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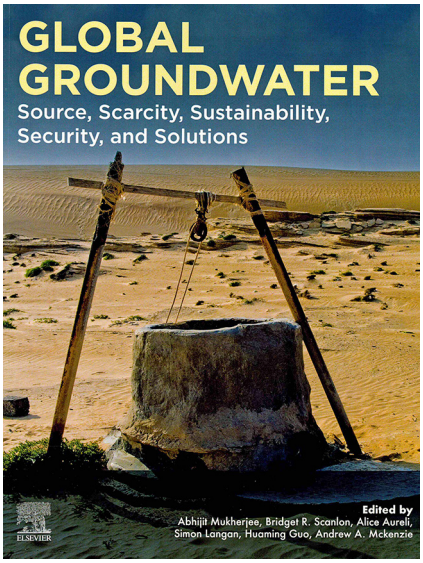
Global groundwater: source, scarcity, sustainability, security, and solutions, by Abhijit Mukherjee, Bridget Scanlon, Alice Aureli, Simon Langan, Huaming Guo and Andrew McKenzie (Eds.), 2020. Elsevier, Amsterdam. 676 pages. Paperback: price $150.00, ISBN 9780128181720; e-Book: price $105.00, ISBN 9780128181737.



For centuries, groundwater has been considered an important source for livelihood and income on a global scale. During the past fifty years, this value has doubled due to climate change, overpopulation and human activities which resulted in scarcity and water pollution. Globally, about 70 per cent of groundwater is used for irrigation and more than half of our drinking water is sourced from groundwater. Within this context, the present scholarly tome documents global groundwater dimensions from various stressed regions worldwide and focuses on current knowledge and experience transfer, from problems of local scale to global view. The global scale of the present book enables us to understand groundwater resources and quantify the two-way interactions with other components of the hydrological cycle, in reflecting on sources, scarcity, sustainability and security and in integrating global solutions for a range of groundwater problems. It will be useful to young professionals in hydrogeology, to managers and to policy makers worldwide.

The book comprises five themes and 45 chapters. The first theme is discussed in a single chapter that describes global groundwater in terms of source and availability, scarcity to security, through sustainability and solutions. It also provides an introduction of why we should study global groundwater. The second theme covers nine chapters that discuss groundwater sources in different hydrogeological environments (carbonate aquifer, Himalayan river basins, mountain areas, plains, Alberta (Canada), the River Nile basin, the Kingston Basin in Jamaica and transboundary aquifers). Groundwater sources here are approached from different perspectives including occurrences, usage, storage, emerging trends and groundwater flow system in shared aquifers. The third theme comprises 13 chapters that focus on groundwater scarcity in terms of quantity and quality, discussing environmental controls, management and monitoring with emphasis on groundwater scarcity in the Middle East and East Africa. It also documents the global distribution of geogenic groundwater pollutants as well as anthropogenic contaminants. This volume offers a wide range of case studies from different parts of the world, for both geogenic pollution and anthropogenic contamination. Moreover, it discusses hydrogeochemical characteristics and groundwater quality assessment in Morocco and in the main aquifers of the US states of Texas and Florida. The fourth theme covers groundwater sustainability and security, in 13 chapters on groundwater recharge, sustainability in cold and arid regions, groundwater management, agricultural production and trade worldwide, groundwater for society, challenges of sustainable use and development, groundwater security and economy of groundwater. The last theme of the book is devoted to the future of groundwater and to solutions, discussed in nine chapters that focus on the future of groundwater science and research including new trends, technologies, modelling and future simulations,

as well as desalination of both brackish and deep groundwater. It also discusses nature-based solutions to groundwater problems, such as managed aquifer recharge and its applications to livelihood and income.

The present tome is a voluminous and scholarly one, in view of the main topic of global groundwater. However, it misses out on common cases such as the focus on its usage for drinking water production and the presence of hot groundwater of acidic nature and very high iron content. For example, the shallow aquifer of the Bahariya Oasis (0-350 m bgs), in the Western Desert of Egypt, about 350 km southwest of Cairo, constitutes such a case of very high iron content and hot acid groundwater. This is the main aquifer in the Bahariya Oasis, in sandstone interbedded with shale and a thickness of more than 1,000 metres and a mean water yield of 150 m^3/h. Most of the agricultural activities and projects in the area are based on the upper zone (0-350 m) of the main aquifer. However, this zone has a very high iron content and hot acid groundwater; such water quality problems appeared after the construction of major integrated projects and extensive stresses for this aquifer. They pose a threat on the sustainability and development based on groundwater from the Nubian Sandstone Aquifer in the Western Desert of Egypt.

Fortunately, the present volume pays ample attention to groundwater sources, scarcity, sustainability, security and solutions, by integrating information and knowledge gained from different case studies worldwide. Moreover, it identifies pathways for transforming knowledge to management of ground water security and sustainability. It deserves to be widely read by professionals who deal with projects with groundwater dimensions, including managers and policy makers.

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