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EU4ENVIRONMENT WATER AND DATA NATIONAL POLICY DIALOGUE – MOLDOVA

NATURE-BASED SOLUTIONS:

MANAGED AQUIFER RECHARGE (MAR)

Andreas Scheidleder and Franko Humer, 26th April 2023

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MANAGED AQUIFER RECHARGE (MAR) - WHAT IS IT?

MAR Definition: *The process of intentionally increasing recharge into aquifer for subsequent recovery or for environmental benefits* (Dillon, 2009)

…whilst ensuring adequate protection of human health and the environment.

Two categories of MAR

- intended recharge (focus of the new EU guidance document)
- unintended recharge (as side-effect of e.g. interventions for flood mitigation purposes)

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MANAGED AQUIFER RECHARGE – PURPOSE AND BENEFITS

Managed Aquifer Recharge (MAR) is a promising adaptation measure to **reduce vulnerability** to climate change and hydrological variability.

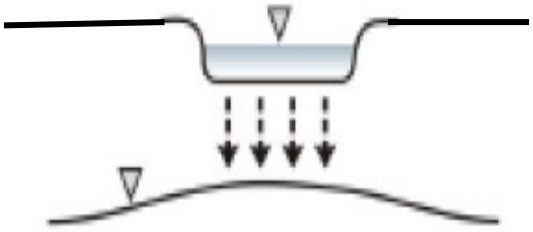
MAR can play an important role as a measure to control over-abstraction, and to restore the groundwater balance.

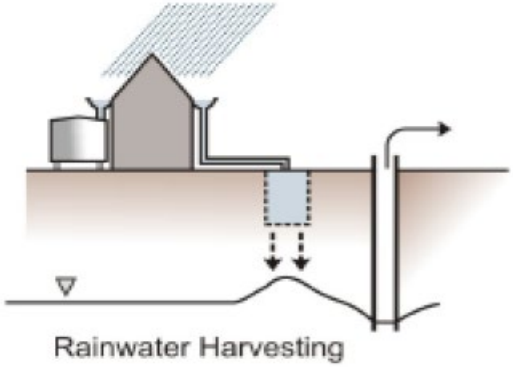
MANAGED AQUIFER RECHARGE – SOURCES OF WATER

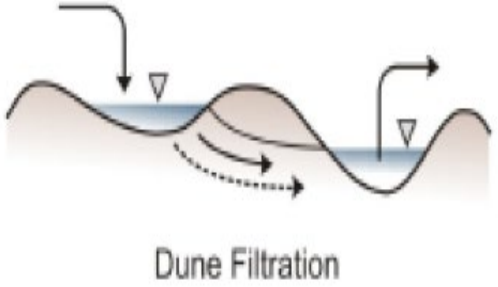
Source water for Managed Aquifer Recharge schemes

- Surface water (water from rivers or lakes)
- Treated Effluents
- Stormwater
- Rainwater
- Desalinated sea water
- Groundwater from other aquifers

MANAGED AQUIFER RECHARGE – TECHNIQUES







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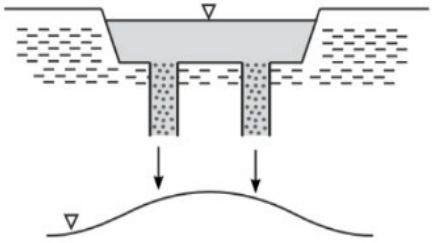
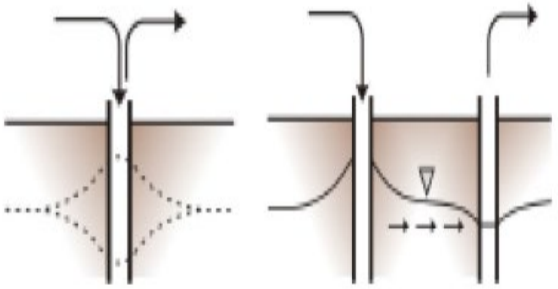
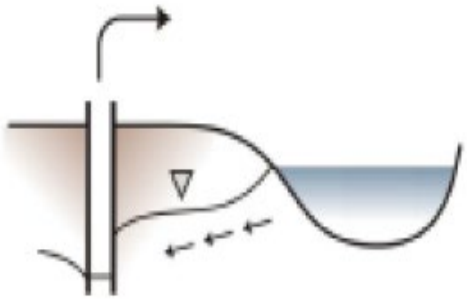


