

Editorial for SpringerOpen ‘Applied Water Science’ special issue: “Implementation of adapted water technologies in a tropical karst region”

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Populated karst landscapes are spread all over the world, they host more than 25 % of the world’s population and are fundamental for the inhabitants’ daily water supply. Nevertheless, the natural boundary conditions in these areas mostly lead to distinct challenges regarding a sustainable water supply. The extraction-related effort greatly refers to the karstified underground with high infiltration rates and, therefore, lacking natural water storages at the surface. At the same time there are vast underground water resources whose utilization is afflicted with distinct difficulties due to the poor accessibility caused by the location deep underground and thus high pump heads, by the heterogeneous spatial distribution as well as by the highly temporal fluctuating water yield. Additionally, karst water resources are distinctly vulnerable to contamination due the poor filter capacity of carbonate rock. Hence, especially in less and least developed countries the effort required for extraction of karst water resources prevalently leads to ‘economic water scarcity’, which is characterized by lacking monetary means to utilize existing resources and by absence of adequate infrastructure and access to adapted technologies.

The Indonesian karst region ‘Gunung Sewu’ suffers from all of these constraints. 1400 square kilometers in size, it is situated in the district of Gunung Kidul, Yogyakarta Special Province (DIY), on the southern coast of Java Island. During recent decades, the Indonesian government has undertaken great efforts to exploit the

underground water resources through application of conventional technological solutions—so far without lasting success. To improve the living conditions for the inhabitants, a German-Indonesian network of scientific institutions, funded by the German Federal Ministry of Education and Research (BMBF), focused on the development of innovative and highly adapted technologies to sustainably exploit the underground karst water resources.

During data collection, development and planning phase particular consideration was given to the hydrological, ecological and sociological conditions pertaining to the project region. Over the years the R&D activities were afflicted with many setbacks due to natural disasters, such as earthquakes and flood events as well as with social challenges, due to the involvement of various partners from different cultural and educational backgrounds. Nevertheless, the technologies’ first-time implementation was accomplished together with German and Indonesian partners from industry, public authorities, NGOs as well as with local communities. Hereby a comprehensive transfer of knowledge was achieved for a vast number of stakeholders. In particular, the ongoing scientific collaboration after commissioning of the pilot plants was essential to accomplish the transition in autonomous operation by the local partners. Since this approach lead to a sustainable utilization, the unique facilities will serve as demonstration objects in the future with the goal to provide comprising knowledge for multiplication attempts to karst and non-karst regions all over the world showing a similar demand situation.

Retrospectively, the key elements for the successful realization of the R&D-project’s objectives were the continuous and far-reaching cooperation with various partners from both countries as well as the personal dedication and

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effort of all people involved. For this commitment, we would like to express our most sincere thanks and acknowledgements. Furthermore, we would like to thank the BMBF for many years of fruitful cooperation and generous funding of the R&D activities. All relevant experiences and insights gained through the research network are outlined within this present special issue of the SpringerOpen Journal ‘Applied Water Science’.

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