



## MANAGEMENT RESPONSES

The assessment of the current situation in the region is not very optimistic, since most of the basic measures related to the sustainable water management have not been implemented so far or are being used insufficiently and have to be approved or introduced. In spite of the fact that most of the necessary measures are not in place, it was indicated that currently only a few measures are being planned for implementation (e.g. increasing efficiency of groundwater use and integrated river basin management, good agricultural practices, data exchange between countries). If this picture reflects the real situation, future perspectives for the groundwater sector seem to be questionable.

In some countries, certain management measures have already implemented and proved to be effective. In almost all cases groundwater quality and quantity monitoring has been introduced, even in some cases effectively (e.g. aquifers No. 2, 4, and 9). However it was widely recognized that measures were inadequate and needed to be improved (e.g. in Armenia, Azerbaijan, Georgia, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan). As a consequence of the inadequate monitoring activities, there is a lack of proper water assessment and planning activities of the transboundary aquifers in the majority of the responding countries. A similar situation was identified in the delineation of protection zones and vulnerability mapping. These were occasionally reported as being used and used effectively (aquifers No. 3, 8, 9 and 18), but otherwise needed to be improved.

In the management of groundwater resources, in the majority of the aquifers, management abstraction by licensing is being used, but considered to be insufficient where this were being applied, and that the abstraction needed to be better monitored.

For groundwater quality the most widely reported tasks that need to be applied were the treatment of urban and industrial wastewaters. Only two countries (Kyrgyzstan and Turkmenistan) reported these measures to be currently effective. In many instances, implementation or improvement of good agricultural practices is also needed, since within the region no country has implemented this measure effectively.

For the introduction or improvement of transboundary cooperation management measures based on integrated river basin management need to be implemented (see the table below). In this connection, the establishment of transboundary legal frameworks and institutions (e.g.

agreements and joint bodies) was recorded as the main task for improvement. Only Turkmenistan reported existence of transboundary institutions. Also data exchange is currently widely considered to be insufficient, and there is a need for it to be introduced.

Groundwater management measures				
Management Measures	Already used and effective	Used, but need to be improved	Need to be applied	Currently planned
Transboundary legal framework and institutions (joint bodies, agreements, treaties, etc.)	12	1, 2, 4	5, 6, 7, 8, 11	
Groundwater abstraction management by regulation (licensing, taxation)		5, 6, 7, 8, 12	1, 2, 18	
Groundwater abstraction management by incentives or disincentives (subsidies, credits, energy prices, energy supply, etc.)		4, 5, 6, 7, 8, 9	2, 12	
Increasing efficiency of groundwater use		4, 5, 6, 7, 8, 9	1, 2	12
Monitoring of groundwater quantity	4, 9,	1, 2, 3, 5, 6, 7, 8, 12, 15, 18	11, 13, 14, 16, 17	
Monitoring of groundwater quality	2, 4, 9,	1, 3, 5, 6, 7, 8, 18	11, 12, 13, 14, 16, 17	
Public awareness campaigns		5, 6, 7, 12	1, 4, 8, 9,	
Protection zones for public supplies	3, 8, 18	4, 5, 6, 7, 9,	12	
Vulnerability mapping for land use planning	8, 9, 18	5, 6, 7	1, 2, 3, 4, 12	
Good agricultural practices		5, 6, 7, 12	1, 3, 4, 9,	2
Groundwater integrated into river basin management		3, 4	1, 5, 6, 7, 9	12
Wastewater reuse or artificial recharge		9, 12	3, 4, 5, 6, 7	
Treatment of urban wastewater	9, 12	11,	3, 4, 5, 6, 7	
Exchange of data between countries		2	3, 5, 6, 7, 9, 12	
Treatment of industrial effluents	9,	12	1, 2, 3, 5, 6, 7	
Rendering of waste products and recultivation of grounds			1	
Neutralization of radioactive elements and rehabilitation of territory				2

Water management in CACENA countries is a complex and critical issue. The application of the Integrated Water Resources Management (IWRM) principles by the CACENA countries will require groundwater to be integrated into River Basin Management Planning. Sustainable transboundary cooperation will most likely be achieved

by creating a basis for assessing the national and regional benefits from technical investments, but these must be complemented by supportive national policy and institutional reforms, as well as capacity-building to strengthen regional institutions.