

NOTES

CHANGING GEOHYDROLOGICAL SCENARIO IN THE HARD ROCK TERRAIN OF INDIA

National Seminar on Changing Geohydrological scenario in the hard rock terrain of India, was jointly organized by the Geological Society of India, Department of Mines and Geology, Central Ground Water Board, Karnataka Jal Biradari and Regional Institute of Cooperative Management on 29-30 April, 2007 at Bangalore. The seminar launched year long Golden Jubilee celebrations of the Society. Delegates from all over the country attended the seminar and participated in its deliberations.

Shri R.H. Sawkar, welcoming the delegates explained that overexploitation of groundwater resulted in water

model of roof top rain water harvesting. This was followed by release of Souvenir Volume by Sheila Nair, Hydrological Studies by S. Das, Special Issue of the Journal of Geological Society by S.V. Srikantia, Karnataka Antharjala by D.R. Patil, Karnataka Bhujal by M.S. Rathore and Jalo Yoddha by A.N. Yelappa Reddy.

Speaking on the occasion Smt. S. Sheila Nair, Union Secretary of Drinking Water Supply, pointed to the need of a coordinated approach of bureaucrats, scientists and engineers for workable policy decisions based on technical and scientific solutions of complex water management



Shri L.C. Jain, former Member, Planning Commission, discussing with delegates.

quality degradation and it was necessary to critically assess the impact of groundwater development over the last half a century on the over all geohydrological situation in the country. The deliberations of the seminar were spread over two days: the first day was mainly devoted to the address by leaders of water management, and the second day to the presentation of technical papers. The inaugural session was presided over by Dr. H. K. Gupta. K.C. Reddy, Adviser to Chief Minister, Karnataka, ceremonially declared commencement of the seminar by switching on a working

problems. S. Das, hydrogeologist, observed that water conservation is the only means of our survival, given the shrinking water availability in future. D.R. Patil, President of Karnataka Jal Biradari and Prof. M.S. Rathore, lauded the efforts of the Geological Society in making available technical knowledge to the people in local languages. Dr. A.N. Yelappa Reddy and S.V. Srikantia emphasized the role of soil, water and vegetation in rainwater percolation and the relevance of interdisciplinary studies on recharge management.

In the three post lunch sessions leaders of water management narrated their experiences and indigenously devised models of watershed development and rainwater harvesting, and spoke about community participation and other aspects of water management and planning. M.S. Rathore stressed the need for changes in water management by generating awareness and developing technologies to cope with growing water requirement. Water being common pool resource should be better managed by the community rather than by individuals or government. Paradoxically, while overexploitation is gripping parts of the country, in the flat lands of Bihar canal irrigation has caused water table rise and water logging, with groundwater polluted from agricultural chemicals. D.P. Mishra felt tanks were the most suitable in such terrains for irrigation. Groundwater should be conserved for drinking water only. Dr. Hire Gowda of K.R. Patil Krishi Vigyan Kendra described how mobilizing community participation succeeded in construction of arm ponds and check dams, recharging bore wells and desilting stream beds in drought prone Gadag district, assuring at least one crop in a year. This presented a model of water management in black cotton soil areas. S. Viswanath mooted integrated water management institution in urban areas covering all sources of water like rainwater, waste water, and surface water, bore well water and dug well waters. Sustainable water management in metropolitan cities necessitates roof top rainwater harvesting and harnessing the recharged phreatic waters. A.R. Khan advocated popularizing simple recharge techniques through print and electronic media.

Shri Rajendra Sing emphasized that modern wisdom with time tested experience holds key to the solution of water management problems. He urged the people to understand the rhythm of water; where water is stagnant, allow it to flow and where it flows, allow it to flow slowly and percolate, and eliminating evaporation loss. With this realization groundwater augmentation was possible in 1058 villages in Rajasthan through revival of traditional water harvesting systems using indigenous knowledge, and the dying Arvari River was rejuvenated. Selection of site where with minimum efforts and cost, maximum water can be harvested, is central to rainwater harvesting. He explained the structure and role of Arvari Parliament to manage the newly created resource. Revival of this community-driven decentralized management is the only solution to droughts and floods. He cautioned that water should be subjected to reckless commercial utilization or mining.

On 30.04.2007 twenty three technical papers were presented in three sessions chaired by Y. Lingraju, S.Das

