

Managed Aquifer Recharge in Italy: present and prospects

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Not a novelty!

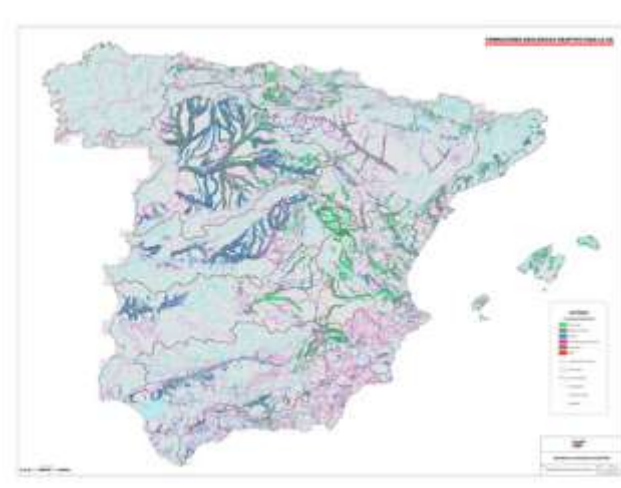
Highly developed from 1950.

(In Italy: Mario Canavari's Manuale di Geologia Tecnica, 1927)

Widespread in US, Australia

In EU: nice examples in Spain

(<http://www.dina-mar.es/>)



Recharge is “managed” in order to assure an adequate protection of human health and the environment.

MAR differs from:

- unmanaged recharge (i.e.: stormwater infiltration facilities)
- unintentional recharge (i.e.: recharge caused by excess irrigation).

IMPACT

On October the 3rd 2014 about 300 persons took part in a 1-day workshop on the application of AR/MAR techniques in Italy.

Italian Network on MAR - INMAR

LA RICARICA DELLE FALDE IN CONDIZIONI CONTROLLATE: L'ESPERIENZA ITALIANA NEL CONTESTO EUROPEO
3 ottobre 2014 presso Piacenza EXPO sala A

La definizione **ricarica in condizioni controllate di un acquifero** (Managed Aquifer Recharge - MAR) raggruppa una serie di tecniche attraverso le quali si giunge ad un incremento del tasso di ricarica naturale di un acquifero. Gli impianti MAR sono quindi interventi di geingegneria ambientale in cui si ricaricano gli acquiferi con aliquote di acqua provenienti da corsi d'acqua, invasi o acque non convenzionali. Potenziali utilizzi delle acque ricaricate consistono: i) nell'incremento delle riserve di acqua per utilizzo in periodi di criticità per utilizzi idropotabili, irrigui, industriali; ii) nel contrastare deficit di bilancio causati da elevati consumi antropici; iii) nel controllare fenomeni di subsidenza; iv) nel contenere fenomeni di intrusione salina; v) nella conservazione della biodiversità degli agro-ecosistemi delle zone umide

partner



patrocinio



9.30 - Messaggio di saluto dell'Assessore Paola Gazzolo (Assessorato Sicurezza Territoriale. Difesa del Suolo e della Costa, Protezione Civile - Regione Emilia Romagna)

I PROGETTI EUROPEI

Chairman: Marco Petitta
Presidente IAH - Sezione Italiana

9.45 - Rudy Rossetto, Enrico Bonari

¹Scuola Superiore Sant'Anna, Pisa

Il futuro della ricarica delle falde in condizioni controllate in Italia: il progetto europeo FPVII MARSOL e la EIP on Water MAR to Market

10.00 - Matteo Bonfanti, Francesca Capone

¹Scuola Superiore Sant'Anna, Pisa

Una preliminare analisi del quadro normativo regolante i programmi di ricarica degli acquiferi in condizioni controllate in Europa: le Direttive Europee e la loro implementazione in nove legislazioni nazionali

10.15 - João Paulo Lobo Ferreira^{1,2}, Teresa E. Leitão²

¹responsabile progetto:EIP on water - MAR to Market; ²National Laboratory for Civil Engineering, Lisbona-Portogallo

Demonstrating managed aquifer recharge as a solution for climate change adaptation: results from EU FPVI GABARDINE project and ASEMWATERNET coordination action in the Algarve region, Portugal

