

Opportunities for participatory data collection	Participatory data collection is feasible through participation in the measurement procedure
Additional information	
References	<p>Hopkins, J. & Anderson, B. (2016). <i>A Field manual for Groundwater-level Monitoring at the Texas Water Development Board</i>. User Manual 52. Retrieved from http://www.twdb.texas.gov/groundwater/docs/UMs/UM-52.pdf</p> <p>Snyder, D.T. (2008). <i>Estimated depth to Ground Water and Configuration of the Water Table in the Portland, Oregon Area</i>. Scientific Investigations Report 2008-5059. Reston, Virginia: United States Geological Survey. Retrieved from https://pubs.usgs.gov/sir/2008/5059/pdf/sir20085059.pdf</p>

4.26 Groundwater chemical status

Project Name: UNaLab (Grant Agreement no. 730052)

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Water Quality: Chemical status of groundwater	Water management
Description and justification	Water covers ca. 71 % of the Earth's surface but only 2.5 % of it is fresh, stored as groundwater and in glaciers. Water is vital for living organisms, and it enables a multitude of human activities such as agriculture, manufacturing and transportation of goods. Available water resources are being extensively used for a variety of purposes, and ensuring that the water quality is monitored and the degraded water bodies are enhanced is essential for protecting the water resources. EU Water Framework Directive (2000/60/EC) sets forth the framework for integrated management of surface waters and groundwater resources in the EU Member States, which are presented as River Basin Management Plans. The Groundwater Directive (2006/118/EC) complements the Water Framework Directive and sets the groundwater quality standards.
Definition	Chemical status of groundwater bodies (good, poor)
Strengths and weaknesses	+ A comparable EU-wide applied assessment - Requires arrangements on Member State-level

Measurement procedure and tool

The following procedure is based off requirements set by the Water Framework Directive (2000/60/EC) and Groundwater Directive (2006/118/EC):

1. Define groundwater bodies within a river basin area
2. Establish type-specific reference conditions per Annex V (Directive 2000/60/EC)
3. Identify significant anthropogenic pressures, and estimate point and diffuse source pollution in particular by substances listed under Annex VIII (Directive 2000/60/EC):
 - a. Organohalogen compounds and substances which may form such compounds in the aquatic environment
 - b. Organophosphorous compounds
 - c. Organotin compounds
 - d. Substances and preparations, or the breakdown products of such, which have been proved to possess carcinogenic or mutagenic properties or properties which may affect steroidogenic, thyroid, reproduction or other endocrine related functions in or via the aquatic environment
 - e. Persistent hydrocarbons and persistent and bioaccumulable organic toxic substances
 - f. Cyanides
 - g. Metals and their compounds
 - h. Arsenic and its compounds
 - i. Biocides and plant protection products
 - j. Materials in suspension
 - k. Substances which contribute to eutrophication (in particular, nitrates and phosphates)
 - l. Substances which have an unfavourable influence on the oxygen balance (and can be measured using parameters such as BOD, COD, etc.)
4. Establish relevant threshold values in accordance to Article 3 and Annex II (Directive 2006/118/EC) minimum for:
 - a. Substances or ions or indicators which may occur both naturally and/or as a result of human activities
 - i. Arsenic

	<ul style="list-style-type: none"> ii. Cadmium iii. Lead iv. Mercury v. Ammonium vi. Chloride vii. Sulphate viii. Nitrites ix. Phosphorus (total)/Phosphates <ul style="list-style-type: none"> b. Man-made synthetic substances <ul style="list-style-type: none"> i. Trichloroethylene ii. Tetrachloroethylene c. Parameters indicative of saline or other intrusions <ul style="list-style-type: none"> i. Conductivity <p>5. Establish monitoring of chemical status for groundwater:</p> <ul style="list-style-type: none"> a. Groundwater monitoring network b. Establish surveillance and operational monitoring per Annex V (Directive 2000/60/EC) c. Set of core monitoring parameters: <ul style="list-style-type: none"> i. Oxygen content ii. pH value iii. Conductivity iv. Nitrate v. Ammonium d. Frequency of monitoring e. Additional monitoring requirements for protected areas as listed under Annex IV (Directive 2000/60/EC) <p>6. Present monitoring results as maps in accordance with Annex V (Directive 2000/60/EC)</p> <p>7. Interpret chemical status of groundwater per Annex V (Directive 2000/60/EC)</p>				
Scale of measurement	River basin; Member State				
Data source					
Required data	Reference conditions; Point and diffuse pollution sources				
Data input type	Quantitative				
Data collection frequency	Frequency of monitoring for drinking water abstraction points:				
	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: left;">Community served</th> <th style="text-align: left;">Frequency</th> </tr> </thead> <tbody> <tr> <td style="height: 20px;"> </td> <td> </td> </tr> </tbody> </table>	Community served	Frequency		
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	<table border="1"> <tbody> <tr> <td>< 10 000</td> <td>4 per year</td> </tr> <tr> <td>10 000 – 30 000</td> <td>8 per year</td> </tr> <tr> <td>> 30 000</td> <td>12 per year</td> </tr> </tbody> </table>	< 10 000	4 per year	10 000 – 30 000	8 per year	> 30 000	12 per year
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Level of expertise required	Moderate to High						
Synergies with other indicators	Indicators forming parts of the Member States' River Basin Management Plans: <i>Quantitative status of groundwater, Chemical status of groundwater, Ecological status of surface waters, Biological status of surface waters, Hydromorphological status of surface waters, Physicochemical status of surface waters and Ecological potential for heavily modified or artificial water bodies</i>						
Connection with SDGs	SDG 3 Good health and well-being, SDG 6 Clean water and sanitation, SDG 11 Sustainable cities and communities, SDG 12 Responsible consumption and production, SDG 13 Climate action						
Opportunities for participatory data collection	No opportunities identified						
Additional information							
References	<p>European Parliament. (2000). <i>Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy</i>. http://data.europa.eu/eli/dir/2000/60/oj</p> <p>European Parliament. (2006). <i>Directive 2006/118/EC of the European Parliament and of the Council of 12 December 2006 on the protection of groundwater against pollution and deterioration</i>. http://data.europa.eu/eli/dir/2006/118/2014-07-11</p> <p>European Commission. (2012). <i>Report from the Commission to the European Parliament and the Council on the Implementation of the Water Framework Directive (2000/60/EC). River Basin Management Plans</i>.</p>						