

V Foreword on groundwater research

Groundwater is vital for the survival and health of the population all over the world. But it is especially important in areas where groundwater resources are the main or even the only possibility to get freshwater, like in many arid or semiarid areas of the globe.

But the world georesources, not only groundwater, have been exploited at a level that causes enormous environmental stress, including the disappearance of species at unprecedented rates. Our need for more and more resources, as for the fuel, led to new techniques for old resources and has been appointed as a problem for groundwater resources, like fracking for oil and gas prospecting and abstraction. Other mining resources are also a source of contamination and depletion of groundwater. Agriculture uses more and more water resources, and fertilization, pesticides, and herbicides have been widely used to increment production and reduce the losses caused by harmful fauna and flora.

With all these needs and uses, aquifers are being depleted all around the world. Groundwater levels have been decreasing in many of our biggest aquifers, and groundwater has been mined in areas where recharge is not possible (deserts for example), compromising the water supply for future generations. The unsustainable water abstraction from aquifers will need to be controlled, or we will see in the future much more migrations of population due to the shortage of water resources in their own regions. We are facing a time where more powerful countries deplete groundwater resources of other countries under the borders, calling for the need for transboundary agreements that can help countries manage their waters near its borders.

Contamination is also affecting our water resources. With this, a part of the world population is struggling against water-related diseases that lead to the death of thousands of people all the years. In some parts of the world, groundwater is no longer even suitable for agriculture. Salinization processes occur not only near shore, with saline intrusion being a problem in overexploited areas, but also heavy metal contamination from mines and industries is a strong problem in other areas. Moreover water is essential for food security in the world; without water for irrigation, we could not support the actual number of inhabitants on earth.

With all these problems, ecosystems have disappeared from the face of earth and will continue to disappear; the respect for the environment has been lost. And we need the ecosystems to have a better life. When ecosystems suffer due to water problems, it is the first indicator that something is not right with our water resources and humans will be the next to suffer.

The solution for these issues is a tremendous effort of the international community of groundwater experts to maintain the vital resource for future generations. Hydrogeologists are many times involved in decisions that can affect other people, other countries, or groundwater-dependent ecosystems, for example, but are sometimes tided to politic or economic decisions taken by others.

But we are the persons that can help change the world. Hydrogeologists must be wise in their decisions. A book like this about *Global Groundwater: Source, Scarcity, Sustainability, Security, and Solutions* is a great contribution for the understanding of this kind of problems and to indicate solutions that can be used or can be appointed for the future. It is an essential book to help address the issues of groundwater scarcity and contamination and the way we can guarantee its future sustainability. A book that builds the bridge between local case studies and global-scale studies is essential for the understanding of groundwater issues at regional and global scale and possible future solutions and commitments.

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