10.45 - 11.15 :COFFEE BREAK

11.15 - Giancarlo Gusmaroli¹, T. Muraro²

¹Studio Ecoingegno, ²Provincia di Vicenza

Progetto LIFE AQUOR: verso una strategia di riequilibrio quantitativo delle acque sotterranee dell'alta pianura vicentina attraverso la ricarica delle falde e il risparmio idrico

11.30 - Alessandro Affatato¹, Daniel Nieto¹, Nasser Abu Zeid¹, Giovanni Paiero²

¹OGS, ²Università di Udine

Progetto Life Warbo: efficacia di azioni di ricarica artificiale

11.45 - Vincenzo Marsala

¹SGI Studio Galli Ingegneria SPA



M.A.R. TO MARKET
EIP Water Online Market Place
Matchmaking for water innovation

DISSEMINATION



April 21st 2015 at Scuola Superiore Sant'Anna (Pisa-Italy)

Workshop

“Advantages of using numerical modeling in water resource management and in Managed Aquifer Recharge schemes”

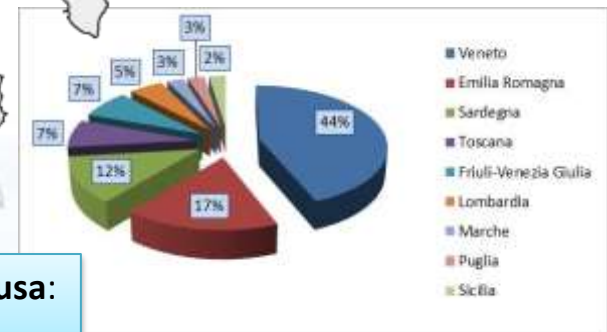
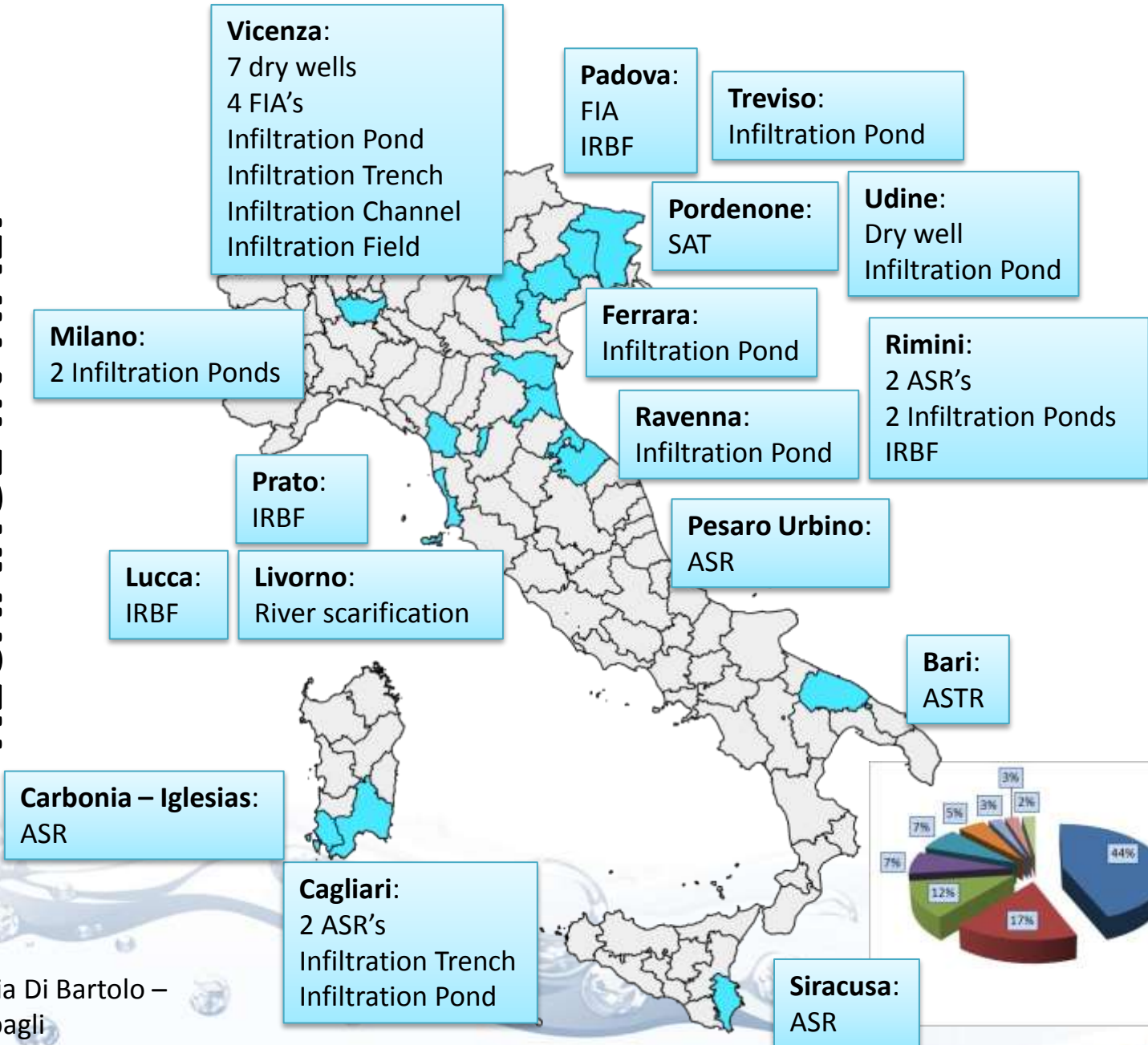
A joint event organized by the HORIZON 2020 FREEWAT project and the EU FP7 MARSOL project (www.marsol.eu) and within the framework of the European Innovation Partnership MAR Solutions - Managed Aquifer Recharge Strategies and Actions (AG128).

