

size (the 135 Mw solar thermal plant in Rajasthan is only 20 per cent solar) of single units. The lament of the authors, that hardly any measurable data exist for assessing performance and impact of RETs in India is sadly true. But in a highly emotional atmosphere surrounding energy choices in India (evidenced by nuclear lobby, Dabhol fiasco, Narmada dam height) complete transparency could invoke murder of RETs. Once this fear is removed and national vision is clear, this transparency can lead to success of RETs, better systems' life and performance and reduced energy embodied in the manufacture of RET devices.

This book, on the whole, is an independent and comprehensive overview of renewable energy technologies in India and their positive implications for India's future environment, as also the present status and its evaluation. All energy decision makers should find it profitable to go through the book and all students in various energy courses would find in it a mine of data and information. Through its well-structured boxes of presentation, informed and intelligent public at large can derive much profit.

C. L. GUPTA

*Solar Energy Unit,
Sri Aurobindo Ashram,
Pondicherry 605 002, India*

Making Water Everybody's Business – Practice and Policy of Water Harvesting.

Anil Agarwal *et al.* (eds). Centre for Science and Environment, 41, Tughlakabad Institutional Area, New Delhi 110 062. 2001. 456 pp. Price not mentioned.

Good quality water is increasingly becoming a rare commodity. People have lost faith in municipal water supply and those who can afford to pay have taken to bottled water, which is available at a price. The average urban dweller, however, has to be satisfied with any type of water, taps remaining dry for most part of the day and life in rural areas has become a daily struggle to fetch water. The scientific community has shown scant interest

in solving this problem of the poor. Rainwater harvesting, recharging of the groundwater reservoir and desalination of brackish water are areas in which no research organization in the country is seriously engaged. A host of engineers are employed in the construction of major dams and in transferring water over long distances, but collection of rainwater where it falls and storing it for local use has not interested them.

Anil Agarwal, well-known environmentalist based at Delhi, has been waging a lone battle against the policies of past and present-day governments. His first report on the state of India's environment was issued in 1981, nearly twenty years ago, and it focused attention on the degradation of India's environment through the unwise policies of the government and people's neglect. Subsequent reports have been issued at five-yearly intervals on aspects like food self-sufficiency, floods and flood plains. The last book, *Dying Wisdom*, released in 1997, draws attention to the water-harvesting systems in practice in ancient and medieval India. These books have made an impact both on the bureaucracy and the people, creating an awareness of what needs to be done for conserving our water resources, preventing their pollution and making water available where it is most needed.

The present volume under review, also issued by the Centre for Science and Environment (CSE), New Delhi, under the direction of Anil Agarwal, summarizes the proceedings of the three-day conference held at Delhi in October 1998, which was inaugurated by K. R. Narayanan, President of India. Water harvesting activists, builders, policy makers and academics from India and abroad are stated to have participated in the conference.

The objective of the conference was to make water harvesting a mass movement and thereby diffuse the water crisis which is building up at an alarming rate in most parts of the country. There is heavy extraction from rivers as well as groundwater reservoirs, resulting in significant lowering of the water table. With too much dependence on the State, which has no money to invest in new projects and is unable to supply water at highly subsidized rates, the only alternative is for the people themselves to take the initiative and revert to and improve the ancient practice of harnessing rainwater by

capturing it where it falls. The book advocates water harvesting in houses and farms by funding small projects in both rural and urban areas and media participation is felt necessary in giving a new fillip to this movement.

The bulk of the book is devoted to demonstrating that rainwater harvesting, widely practised in India in earlier times, is feasible and can be successfully implemented, thereby making people self-sufficient in this most essential of commodities – water. The book, with the most appropriate title, is intended to involve everyone in the process of ensuring water supplies.

Chapters 2 and 3 of the book narrate remarkable success stories of the work turned out by villagers of Ralegan Siddi under the leadership of Anna Hazare, Sukhomarji under P. R. Misra and the numerous villages in Alwar district, Rajasthan by *Tarun Bharat Sangh* under the leadership of Rajendra Singh. Many traditional water-harvesting systems in Rajasthan, Bundelkhand, Madhya Pradesh and other parts of the country are outlined. Their re-emergence as crucial sources to meet the growing water scarcity in many rural parts emphasizes the need to revitalize the numerous tanks by desilting them and restoring them to their original state.

A heartening development in this direction is the mushrooming of voluntary organizations in different parts of the country, whose work and success stories are narrated in a number of papers. Spectacular results obtained in parts of the Thar desert and the Western coastal plains and revival of the river Aravai in Rajasthan are illustrated by many excellent photographs in colour, bearing ample testimony to the success of the programme.

A silent revolution seems to be sweeping across Rajasthan through voluntary organizations like the *Tarun Bharat Sangh*, which has constructed 3000 water-harvesting structures in 760 villages, regenerating 0.65 million hectares of land! *Pani Yatras* organized by CSE have helped to spread the message of rainwater harvesting and its conservation far and wide.

