URBAN WATER SUPPLY - A MAJOR CAHALLENGE TO INDIA

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ABSSTRACT

Water is the prime requisite of all the developmental activities. Ever since pre-historic period man has been exploiting water resources uninterruptedly for their requirement. Indiscriminate use of water has created an imbalance in the environment. Large scale migration leads to over crowding of cities and growth of slumps. Presently, nearly 25% of the total population of the country is residing in urban areas. Marked growth of urban population is a common phenomenon. Consequently, large scale exploitation of water resources has taken place during the post independence period to meet the drinking water need in urban areas of the country. The drinking water need is mostly met through ground water on account of easy accessibility, dependability and comparatively lower cost of exploitation . Ground water sources is under severe stress in almost every town of the country which is reflected through continuous lowering of the water table. More so, man's intervention with the nature has resulted in environmental degradation, pollution of water resources, both ground water as well as surface water. The studies carried out by the World Bank indicate that most of the diseases are in some or from related to poor quality of water in use for human consumption.

The management and conservation of water resources to be given a serious thought. The timely action is warranted in this regard, otherwise, the day is not far off when the human being will have to depend upon rationed supply of water. The use of polluted water may result in serious health hazard.

1.0 INTRODUCTION

The ground water is the vital and sustainable source for various usage. Management of Ground Water resources is a major emerging challenge for India. Pollution control, overdrawal, artificial recharge are few issues related to management which require broad based approach to ground water management. The recent trend in ground water management specially in urban areas have focused on supply side solution that is artificial recharge.

The Private sector has played the key role in ground water development uninterruptedly and are likely to play prominent role in future as well. Constitutionally the ground water is a state responsibility. But being a natural asset, the Central Government's role is inevitable to conserve & manage the vital resource for the development purpose. Time has come to introduce ground

water legislation uniformly over the entire country, otherwise indiscriminate utilisation of Ground water may lead to crisis in many parts of the country.

2.0 A CASE HISTORY OF HYDROGEOLOGICAL SET UP IN PATNA TOWNSHIP

The township of Patna, a historic township is the oldest system of civilization of the country, which had ever been depending upon ground water alone for drinking needs. The urban population of Patna has shown unprecedented growth rate of 6.5 % between 1971 and 1991 with a total population of 1.4 million in 1991. The projected population for Patna Township is 2.5 million in the year 2001. Nature has endowed excellent ground water repository containing fresh and potable ground water to this township. The Exploratory work has indicated presence of thick pile of quaternary sands (more than 400 m thick) deposit by mighty river Ganga and its tributary Sone in the area under a thick clay layer (30 to 50 m in thickness) The thickness of aquifer material within 200 m depth from the ground is more than 100 m. The ground water occurs under confined conditions having the piezometric surface resting at a depth ranging between 4 and 8 m below ground.

Maitra and Ghosh after analysing more than 100 bore hole data of Patna town concluded presence of clay layer with intermittent sandy horizon within a depth of 60 m below the ground and there after continuous sandy horizon below. Two aquifer groups were identified. The first aquifer lies within the depth of 60m from the ground while second aquifer commences below the depth of 90m. which is extensive and continuous. The studies reveal that the deeper aquifer does not manifest in vertical leakage or delayed yield phenomenon.

The pumping test results conducted by CGWB in Patna have shown that the transmissivity value of deeper aquifer range between 4000 to 6000 m^2/day over Patna area and it gradually increases westwards in Danapur Cantt. area. The tube well taping 40 to 60 m of aquifer material are capable of yielding 180 to 250 m^3/hr fresh ground water at a draw down of 2 to 4 m.

The estimated annual recharge ground water for the Patna Township area is 200 million cubic metre while the present annual utilisation is of the order of 150 million cubic metre. The heavy withdrawal of water from the ground storage is going on over the entire Patna urban area. No long-term record of the piezometric surface is available for general decline in piezometric surface is reported.

Keeping in view the heavy withdrawal and future demand of water for drinking purposes in Patna urban area needs a careful monitoring of hydrogeological regime and management of precious ground water resource.

3.0 A CASE HISTRORY OF URBAN WATER SUPPLY TO LUCKNOW

The Lucknow town, Capital of Uttarpradesh has recorded extensive growth. The township is underlain by thick pile of alluvial sediments. The exploratory work has indicated presence of three to four aquifer group down to a depth of 500 m from the ground. The first aquifer lies