Presentations freely downloadable from H2020 FREEWAT website www.freewat.eu



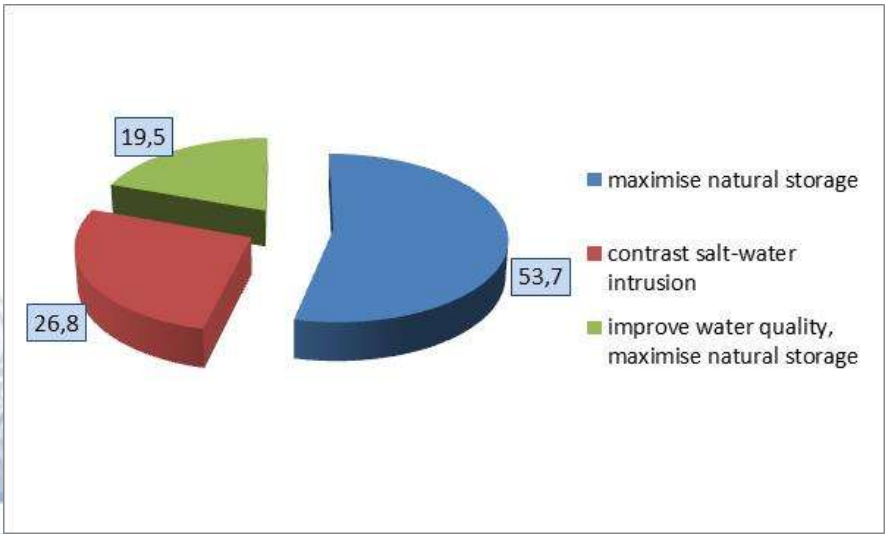
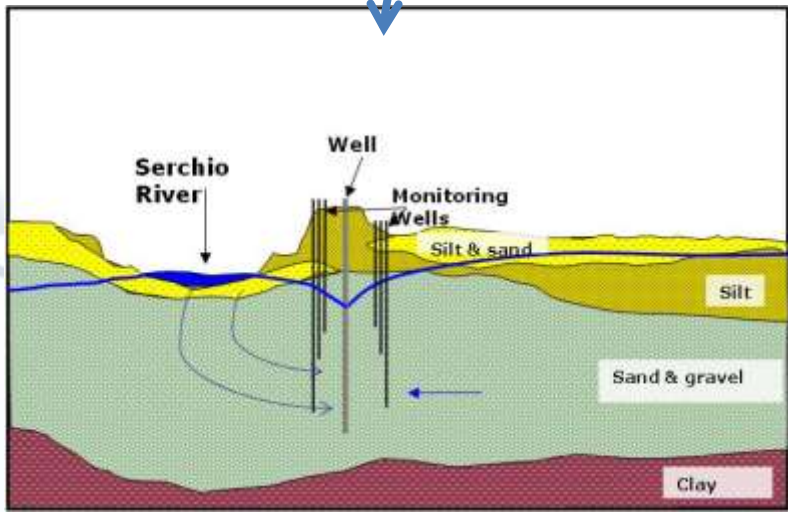
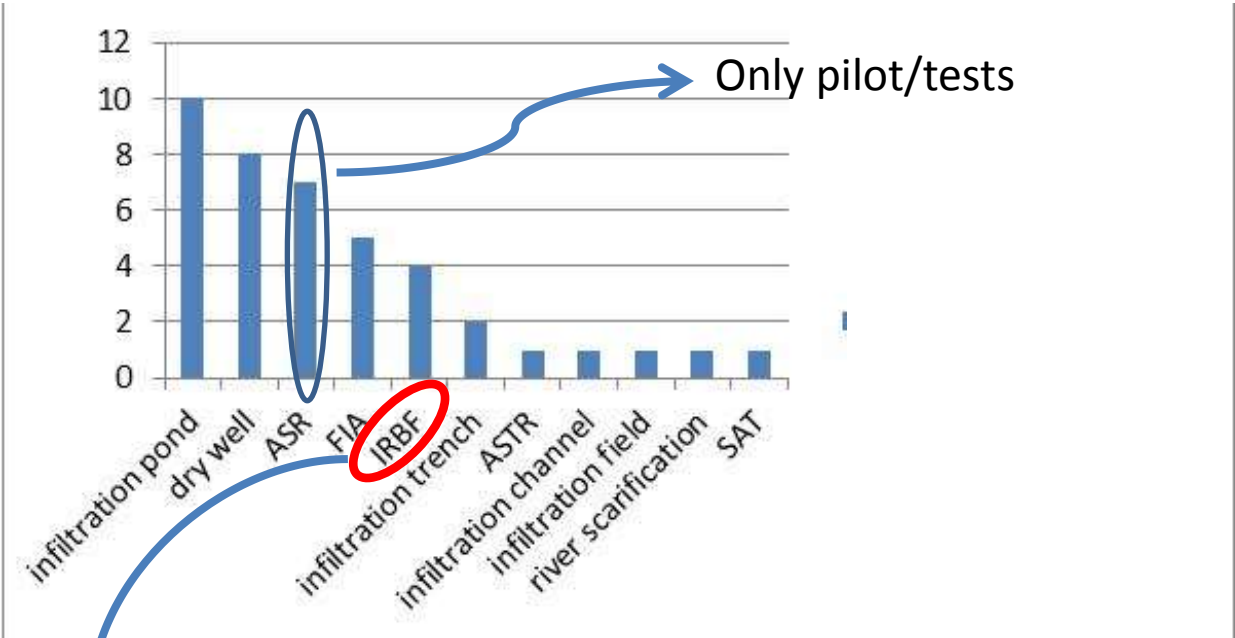
ARTIFICIAL AQUIFER RECHARGE IN ITALY