A quite promising development is the promotion of roof-water harvesting, especially in salinity-affected areas (Chapter 4). When once the success of roof-water harvesting spreads, the construction of underground storage reservoirs will be

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undertaken and will go a long way in solving chronic shortage of water in cities. Chennai has set an example in this respect by amending building laws to make it obligatory for all new constructions in the city to have rainfall harvesting structures to store water. Such stored water could be used for flushing toilets, washing and gardening.

Chapter 5 outlines technology available for water harvesting such as remote sensing and geographic information system, groundwater recharge designs, computer databases and waste-water recycling. Significant advances in these fields are possible provided the scientific community applies its mind to effect improvements in traditional technology.

The need to make water everybody's business is emphasized in a group of papers assembled in Chapter 6. Reasons for decline in traditional technologies are analysed. Official preoccupation with mega projects implemented with borrowed money and neglect of tanks has

resulted in too much centralization and the consequent neglect of traditional technologies based on self-reliance. Another glaring factor is the lack of interest shown by research institutes in tackling problems of the poor in rural areas.

CSE and particularly its leader Anil Agarwal are to be congratulated for having rendered great service by forewarning the people of the bad days looming ahead – the spectre of water famine – threatening to overtake them and suggesting measures for combating the menace.

The attractive part of this educative book under review are the numerous photographs in colour and the large number of line drawings specially drawn to convey its message to everyone. Scientists in our research institutes must take note of this publication and help in organizing sanctuaries within their campus, where models can be created and the effectiveness of the technologies aimed at rainwater harvesting and pollution control are demonstrated.

State water is heavily subsidized and thus under-priced leading to adoption of wasteful practices and squandering of a precious resource. We have more wealth in water than Arabia in oil. This resource therefore, has to be conserved and used with great care if future crises are to be avoided. Our scientists should develop technologies aimed at converting our water resources into real wealth through efficient conservation and use and thus build a future based on the enduring past of India. The book under review is a step in that direction and deserves to be closely studied by our administrators, scientists, the intelligent public and all those concerned with public welfare.

B. P. RADHAKRISHNA

*Geological Society of India,
No. 63, 12th Cross, Basappa Layout,
P.B. No. 1922, Gavipuram P.O.,
Bangalore 560 019, India
e-mail: gsocind@bgl.vsnl.net.in*

PERSONAL NEWS

A link with the past: Divya Darshan Pant (1919–2001)

On 9 May 2001, India lost an eminent botanist, an excellent teacher, a distinguished visionary, researcher and a fearless critic in the demise of Divya Darshan Pant. Pant was the founder of a strong school of research in palaeobotany and morphology of plants in the Department of Botany, Allahabad University. Beginning his career as a lecturer in 1945, he became Professor and Head of the Department of Botany in 1966. When he was at the helm of affairs from 1966 to 1981, the department achieved international fame for both teaching and research.

Divya Darshan Pant was born on 18 October 1919 in the pine-dotted picturesque surrounding of Ranikhet in Kumaon Himalaya. His father Ambika Dutt Pant was a highly respected Ayurvedic physician and Editor and Publisher of a magazine, *Himalaya*. After his early school education in Ranikhet and Nainital, he moved to Lucknow where he graduated and later received his post graduation and

research training under Birbal Sahni. In 1946, he married Radha Pant, a biochemist who later headed the Department of Biochemistry and Home Science in Allahabad University.

The blending of interest in living and fossil plants and combination of facts with interpretative ideas were Pant's main distinctions. His work enables us to peep into the plant world of Gondwana and Pre-Gondwana times through the modern window. On the basis of his important research contributions on the reconstruction of plants of glossopterids, diversity of the floristic elements and reproductive biology, he was recognized as an authority on *Glossopteris* flora. His interpretation of the compressed organs of *Glossopteris* and related genera, including their vegetative parts and fructifications have been vividly confirmed by the subsequent findings of permineralized fossils. He was the first to propose the existence of mycorrhizic gametophytes in

Rhynie Chert by his interpretation of gametophytic and mycorrhizic nature of *Rhynia gwynnevaughanii* and strongly advocated it against criticisms throughout his life. However, this work induced others to discover various gametophytes in Rhynie Chert like *Lyonophyton* and *Sciadophyton*.

On the basis of his work Pant established that the members of the *Glossopteris* flora had very diverse woods, megaspores, fructifications and seeds. His work on Gondwana conifers, particularly *Buriadia heterophylla* suggested that these could either be regarded as coneless prepinophytes or may be altogether assigned to new group of plants. His work also shed light on Lower Gondwana structurally preserved pteridophytes. Apart from the peninsular part of India, he had extended his studies on extrapeninsular Lower Gondwana and Pre-Gondwana (Lower Carboniferous) flora of Punjab–Kashmir Himalayas, where he found an admixture of Cathaysian and