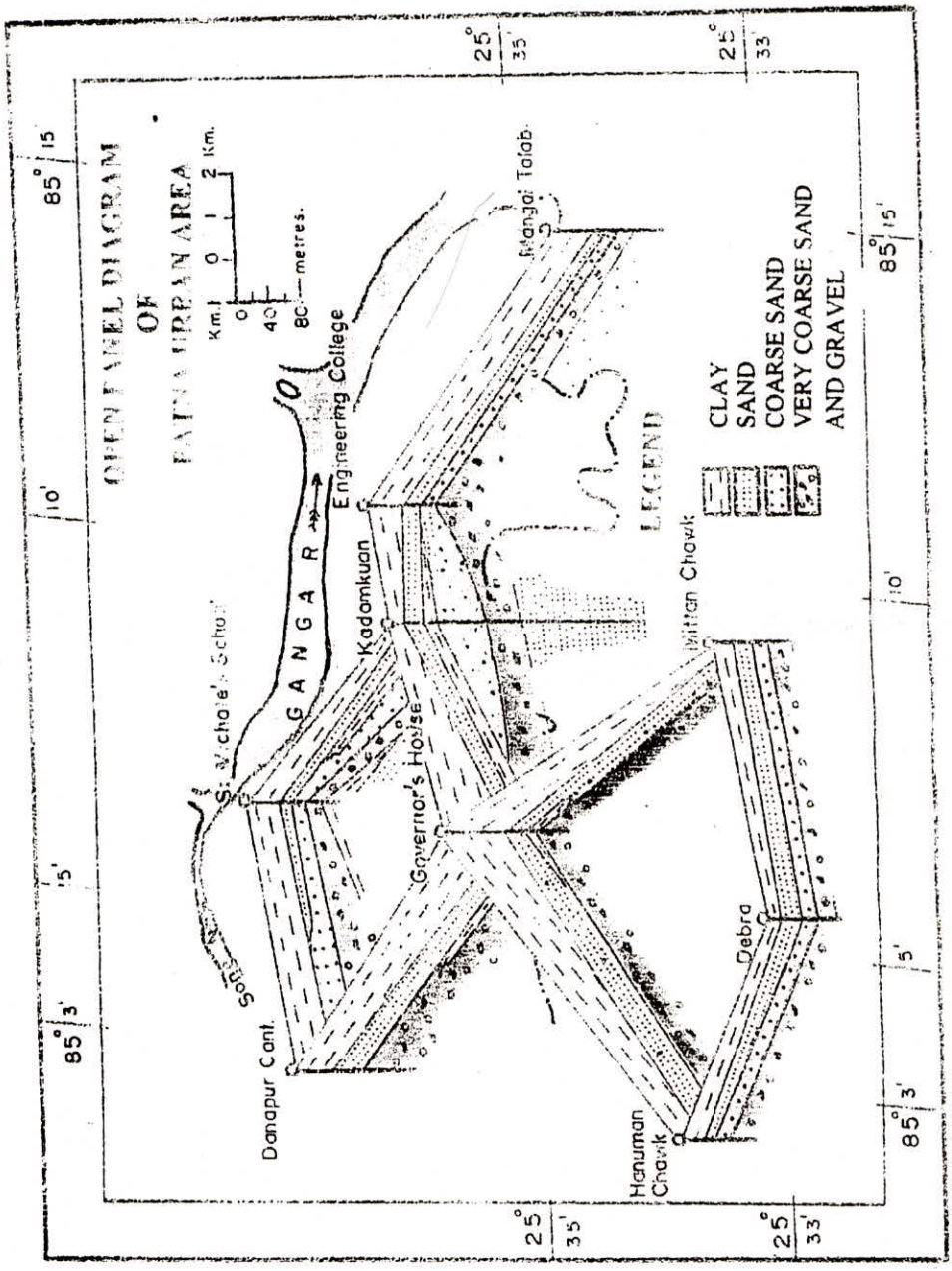

Fig. 1

within 50 m depth from the ground which consists thin silt/fine sand lenses embedded in clays. The second aquifer group lies between 80 to 150 m depth from the ground which is quite extensive and most potential aquifer group over the township. The third aquifer occurs between the depth range between 200 and 300 m, while the fourth aquifer group occurs below the depth

of 400 m from the ground. Trivedi etal, based on resistivity survey around Lucknow town, have identified presence of aquifer having poor quality of ground water at different depth.

LOCATION	POOR QUALITY AQUIFER Depth Range (m)
Alambagh	202-228
Distt. Jail	185-228
Indira Nagar	150-220
Raj Bhawan	132-202
Lucknow University	105-148
Chin Hat	140-177

Heavy withdrawal of water in Lucknow township area have resulted in continuous decline of water level. The long term record at Aminabad indicates depletion of storage to a tune of 8 m during past 10 years. The situation is quite alarming. The other problem which the township is facing is contamination of shallow aquifer on account of poor sanitary system of the old township. The township is facing acute drinking water problem which requires management of the resources for optimal utilisation. The deeper aquifer needs to be explored. Huge amount of rain water is being wasted, needs to be harvested through suitable structures. Artificial recharge to ground water has got to be looked into.

4.0 WATER & SUSTAINABLE URBAN DEVELOPMENT

The continuous growth of urban population over the country indicate that by the end of present century nearly half of country's population will start living in towns. The gap between the demand and supply is continuously widening. Rapid urbanisation and industrial growth is likely to put heavy stress on ground water resources and create environmental hazard. Special attention is needed to the future problems.

Following activities need to be implemented in this regard.

1. Protection & conservation..
2. Efficient & equitable allocation of Water.
3. Creation of public awareness and participation.
4. Institutional/Legal/Management reforms.
5. Artificial recharge and rain water harvesting.
6. Improvement of sanitary system.

