

Groundwater Resources and Management in Hard Rocks – Subhajyoti Das, and R.A. Duraiswamy
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Since 2007 the Geological Society of India has been organizing every year one national seminar or workshop on groundwater management in hard rocks at various centers across the country to find out region specific problems and solutions thereof. The two day National Conference on ‘Groundwater Resources and Management in Hard Rocks’ organized jointly by the Geological Society of India, Department of Geology, University of Pune, and the Groundwater Surveys and Development Agency, Water Supply and Sanitation Department, Government of Maharashtra on 12-13th February 2010 at Pune University, was fourth in the series, commemorating Diamond Jubilee of the University and in the honour of Dr. B. P. Radhakrishna – the patriarch of Indian geology. The conference was attended by more than 300 delegates and students representing various organizations, institutes and universities from across the country including two guests from Vietnam. The inaugural function was presided over by Smt. Malini Shankar IAS, Principal Secretary, Water Supply and Sanitation Department, Government of Maharashtra. Prof. K.B. Powar, former Vice Chancellor, Pune University, and Secretary General, Association of Indian Universities, were the Chief Guests. Welcoming the delegates Prof.N.J.Pawar, Head of the Department of Geology, Pune University, narrated the background of the Conference, pointing to the strategic importance of groundwater in hard rocks. Dr. K. R. Gupta, Honorary Secretary, Geological Society of, apprised the audience of the activities of the Geological Society of India in promoting studies in earth science, and disseminating the topical issues, results of research through its publications and seminars, water being a key area. Shri K.M. Nagarjole, Director, Groundwater Surveys and Development Agency, Pune, briefed the audience about the agency’s multidisciplinary R & D activities, focused on village-wise surveys, monitoring and groundwater management, publication of watershed-wise lineament maps showing areas suitable for groundwater extraction, and aquifer level management.



After ceremonial lighting of the lamp by the Chief Guest and others, the Abstract Volume of the Seminar was released by Smt. Malini Shankar, Principal Secretary, The volume contains about 101 abstracts of papers on various themes related to groundwater. ‘Climate Change: past, present and future’ - a book authored by Dr. U.B. Mathur, was also released by Shri B.M. Jha, Chairman, Central Ground Water Board. Introducing the book, Mathur told that climate changes are with or without human activities, we need not be terrorized by IPCC Reports. The country is well placed with adequate rainfall.

In his Key note address on ‘Ground-water Development and Management in Hard rocks’, B.M. Jha emphasized on a combination of supply side and demand side management measures for long term sustainability of groundwater resource. In her Presidential Address Smt. Malini Shankar, IAS, talked about imaginative and innovative technologies, and community based management models as answers to emerging water crisis. The single convergent objective is improvement of the society. Withdrawal for the benefit of a few at the expense of rural masses is not acceptable in a welfare society. This was followed by the presentation of papers organized in seven Technical sessions spread over two days. A relevant summary of selected notable presentations is given below.

In the first session (Community Management of Groundwater Resource) Chandrakant Dalvi, District Collector, Pune delivered the lead talk on “Watershed Development through community participation – “The Nidhal Experience” highlighting the collective strength of the community participation to overcome water scarcity through traditional drainage line treatment combined with area treatment and change in cropping pattern to cash crops. A. B. Patil spoke about achieving water security through participatory water management, and equitable distribution of water rights. According to Duraiswami, spring development should be integrated with watershed development as a viable alternative water source in the Konkan region of Maharashtra. The catchment areas should be protected against pollution of springs.

In his lead talk in the second Technical session (‘Water Conservation - optimal utilization, conjunctive use, rainwater harvesting and artificial recharge’) M.A. Ghare spoke about three emerging areas of groundwater management, namely increasing demand vis-à-vis excessive localized supply, excessive localized generation of waste, and competition among users and uses. Water should be used frugally and with discretion. Y.K. Murkute presented an interesting study of petrographic texture vis a vis aquifer characteristics in sandstones. S.D. Limaye spoke about UNESCO-IUGS-IGCP Project GROWNET. He apprised all about Best Practices in groundwater management in low income countries, like Exploration & Assessment, Appropriate Drilling Technology, Efficient Use of Water, Watershed Management, and Participation of women in groundwater management. S.N. Patil enlightened the Audience about integrated water shed development presenting step by step method for practitioners. P.L. Salve made in-depth observation on groundwater potentials of basaltic trap units in Jalgaon district of Maharashtra, highly useful for development planners. S. S. Hegde drew attention of the geoscientific community to the unprece-dented decline of water levels in the over-exploited Kolar region of Karnataka and explored the scope of exploiting deep aquifers.