UNMONITORED



Credits: Silvia Di Bartolo – Alessio Barbagli

MAIN TYPES OF ARTIFICIAL RECHARGE



RECENT YEARS/1

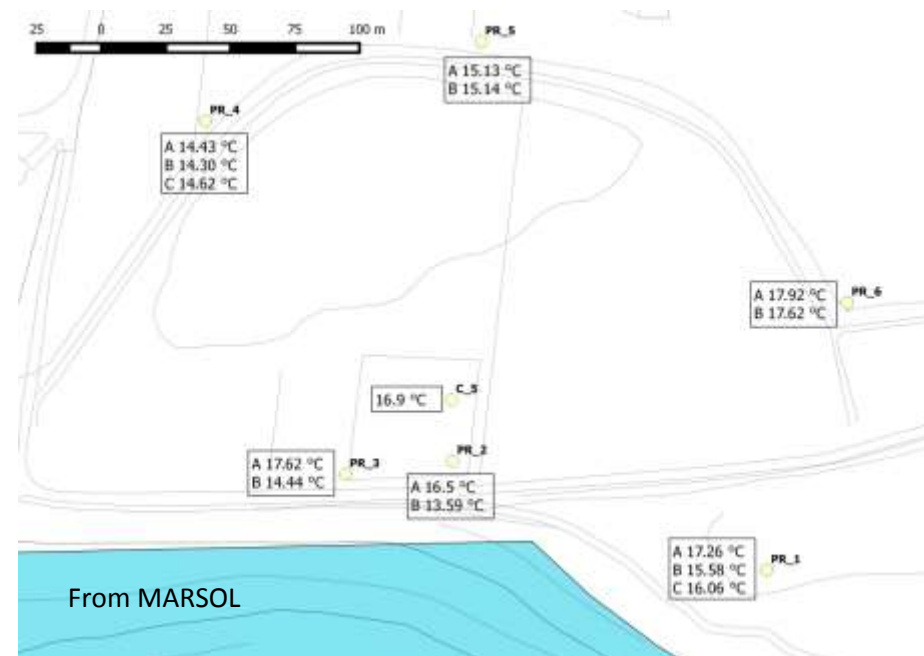
Some projects on aquifer recharge were co-financed by the European Commission mainly through the LIFE program.

- **TRUST** (*Tool for regional - scale assessment of groundwater storage improvement in adaptation to climate change*, LIFE07 ENV/IT/000475; Marsala 2014);
- **AQUOR** (*Implementation of a water saving and artificial recharging participated strategy for the quantitative groundwater layer rebalance of the upper Vicenza's plain* - LIFE 2010 ENV/IT/380; Mezzalira et al. 2014);
- **WARBO** (*Water re-born - artificial recharge: innovative technologies for the sustainable management of water resources*, LIFE10 ENV/IT/000394; 2014).