Well or borehole infiltration



Aquifer storage (transfer) and recovery



Source: Dillon, P., 2005. Future management of aquifer recharge. Hydrogeol. J. 2005, 13, 313–316

RELEVANT **WATER FRAMEWORK DIRECTIVE** REQUIREMENTS TO BE RESPECTED

- **Ensure a balance** between the abstraction and recharge of groundwater (regulate GW abstractions through an assessment and control regime).
- **No deterioration** of the status of surface and groundwater bodies.
- **Prior authorization** of artificial recharge or augmentation of groundwater bodies and **controls** (periodically reviewed).
- **Prevent** inputs of **any** hazardous substances and **limit any** inputs of non-hazardous substances into groundwater.
- **Ensure recovery of the costs** of water services, including environmental and resource costs.

EU (DRAFT) GUIDANCE DOCUMENT – MAR UNDER EU LEGISLATION

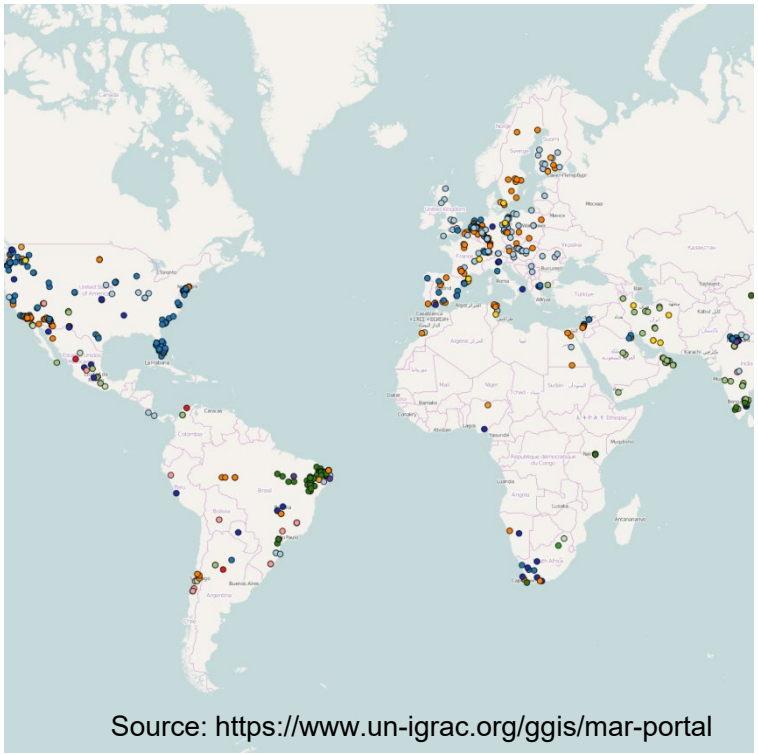
- Focusing on ‚intended recharge' only
- Considers requirements of EU legislation (e.g. Water Framework Directive, Groundwater Directive, Environmental Impact Assessment Directive)
- **Defines key requirements for MAR Authorisations** (application of risk-based approach)

- 7 case studies
- Link to 17 research projects
- Overview of activities with unintended recharge
- Outline of Australian MAR Guidelines

Adoption planned by Mid of 2023

MANAGED AQUIFER RECHARGE – SITES AROUND THE WORLD

Global Inventory of MAR Schemes (https://www.un-igrac.org/ggis/mar-portal)



Source: https://www.un-igrac.org/ggis/mar-portal

1200 case studies carried out in more than 50 countries

224 European MAR sites in 23 European countries as active in the year 2013 (Sprenger et al. 2017).

Austria: 9 artificial GW recharge facilities (42-500 L/s) active in 2022
(recharge by 1x GW, 1x spring and 7x SW)

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CONTACT & INFORMATION

Andreas Scheidleder andreas.scheidleder@umweltbundesamt.at

Franko Humer franko.humer@umweltbundesamt.at

http://www.eu4waterdata.eu/

www.umweltbundesamt.at

twitter.com/umwelt_at

www.linkedin.com/company/umweltbundesamt

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