

## BOOK REVIEW

**HYDROGEOLOGY AND WATERSHED.** Dr. Rabindra N. Tiwari (Ed.). Excellent Publishing House, New Delhi, 2016, 169p. ISBN: 978-93-84935-83-2. Price: not mentioned.

As explicitly indicated by the title, the book under review, edited by R.N.Tiwari, is an assorted mix of priceless research articles mainly dwelling on hydrogeology as part of integrated watershed management in the arid and semi-arid areas of the country. Of late, this terrain is increasingly attracting attention of the nation being resource-rich but economically backward. In this region, chronically suffering from drought, deficient rainfall and surface water resource, groundwater is the only sustainable source of water holding key to food and drinking water security and all development activities. But aquifers in this terrain underlain mostly by consolidated, fractured/ weathered/ structurally deformed formations and with varied morphometric features from rugged hills to erosional plains and river valleys, are thin, discontinuous with moderate to limited and widely varying groundwater potentials, and hence prone to overexploitation and pollution constraining all round development and growth. Integrated and optimal use of all water resources, - surfacewater, groundwater and rainwater,- as part of watershed management is the primary solution of the problem, watershed being held as a basic unit for natural resources planning. In this context, Rabindra Nath Tiwari, a versatile geologist, has brought out this excellent publication containing selected case studies with the objective of lending scientific boost to the watershed management with groundwater as the core element. The articles are all products of sustained field studies. They have used modern scientific tools like remote sensing, geophysics, GIS apart from field hydrogeological procedures producing area-specific and problem-specific management models for practicing hydrogeologists. Thus, the book virtually plays a pivotal role in educating and mobilizing the community of water users, scientists and managers in harnessing and conserving groundwater resources for food and drinking water security so crucial for development of the region. This focal theme is more than highlighted in the very first and introductory article on the role of water in the development and management of watersheds in the arid/semi-arid areas followed through the rest of the book with an attempt to formulate the best management practices.

Some of the highlights of the book with review comments are placed below.

**Watershed management and groundwater:** The principal objective of watershed development is optimal utilization of land and water endowments, promoting adequate vegetative cover, optimizing and conserving water resources, harvesting rainwater, controlling soil moisture and recharge. It primarily involves an understanding of its ecosystem comprising hydrology, geology, hydrogeology, soils, biodiversity, agroforestry and other environmental factors, and the services they provide. Any development plan needs to integrate all these components for sustainable and inclusive growth. Morphometric analysis using

geospatial techniques prioritizing favorable areas for actions; and use of geophysics for sub-surface imaging are some of the sophisticated gadgets used in terrain evaluation including hydrogeological assessment. The accrued knowledge leads to watershed management design from ridge to valley, from soil-water conservation to water harvesting, artificial recharge, sub-surface dykes etc. The idea is to devise the best practices in different hydrogeological terrains. A participatory approach involving all stakeholders is crucial for success of the watershed management. Ichalahalla (Karnataka) and Padhori (U.P.) watersheds are shining examples of how community-based water harvesting and conservation enabled turn around in economy from penury to affluence.

**Impact of development:** Monitoring and assessment of environmental and social impacts constitute essential parts of the development program, for relevant follow-up actions. Water quality and water level changes due to surface water-groundwater interactions, or livelihood changes of the project beneficiaries are the major consequences of development.

**Climate change technology:** Agriculture and water are the two worst hit by climate change. Rainwater harvesting, water conservation, and crop-water planning, in other words watershed management, may insure food and drinking water security against the fallouts. This gains added significance in our quest of climate change mitigation technology.

The book is written in lucid language and with a commendable clarity of expression and flow common in international publications. Flow charts, data tables and well-drawn figures are highly illustrative. Books like this one provide important edifices for thought-provoking interactions on research subjects and products, as also for the latter's quick and wide transmission and publicity. The ultimate goal should be to compile/analyse all such case studies to reveal regional pictures and practices, and bring out a Treatise on watershed development and groundwater management in the country.

This review may not be complete without a mention of some avoidable shortcomings of the book, which include printing mistakes, and reproduction of figures. Further, a subject index at the end will make it reader-friendly. Notwithstanding these deficiencies, the Editor and the authors of the book deserve commendation for this otherwise good, authoritative and knowledge-filled research document which will surely enrich the reference libraries of Universities and Institutes dealing with hydrogeological studies.

*Geological Society of India*  
E: [subhajyoti\\_das@hotmail.com](mailto:subhajyoti_das@hotmail.com)

SUBHAJYOTI DAS