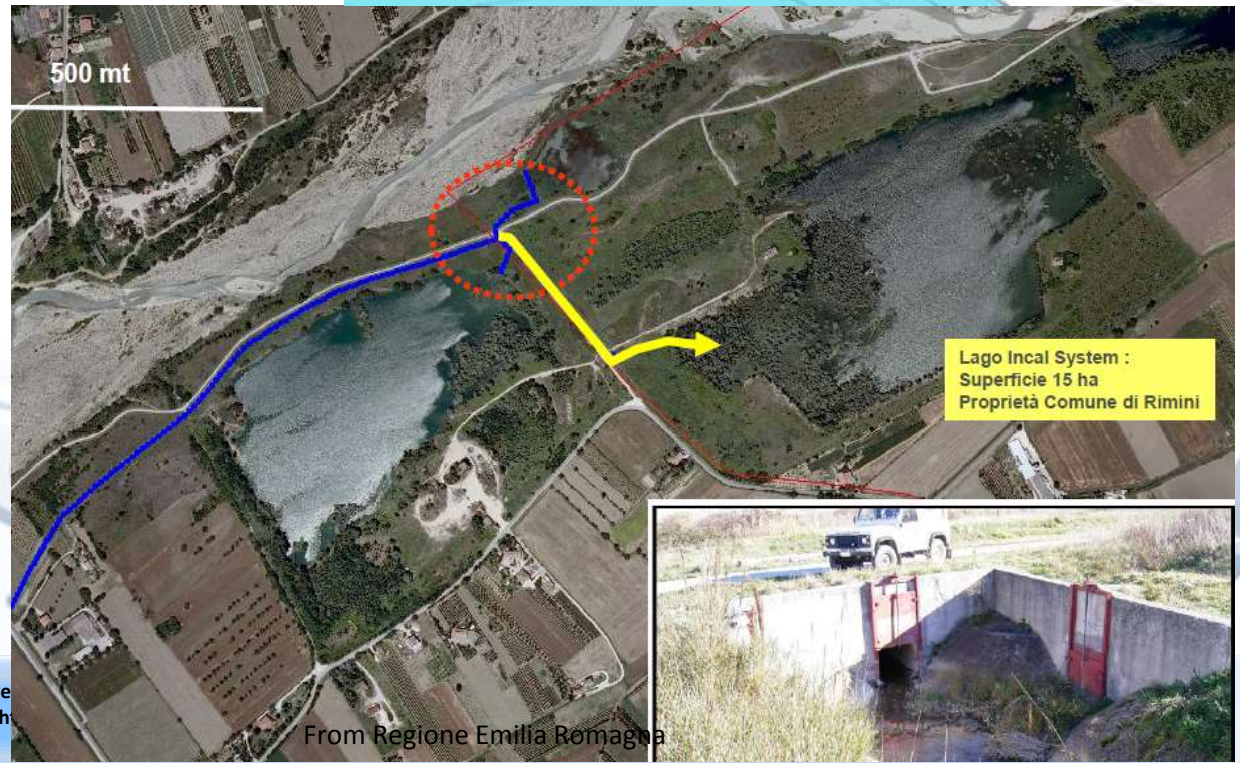


RECENT YEARS/2

Within the EU FP7 MARSOL project a dedicated monitoring and decision support system is under development to monitor recharge at a large induced riverbank filtration plant, worth 15 Mm³/year in Lucca (Borsi et al. 2014).



In 2014, the Regional Authority of Emilia Romagna started a MAR pilot on the Marecchia River fan using a recharge basin to alleviate water scarcity in the Rimini area as results of drought periods (Severi et al. 2014).



Demonstrating Managed Aquifer Recharge to Water Scarcity and Drought An EU FP7 Project

From Regione Emilia Romagna

TWO NEW MAR PROJECTS

EU LIFE REWAT 2015 -2019

sustainable WATER management in the lower Cornia valley through demand REDuction, aquifer REcharge and river REstoration



PHARM - SWAP MED

Removal of PHARMmaceuticals from treated wastewaters in the Soil - Water - Plant continuum in the MEDiterranean basin



*Ministero degli Affari Esteri
e della Cooperazione Internazionale*



Ministry Of Science
Technology and Space of the
State of Israel

REGULATION & POLICIES

- Aquifer recharge is allowed by law in Italy only since September 2013 as part of WFD RBM, but still a regulatory framework for its application is missing.
- Funding for setting up new MAR plants may be available at national level.
- At the same time, lack of knowledge at intermediate governing bodies level is preventing the application of these techniques (i.e. engineers are very good in dams building but knowledge on MAR is less than basic).

Dissemination of MAR scientific findings and technical know-how among professionals, governing authorities and the public is crucial for the application of MAR techniques.

REGULATION COMING ...

MINISTERO DELL'AMBIENTE E DELLA TUTELA DEL TERRITORIO E DEL MARE
GABINETTO DEL MINISTRO
