

URBAN GROUNDWATER MANAGEMENT

The editorial article, "Rain Water Harvesting" by Dr. B.P. Radhakrishna (Jour. Geol. Soc. India, v.50, Sept. 1997) was a thought-provoking one meant to highlight the untapped and vast potential of rain water resource. This topic has been taken up by L.C. Curtis in his paper "Rain Water Harvesting – A Possible Seasonal Addition to Bangalore Water Supply" (Jour. Geol. Soc. India, v.51, April 1998) which discusses the basic requirements for adopting the technique to augment the city's water supply. The present article is a follow-up on the subject in order to outline the water problems of urban areas and their management.

The fast pace of urbanisation, a direct consequence of population growth, is exerting tremendous pressure on our land and water resources. Given the present trend of development, by the early 21st century, the half of humanity will live in urban areas and there will be 20 megacities around the world with a population of more than 10 million, including the Indian metropolises of Calcutta, Mumbai and Delhi. Cities are fast becoming a vast concrete jungle where the ecosystem is highly artificial and over-exploited. Unscientific and haphazard development of urban areas is causing irreparable damage to our groundwater resources which could lead to major water crises in the near future.

Vital facts regarding the urban areas are:

- There is little area in the cities or large towns, which is free from either building or some sort of solid cover.
- Natural drainage of the land in the cities is either partly filled up or choked.
- As more and more concrete structures come up, the green cover of the urban areas is being progressively reduced.
- Due to the pressure on land, even wet and low-lying areas that are vital for drainage of the land are being utilised for constructional purposes.
- Groundwater is being tapped in an indiscriminate fashion through bore/tube wells.

The following are the natural consequences of the damages caused to the urban water systems.

- There is very little groundwater recharge in urban areas since bulk of the rain water cannot seep into the predominantly sealed ground and there is considerable surface run off. This leads to a shortage of ground water during the summer time.
- Groundwater levels decline considerably due to excessive draft through bore/tube wells.
- Water logging is common in city areas since the natural conduits of water movement are non-existent or choked.

Major Indian cities such as Delhi, Mumbai, Calcutta and Chennai are experiencing decline in the ground water levels, water logging after even minor showers and drying up of water sources during summer time.

Control Measures for Urban Groundwater Management

A comprehensive land and water management policy for the urban areas involving city planners, earth scientists, land use experts, environmentalists and the general public is urgently needed to avert or minimise major water crises in the future. The following steps could facilitate this:

A. Preparation of a vulnerability map of urban areas for checking over development: Urban planners should carry out a developmental impact assessment of the cities and classify land based on their degree of development. Fully developed and overdeveloped areas should be demarcated as sensitive zones where further developmental activity of any sort should be banned.

B. Rejuvenation of natural drainage systems: A healthy drainage net work ensures smooth operation of water cycle in an area and hence revitalisation of both existing and defunct drainage systems is needed on an urgent basis in the urban areas. Desiltation and cleaning up of lakes, streams and tanks coupled with the creation of new water infiltration structures such as recharge wells and water collection basins will in a large way solve many water problems of cities.

C. Preservation of wet and low-lying lands: Wet and low-lying lands act like giant sponges in holding huge quantities of rain water and are equally important in the drainage of land. They recharge the ground water and also prevent floods. These areas should be clearly demarcated and declared as environmentally fragile zones that need to be preserved at all costs.

D. Rain water harvesting: As the Biblical saying goes, "The harvest is truly plenteous, but the labourers are few", we have to realise the potential of rain water as a cheap and renewable resource.

Rain water falling on a square kilometre of land area in one year, if properly utilised, will make significant changes in the water budget of a region and augment the water supply systems. Most of the city planners of the past had the vision to construct large tanks to collect and store rain water but which now lie in a state of neglect. Giving life to these apart from constructing new and cheap rain water harvesting structures can yield huge benefits. The Central Ground Water Board is taking a lead role in popularising roof top rain water harvesting methods in Delhi and its suburbs. Public participation is as important as government initiatives in the implementation of this. Building codes of cities need revision to make this mandatory for all new constructions. Construction of various rain water harvesting structures in public places such as parks and zoos could enthuse the public.

E. Water pricing: The fact that water is the cheapest commodity in India has made people treat this valuable resource in a casual way thereby leading to considerable wastage. Water should be priced suitably to compel the public to realise its value and to conserve it. The Central Ground Water Authority's move to give licenses to private bore well construction units is a step in the right direction but more control on the number, density and depth of the wells actually drilled is necessary.

F. Mass contact programmes to educate the public: Public participation is at the root of success of any policy and hence proper coordination between government departments involved in water resources management, NGO groups and the public is also a great need. Proper information and education should be imparted to the people about the necessity for ground water management.

G. Awards/incentives for optimal utilisation of water: Instituting awards for innovative, practical and optimal methods of water use should encourage the public to practice water management.