and T.M. Hunse respectively. K.C.B. Raju in his address dwelt on how unscientific demand-driven development and misuse of groundwater led to its overexploitation affecting agricultural economy, socio-economic condition of farmers and availability of drinking water. In his view sustainability and equity requires Water Resources be declared as National Asset. T.N. Venugopa and S.N. Nagaraj Sharma warned that continued exploitation of groundwater by drilling deep bore wells in Karnataka has resulted in drying up of wells down to even 300m depth. N. Varadaraj, G. Sudarsan, B. Shaji and others analyzed the alarming groundwater situation in Tamil Nadu, Andhra Pradesh and Kerala, where groundwater development has reached 85%, 70% and 47% respectively. All speakers recommended rainwater harvesting and artificial recharge to replenish groundwater and to protect ground water quality. M. Prithviraj dwelt on the dismal water management scenario in the country consequent on ever increasing development needs and uncontrolled utilization of water resources. He outlined the programs of the Department of Science and Technology for research and training to cope with the problems of water management. The complexity of hard rocks demands multi disciplinary approach in groundwater targeting and management. This is revealed by several case studies like integrated morphometric and geological analysis based on satellite imageries and GIS to assess groundwater prospects in Tarchella water shed (K. Rajaram and M. Najeeb), conjunctive use investigations aided by mathematical modeling in Ghataprabha canal command (M. C. Reddy), and development of Decision Support Tool by Indo-French Center for groundwater research (NGRI, Shakeel Ahmed). Interesting case studies were presented on site specific designs of rainwater harvesting and artificial recharge structures (K. Dwarkanath, M.A. Farooqi and K. Sooryanarayana) and on importance of desilting tanks to improve recharge (Y. Lingaraju and U.M. Bagari). Premji Antala spoke about the technology of dug well recharge. M. Shekar and Y. Javed in a significant study analyzed complex climatic and anthropogenic controls on groundwater discharges in Kabini river basin. M.V. Shashireka presented the groundwater quality scenario in Karnataka. Groundwater quality reportedly deteriorated due to over exploitation, contamination from untreated sewage or industrial effluents and use of chemical fertilizers, as also due to drainage congestion in irrigation projects. Speakers discussed about nitrate pollution of shallow groundwater and fluoride pollution of bore well waters in Karnataka (J. M. Neelakantarama, K. Kumaresan and S.S. Hegde). N.J. Pawar et al. presented an innovative method of multi-parametric coding system for delineating groundwater

contamination zones in Pimpri Chinchwad Municipal Corporation area. S. Chidambaram analyzed the effects of secondary leaching, saline water intrusion and anthropogenic influence on groundwater quality in Gadilam river basin. Reuse of treated waste waters in fish farming and irrigation was discussed by V. Sreekrishna and others.

In the concluding session L. C. Jain, former Member of the Planning Commission spoke at length about rural development planning, of which water is a key input. He was of the view that village development plans should be invariably based on technical information combined with indigenous knowledge of soil, crop and water. Development should not tamper with natural flow of water. Equipped with GIS scientists should assist Panchayats to prepare area development plans. He spoke about relevance of village plans for economic development and social justice.

The recommendations of the seminar highlight the issues of harmonious development, conservation and augmentation of groundwater, S & T inputs in groundwater management, rainwater harvesting, conjunctive use, village level integrated multidisciplinary surveys merging science with indigenous knowledge, equity and sustainability of the resource and community participation. The seminar successfully brought leaders of NGOs, and water managers at grass root level face to face with scientists, technologists, economists in iterative sessions on how modern science and technology can address the needs and aspiration of the people for mitigation of water crisis.

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FLOW STRATIGRAPHY OF DECCAN TRAPS IN KARNATAKA*

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EXTENDED ABSTRACT

Subsequent to the cessation of sedimentation in the continental interior basins of varying dimensions at the end of Neoproterozoic era, the Deccan Plateau segment in the Indian Peninsular Shield, witnessed a prolonged respite in geological events. A quiescence of such longevity was complemented by a chain of events triggering one of the most prolific effusions of basaltic rocks lasting over a period of 5 million years during the late Cretaceous – early Paleocene epoch. The early flows rapidly obliterated and concealed the pre-trappean landscape with the later ones, by and large serially occupying the already leveled up grounds.

Southern central segment of the Deccan Trap occupies the major part of the northern districts of Karnataka with a 28,000 sq km spread. This segment of basaltic country forms a relatively low lying undulatory terrain, where isolated small outliers of trap spread over the sedimentary sequence of Purana basins and peneplaned gneissic complex. On the western side, it forms Sahyadri ranges where as on the eastern side with a gentle gradient, the basalts are in contact with granitoids of Hyderabad Table land. A gradual rise in

elevation is seen from east to west upto Nipani hill ranges in the western part of the Belgaum district. Northeast of Gulbarga town and north of Mullamari River, a steep rise in elevation gives rise to Bidar Table land, covered by a thick zone of laterite.

A cursory look at the voluminous literature available on Deccan Trap shows that the lithostratigraphy of the flows is one of the least discussed domains. Beane et al (1986) have provided a well accepted lithostratigraphic classification for the entire basaltic province of Deccan assigning a 'Group' status with 3 subgroups and numerous formations. Formations were further divided as Members and Chemical types. Major and trace element geochemistry supported by textural and petrographic characters and Sr isotopes ratio were the critical factors which determined their divisions into Members. In that scheme of classification, flow sequence of Karnataka is considered to belong to the uppermost War Subgroup with three Formations viz Poladpur, Ambanelli and Mahabaleshwar in the ascending order.

In the northeastern sector of Karnataka, Mitchell

*Gist of the lecture delivered on 28th March 2007 at the Geological Society of India, Bangalore