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Via Cristoforo Colombo, 44 - 00147 Roma Tel. 06-57223433/28 - Fax 06-57223470
e-mail: dpn-dg@minambiente.it

Schema di decreto recante criteri per il rilascio dell'autorizzazione al ravvenamento o all'accrescimento artificiale dei corpi idrici sotterranei al fine del raggiungimento dell'obiettivo di qualità, ai sensi dell'articolo 104, comma 4-bis, del decreto legislativo 3 aprile 2006, n.152, e successive modificazioni.

PROSPECTS

MAR can be a valuable option in case of aquifers where the balance is compromised.

As dams construction is pretty an unfeasible option (due to economy and unwilling population and several environmental issues) MAR can constitute a valid alternative.

It is of outmost importance to define which are the financial instruments to sustain these water infrastructures, so to guarantee not only their set up, but also routinely operations.

This may also contribute to opening a **new market in the water sector**.

LIMITATIONS

An aquifer is needed and also a source of water to perform recharge.

Future work (*research in primis*) is needed in order to foster the use of treated municipal wastewater (Soil Aquifer Treatment systems).

The absence of regulatory framework limits MAR application to demonstration/pilot examples.

While care is paid to the MAR plant set up, still little attention is given to the monitoring system, especially related to quality issues.

The latter may change MAR from being an opportunity to a threat.



CONCLUSIONS

The majority of the recharge plants are unmanaged – unmonitored.

Growing interest from research institutes and local authorities on the use of this low-cost techniques (compared to other solutions).

The regulatory framework is so far extremely needed.

Training activities for professionals and awareness raising among relevant stakeholders will constitute a turning point for the application of MAR in Italy.

