

Groundwater: Making Invisible Visible

Neno Kukuric

Director, International Groundwater Resources Assessment Centre, Delft, The Netherlands

Water scarcity already affects about 2.7 billion people around the world for at least one month per year and by 2025 this will worsen to severe water shortages if consumption continues at current rates. As surface water availability decreases in the face of climate change and increasing consumption, reliance on groundwater is growing and is likely to grow even faster.

Groundwater already provides almost half of all drinking water worldwide, about 40% of water for irrigated agriculture and about 1/3 of water required for industry. It sustains ecosystems, maintains the baseflow of rivers and prevents land subsidence and seawater intrusion. Groundwater is an important part of the climate change adaptation process and is often a solution for people without access to safe water. Despite these impressive facts and figures, invisible groundwater is out of sight and out of mind for most people.

Human activities (including growth of population and wealth) and climate variability are increasing the pressure on groundwater resources; serious pollution and depletion problems are reported for many parts of the world. Nevertheless (and despite the high importance and evident threats), we still do not know sufficient about the state and trends of groundwater resources globally and we do not manage aquifers well enough.

What could we do more to improve state and visibility of groundwater resources? Obviously a better/more extensive monitoring and assessment leads to better understanding of groundwater issues, which is prerequisite for informed management and governance. However, the level of investments for monitoring/assessment of groundwater resources tends to be very much related to visibility, clarity and priority of a problem. Since groundwater is invisible to many, it is an additional challenge to provide sufficient evidence, convince decisionmakers about priority issues and secure investments. Therefore, building a case for invisible groundwater (through improving information sharing, awareness, education, lobbying, etc.) deserves more attention.

It is simple: the more we know (monitoring & assessment), the more we can tell; by telling more (visibility) we increase possibilities to do/learn more again. Below are some suggestions (points for discussion) about where and how to step up our efforts:

- Improve the knowledge on groundwater resources, especially their **status/change** through **monitoring**: “You can’t manage, what you don’t measure.” In 2007 IGRAC initiated the Global Groundwater Monitoring Network (GGMN) programme to improve quality and accessibility of groundwater monitoring information. There is a concern about reduction of monitoring networks and overvaluation of proxy/derived information from remote sensing and regional/global models (also as consequence of lack of sufficient monitoring datasets).
- Improve **information and knowledge sharing**. In order to engage in groundwater management and take responsibility, stakeholders need access to reliable data and information on groundwater. This requires processes and systems for sharing of data, information and knowledge at all levels.
- Climate change and human impact on groundwater resources do not stop at administrative borders. The majority of large aquifers in the World are **transboundary**. Political, institutional, socio-economic, cultural and other differences among countries make the assessment and management of internationally shared aquifers challenging. Significant progress has been made in assessing transboundary aquifers, but less so in management/governance.

- Develop and promote use of contemporary, interactive **information management systems** as an enabling environment for **international cooperation**. A breath-taking development of web-based ITC already provides a unique support for sharing (and joint gathering, processing and dissemination) of data and information. (*Technology is in place, it's about people where most additional effort is required.*)
- Raise awareness on **multiple value** of groundwater using **customised approaches and tools** (social media, serious gaming, water footprint, educational material, etc.) for various target groups. *How to effectively convey a message that invisible character of groundwater does not easily lend itself to inform policy and therefore needs constant increased attention?*
- Go beyond the groundwater sector: raise attention to groundwater **in a context of relevant societal/environmental issues** (e.g. managed aquifer recharge as an effective climate adaptation measure) and **in an integrated manner** (i.e. groundwater as a part of the problem/solution, cross-sectoral integration).
- Involve **investor risk** analysts and assets managers: **why groundwater matters?** Groundwater resources are extensively used in production processes by companies all over the world, including large multinationals. The knowledge about these resources needs a substantial improvement for the benefit of all: the investors, society and environment. What are **business incentives** for action and how to distinct genuine efforts in water stewardship from “greenwashing”?
- Think positively, think **in terms of solutions**: advantages (and limitations) of solar pumping, smart crops, and water-saving irrigation technology. Is silent revolution over? Regulations (e.g. metering), legislation and other measures on **demand side**.
- Provide a fresh view on the role of **UN agencies** and international groundwater (related) organisations. Explore the ways to develop joint UN inter-agency projects/activities on groundwater (e.g. World Groundwater Day), to link groundwater stronger to SDGs and to add groundwater on agenda of high level panels and national cooperation agencies.
- Strengthen **people networks** and trust building process: it is all about people/stakeholders and connecting/involving them. Human dimension of decision-making in water sector is often larger barrier than engineering or even financial restrictions, also due to number/diversity of stakeholders and a **non-market value** of water. The latter (common resource pool) makes groundwater additionally vulnerable to “tragedy of commons” and only good groundwater governance at the local level can prevent it.

Practically all the above-mentioned issues have already been addressed by various organisations, at various levels, all over the world. Yet, apparently not sufficiently or effectively enough: although there are still no completely reliable figures about the magnitude of groundwater stress globally, there is no doubt that we are **increasingly depleting and polluting** our groundwaters. **Strengthening cooperation and information & knowledge sharing** (at all levels!) is crucial for all groundwater issues listed above, whether it is monitoring, assessment or good governance. Only by working together (with dedication and passion of someone who has a dream) we can substantially increase visibility and improve management of groundwater resources globally. Is there any other option?