The 3rd Technical session was on ‘Remote Sensing, GIS and Groundwater Modeling’. Prof. Vishwas S. Kale delivered a lead talk on this topic. The 4th session on ‘Groundwater quality and related issues’ received an overwhelming response in terms of papers presented indicating that the focus of the present geoscientific community should be proactively quality centric. Prof. D. Chandrashekaram, IIT Mumbai delivered a lead talk on “Arsenic contamination of groundwater”. He touched upon Irrigation- Plant- Arsenic relationship and explained the enrichment of arsenic in rice plant roots. Viswanatham of World Bank spoke about Yemen Integrated Fluorosis Programs. The Best Practices in Fluoride mitigation should be published. UNICEF, Groundwater directorates of hard rock states along with CGWB and Rajiv Gandhi Technology Mission may jointly implement the program. He stressed that the important aspect is Reliability, Affordability and Sustainability of the Defluoridation Technology. The ever-increasing menace of saltwater intrusion and inland salinity was addressed by several authors. Prof. N.J. Pawar, Department of Geology presented an important paper on the groundwater contamination in Pune city. K. Saravan spoke about effects of land use on groundwater quality in Kerala.

The 5th session was on ‘Geophysics’. Many papers presented were on groundwater prospecting in the hard-rock terrain of the Deccan Traps. Technical session 6 was on ‘Groundwater Manage-ment’, while the 7th Technical session was on ‘Impact of climate change on ground-water resources’. S. Sinha-Roy delivered an excellent lead talk on focused ground-water recharge in arid and semi-arid regions of Rajasthan in a climate-change scenario.

In all, 68 papers were presented during the conference. People of eminence from various government organizations and reputed institutions chaired the sessions. The valedictory function was presided over by R.H. Sawkar, Secretary, Geological Society of India. Subhajyoti Das, Technical Organiser of the Seminar, summed up the issues deliberated in the Conference with a clear message: (a) we are to manage our resources ourselves through our own participation, (b) integrated water management, - surface water, rainwater, groundwater. (c) S&T inputs in groundwater management linked with traditional know-ledge, (d) groundwater pollution needs to be curbed and mitigated. The sole objective should be to reach science and technology to the grass root level, and to publicise people friendly management models. The valedictory function concluded with the distribution of certificates to the participants. Prof. N.J. Pawar thanked all the participants, Guest of Honour and the funding agencies for their trust and support. Several important recommendations emerged from the deliberations at the conference. These are:

1. Role of community participation is vital for watershed development projects and Earth scientists should enroll as facilitators of change.
2. Communities should adopt sound participatory water management techniques and ensure equitable distribution of water resources.
3. Springs are an integral part of the hydrogeological system and their potential should be tapped in right earnest as a sustainable alternative water supply source.
4. Groundwater occurrence and flow is a complex process in the hard rock terrains and understanding the same should be attempted by combining traditional geohydrological surveys with the state of the art tools like Remote Sensing, Geographical Information System, Groundwater modeling and improved interpretations of the geophysical techniques.
5. Depleting and rising groundwater conditions across the country needs to be evaluated and understood urgently so that corrective interventions can be implemented to secure our drinking water and irrigational needs vis-à-vis environment.
6. Groundwater quality is of prime concern to all stakeholders. Quality needs to be tackled at the grass root (field) as well as the intellectual (academic) levels. Specific work groups relating to urban hydrogeology, industrial pollution, effluents, saltwater intrusion, or geogenic pollution like fluoride, arsenic, iron etc, need to be formulated with an intention of providing proactive intervention.
7. Groundwater management policies and practices should transcend from academic echelons to actual field implementation.
8. The Geoscientific community must look into the future scenarios of global climate change vis-à-vis impact on groundwater resources. Such input may prove imperative to the future food and energy security of our country.

Besides the technical sessions a poster exhibition showcasing the various aspects of groundwater geology, water-shed development, water quality and sanitation, were on display.