São Paulo-Brussels Groundwater Declaration

For the whole world, 2021 has been an extraordinary year, not least for groundwater. In 2021, the International Association of Hydrogeologists (IAH) exceptionally presents two congresses: in August 2021, the 47th IAH Congress in São Paulo, Brazil, and, in September 2021, the 48th IAH Congress in Brussels, Belgium.

For this occasion, the IAH National Chapters in Brazil and Belgium, along with the IAH Executive Committee, Associação Brasileira de Águas Subterrâneas (ABAS), and Asociación Latinoamericana de Hidrología Subterránea para el Desarrollo (ALHSUD) launched a survey on groundwater challenges and solutions for sustainable management and awareness. Hundreds of hydrogeologists from all over the world participated in this survey. The analysis of the remarkable answers and thought-provoking suggestions are the basis of the São Paulo-Brussels Groundwater Declaration.

Groundwater is critical to Earth's survival:

- Groundwater is the most extracted natural resource from the planet's subsurface.
- Groundwater is responsible for supplying more than 50% of the global population, being the only source of water in many locations, including arid and semi-arid regions.
- Aquifers, our planet’s natural water reservoirs, hold 97% of the fresh and liquid water that are the main ally in facing climate change, as long periods of drought have little effect on their water availability.
- Groundwater supports economic activities globally, supplying 40% of irrigated agricultural and 30% of industries. However, the economic and social importance of groundwater is underestimated. Easily accessible at low cost, with good natural quality, and occurring in almost all parts of the planet, groundwater is critical to local and family economies, and agricultural activities. Despite this, its importance is often not recognized by managers and governments.
- Groundwater, being easily available, is the first choice for people without access to public water supply and, therefore, an essential ally in the fight against poverty, child mortality. Groundwater supports the very survival of vulnerable populations.
- Groundwater is an active component of the hydrological cycle that maintains river flow and lakes, prevents saltwater intrusion in coastal areas, sustains trees in forests, and life in mangroves and wetlands. Biodiversity heavily depends on groundwater.

Everyone must face these issues:

- Groundwater resources are threatened by over-exploitation of aquifers, aggravated by quality degradation from urban and agricultural activities. Groundwater quantity and quality are interlinked: one is of little use without the other.
- Sustainable groundwater management needs monitoring, regulation, and communication. Because groundwater is not visible, the public and the decision-makers underestimate its importance and the consequences of natural and anthropogenic impacts. Most parts of the world lack adequate monitoring of both quality and quantity. Communication on the role of groundwater is crucial for society, the economy, and the environment.
- The lack of political will is one of the main obstacles for groundwater management and governance in most regions in the world. Decision-makers and politicians prefer large visible infrastructure works due to their prominence compared to wells, giving more attention to surface water abstractions.
- Groundwater management and governance are constrained by a lack of studies, which prevents the identification of problems and the needs for water resources management. This is aggravated by government institutions unable to deal with the problem because groundwater issues are dispersed among various government bodies without leadership or coordination.

It is imperative to protect groundwater through the following urgent actions:

- Encourage, support, and petition governments to establish or to strengthen their policies for groundwater management according to the United Nations Sustainable Development Goals, particularly SDG-6, which seeks universal and equitable access to safe water and adequate sanitation for all.
- Encourage and expand groundwater use, which, although suffering local problems of over-exploitation and contamination, is still a resource that has not been fully exploited. Expanding its use would lessen the problems arising from global climate change, reduce poverty, and support economic growth and social well-being. The use of groundwater, integrated with other resources, would promote the protection and restoration of vulnerable ecosystems.
- Strengthen the institutions responsible for the governance of groundwater so that they promote efficient, inclusive, ethical, democratic, and socio-ecologically conscientious policies. Good management must be based on good science.
- Encourage, and disseminate, research, innovation and good practices in the use and protection of water, including integrated water resources management (IWRM), that consider the conjunctive use of surface and groundwater and nature-based solutions to addressing the challenges associated with water security and the well-being of society.
- Seek financial resources and invest in the development of integrated and sustainable water management, recognizing groundwater as an equally important

resource, which, due to its characteristics, requires systematic studies that offer innovative and efficient solutions to the problems of society and the environment.

- Recognize and promote the potential of young hydrogeologists in the search for new solutions to over-exploitation, contamination, and lack of management of water resources, through investments in their technical and scientific training, offering scholarships and support for academic research.
- Recognize that hydrogeologists and water scientists have a social and ethical obligation to produce and make available the knowledge generated to promote the proper groundwater management and governance and the effective engagement of the public and stakeholders in solving the problems that afflict populations, especially from developing countries.
- Finally, groundwater is a resource hidden from our view, which makes it difficult for society and decision-makers to be engaged in the search for solutions to their problems, so there must be an effort by governments, hydrogeologists, NGOs, and all of society to make perceptible this crucial resource for planetary well-being and dignified human life.

Let's make the invisible visible!

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