Interreg CENTRAL EUROPE

Co-funded by the European Union

MAURICE

RECHARGING AQUIFERS THROUGH URBAN PRACTICES AND AGRICULTURAL MAR

AG-MAR IMPLEMENTATION FRAMEWORK

STAGE 1 PREPARE THE GROUND

Site Selection
- Prefer homogeneous pilot areas
- Match scale to objectives

Data Collection
- Hydrogeology
- Groundwater levels
- Soil and land-use data
- Climate information

Governance & Stakeholders
- Regional authorities
- Irrigation managers
- Researchers
- Farmers

Resource Planning
- Funding
- Monitoring equipment
- Technical capacity

STAGE 2 ASSESS SUITABILITY

- Aquifer suitability
- Soil permeability
- Existing irrigation infrastructure
- Climate vulnerability
- Groundwater dependence
- Comparison with alternative adaptation measures

Define a clear objective:
- Drought adaptation
- Water security
- Climate resilience
- Ecosystem support

STAGE 3 ASSESS FEASIBILITY

TECHNICAL FACTORS
- Water availability & quality
- Soil suitability
- Crop tolerance to flooding
- Modelling & uncertainty analysis

NON-TECHNICAL FACTORS
- Legal and regulatory framework
- Economic viability
- Governance structure
- Social acceptance

STAGE 4 IMPLEMENT AG-MAR

- Winter field irrigation
- Water circulation through irrigation canals
- Coordinate with farming calendars
- Use intermittent flooding
- Avoid recharge after fertilization periods
- Maximize recharge while preventing waterlogging

STAGE 5 MONITOR & IMPROVE

MONITOR
- Groundwater levels
- Infiltrated water volumes
- Irrigated hectares
- Water quality
- Crop performance

MEASURE SUCCESS
- Water stored
- Irrigation demand met
- Stakeholders involved
- Ecosystems benefiting
- Groundwater recovery

Continuous learning and adaptation

URBAN GROUNDWATER ADAPTATION SOLUTIONS

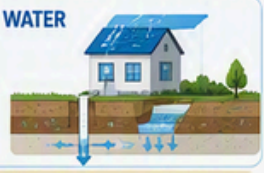
4 Priority Actions

1. UNSEAL URBAN SURFACES

- Replace impervious surfaces where possible
- Introduce blue-green infrastructure
- Increase natural infiltration and groundwater recharge

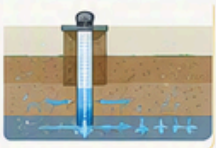
2. INFILTRATE ROOF & RUNOFF WATER

- Use infiltration trenches, ditches, and drainage systems
- Assess local soil permeability before implementation
- Prevent flooding risks



3. USE INFILTRATION WELLS

- Recharge permeable aquifers directly
- Higher efficiency than surface infiltration
- Reduce basement flooding risk through targeted design



4. REDUCE GROUNDWATER EXTRACTIONS

- Avoid unnecessary groundwater withdrawals
- Re-infiltrate extracted water whenever possible
- Prevent discharge to sewage systems

PILOTS RESULTS

GERMANY Stuttgart
- Groundwater levels declining for >20 years
- +2°C temperature increase since 1950
- Recharge reduced by ~20%
- Groundwater deficit: 10-20 L/s
- Artificial recharge wells could raise levels by 0.5-2 m

ITALY Milan
- Integrated groundwater-crop model developed
- 33 ha of infiltrating fields during two winters
- Ag-MAR stored up to 8 Mm^3 groundwater
- 70% of infiltrated water retained at the end of the implementation
- 1.2 l/s increase in groundwater dependent ecosystems flow

See more:

Dashboard

Deliverable