Location	: AMINABAD	Well No.	: LKO10
District	: LUCKNOW	Depth of Well	: 21.00 m
State/Ut	: U.P.	Type of Well	: DUG
Trend	: -11.91m	Mean	: 12.13 m
Best Fit	: Y = -0.046 + 1.24	Period	: 1977-1999

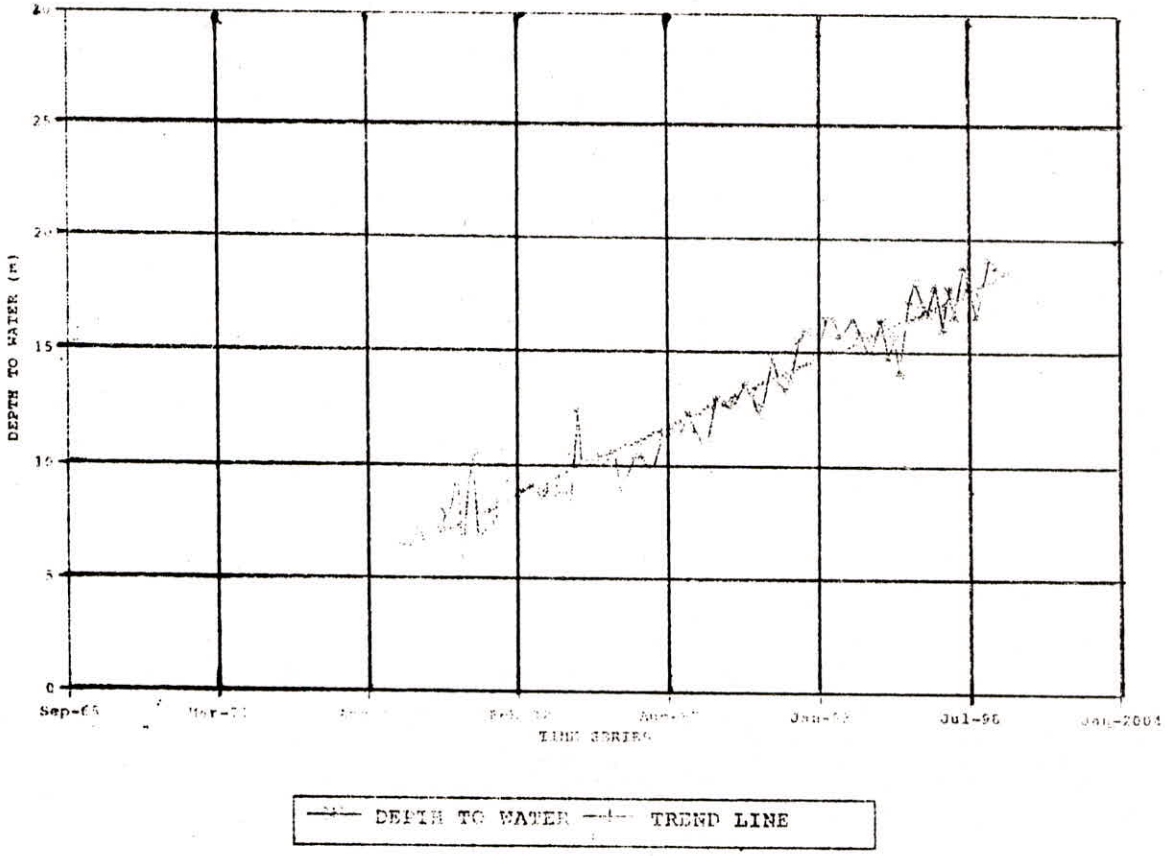

Fig. 2

With the rapid growth of urban population and increased demand for safe drinking water, the critical role played by local Municipal Authorities, managing the supply of Drinking water, is of utmost importance.. Experience in the country is that the ground water is being exploited indiscriminately resulting in over drawal and contamination. It is essential to estimate precisely the resource availability and plan the developmental activities accordingly so that over exploitation does not have an adverse impact on the ground water repository. In case it is difficult to meet the requirement of water through existing resources, conservation practice need to be adopted.

An efficient and equitable allocation of water resources has to be worked out. In order to protect and conserve the ground water. Introduction of Water Tariff at a higher rate may be introduced. The re-cycled sewage water after treatment may be used in urban areas for other purposes except for drinking.

The reorganisation of institutions engaged in water supply is needed. Legal actions need to be taken for misuse of precious resource. This could be achieved only by promoting public awareness and participation of the public in managing, protecting and using the water resources.

Drying up of stream, depletion of ground water storage, contamination of surface/sub surface water are common feature. Poor management of water resources is responsible to a great extent for water scarcity. In present scenario where the surface/ground water sources are limited and there is heavy stress on ground water, the rain water harvesting is an effective tool to be utilised. Huge quantity of rain water is going waste every year which needs to be conserved/stored in surface or subsurface structure for the optimal benefit of human kind. With the unscrupulous development of ground water, the traditional rain water harvesting structure have lost the importance and practically vanished. It is essential to revive these traditional system coupled with the knowledge of modern technology to supplement the drinking water need. To achieve the goal it is essential to seek active participation of people.

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