at <http://www.dina-mar.es/>