Arghyam's Inputs to the Pre-Budget Consultation of the Finance Minister with Social Sector related groups 4 January, 2013

Launch a Research Initiative to Mainstream Groundwater into Urban Water Supply

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Integrate participatory groundwater management principles into watershed development



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1. Launch a Research Initiative to Mainstream Groundwater into Urban Water Supply

Universal provision of clean water to all of India's cities and towns is not feasible without adequate policy attention directed towards the sources of water. Groundwater has been and will remain an essential source of urban water supply, especially in smaller cities and towns. Surface water is an increasingly scarce and expensive resource and cannot be solely relied upon to service urban India and can exacerbate rural problems if promoted unchecked.

In the long run, it is paramount that **groundwater be mainstreamed into urban water supply planning and policies**. Today, however, there is insufficient knowledge to effectively tackle the twin problems of overexploitation and contamination that plague urban groundwater. There is insufficient data and research to formulate sound policies that can incorporate groundwater sustainably and safely into drinking water supplies in cities.

It is proposed that in the Union Budget of 2013-14, the Government of India launch an **Urban Groundwater Research Initiative** with an allocation of **Rs. 50 crores** spent over three years, with a mandate of knowledge creation in the sector. Existing groundwater usage, its potential in augmenting other sources, the role of urban water bodies in groundwater recharge, and the nexus between sanitation and groundwater all need to be understood much better than they are today. A commitment to high quality research through partnerships with premier research institutions and competitive grants are necessary for robust policy formulation on urban groundwater. This will be a small investment that adds to the water security of India's towns and cities.

BACKGROUND

In a rapidly urbanizing India, the provision of universal cover of water and sanitation requires a significant investment of financial, political, scientific and human capital. The High Powered Expert Committee on Indian Urban Infrastructure and Services estimates that Rs. 40,000 crore will have to be spent every year for the next 20 years on urban water and sanitation to eliminate the infrastructure deficit. This comes at a time when the Kelkar Committee report¹ warns of an impending fiscal precipice, calling for an additional saving of Rs. 20,000 crore under Plan Expenditure. Investment estimates for water supply infrastructure are mostly based on surface source calculations, and the incorporation of local groundwater sources could potentially reduce the level of capital investment required in the long run.

Meanwhile, the reality is that a large fraction of urban water needs are met by groundwater. According to the 2011 census, 27 per cent of urban Indian households continue to obtain water from wells, bore wells and hand-pumps – all dependent on groundwater. Apart from private use, groundwater also forms an essential part of the municipal supply of piped water. In 1999, 8 million+ cities and over half the Class I and Class II towns surveyed were dependent on groundwater as a primary source of drinking water.² In 2009, 75 of Karnataka's 216 urban local bodies depended groundwater as the primary source as well.³ 11 out of 71 cities surveyed by the Centre for Science and Environment in 2012 depend almost exclusively on groundwater for public water supply.⁴ It is therefore imperative to acknowledge and mainstream groundwater into urban water supply.

Almost all new projects that are sanctioned for supplying drinking water to cities consider only surface water sources. Large capital investments and significant recurring expenditure are necessary as surface sources can be very far from city limits. The city of Bangalore, for example, draws 900 million litres of water a day (MLD) from the river Kaveri about a 100 km away and 500 metres below the city. Surface water sources are also heavily contested – where the agricultural, industrial, rural and urban domestic

¹ Report of the Committee on the Roadmap for Fiscal Consolidation:

http://finmin.nic.in/reports/Kelkar_Committee_Report.pdf

 ² Status of Water Supply, Sanitation and Solid Waste Management in Urban Areas, NIUA & CPHEEO (2005) <u>http://www.niua.org/Publications/research_studies/Water_supply/status_ws_sew_swm_report.pdf</u>
 ³ Urban Development Policy 2009, Government of Karnataka <u>http://www.indiawaterportal.org/node/11167</u>

⁴ Excreta Matters, Centre for Science and Environment, New Delhi (2012)

needs compete with each other for a scarce resource. It may be prudent for smaller cities to invest in groundwater management for water supply to avoid these pitfalls of accessing distant water sources.

Broadly, urban groundwater is afflicted by the twin problems of overexploitation and contamination by untreated wastes. Current knowledge of urban hydrogeology is insufficient to solve them. While metropolitan cities may have extremely contaminated and depleted groundwater reserves, smaller cities and towns present an opportunity as the problems are less entrenched and more easily reversible, thus offering alternate paths for sustainable urban water supply provision.

City centres can be places with high, if contaminated groundwater tables. The ground can also provide a natural filtration service, capable of removing bacterial contamination. An Arghyam supported study conducted by IISc where a dense network of wells was monitored for quality and quantity found the above to be the case in a small town (Mulbagal) in Karnataka.⁵

While groundwater continues to be an important source of water supply in Indian cities, we still lack sufficient knowledge for making sound policies on its use. Urban groundwater has received policy attention thus far on two promising fronts: in rainwater harvesting mandates in several cities, and model groundwater legislations that are currently in various stages of realization across the country.

The Central Ground Water Board has but 1-2 groundwater monitoring stations in most cities. The Central Pollution Control Board maintains only 490 groundwater quality monitoring stations across the country. This remains inadequate for robust decision-making on urban groundwater.

Four of the Working Groups set up by the Planning Commission to develop the 12th Five YearPlan have taken cognizance of the importance of ground water for urban water supply intheir reports. These are:Environmental Sustainability of Indian Cities;
Urban, Industrial Water Supply and Sanitation;
Water Database Development and Management; and
Sustainable Groundwater Management Working Groups.The proposed initiative is in agreement with the broad principles of the recommendations of
the Working Groups.

⁵ Nadhamuni, S. An Approach to Integrated Urban Water Management (IUWM): The Mulbagal Experience, Arghyam, Bangalore (2012)

THE URBAN GROUNDWATER RESEARCH INITIATIVE

Studies to date have shed some light on the prevalence, necessity and potential of using groundwater for urban water supply, but far from enough. With a long-term aim of mainstreaming groundwater into urban water supply, it is proposed that a beginning be made by fostering knowledge creation and the promotion of better public understanding by launching an *Urban Groundwater Research Initiative*, with the following mandate:

- Assessment of the extent of urban groundwater usage, including public and private extraction and use.
- Commissioning of comprehensive studies on urban hydrogeology including on ground water levels, quantity and quality along with estimations of the potential for sustainable use for urban water supply, including the connection with sanitation.
- Development of monitoring wells at the ward-level in towns and cities and the metering of public wells and bore wells.
- Protection of urban water bodies including lakes and traditional water structures.
- Development of strategies to recharge aquifers through lakes, storm water systems and rainwater harvesting.

The Urban Groundwater Research Initiative could be placed under one of the following agencies:

- a) The **Central Public Health and Environmental Engineering Organisation (CPHEEO)**, which has played a significant role in understanding urban groundwater to date.
- b) The **Science and Engineering Research Board (SERB)**, which has been set up as an autonomous body for promoting advanced scientific research.
- c) The **Central Ground Water Board (CGWB)**, the premier government authority on groundwater in India.

The selected nodal agency should be empowered to execute the research initiative by entering into collaborations with premier research institutions in India of national and international repute, by administering competitive research grants to research groups and working with individual cities where the projects will take place. A preliminary budget is suggested below, spread over 3 years between 2013-14 and 2015-16:

Theme	Project s	Unit Cost	Total
 <u>Urban Groundwater Research Grants on:</u> Understanding public and private groundwater use – across the country; Within cities; amongst various user groups Explore nexus between groundwater quality and sanitation practices Develop safe treatment options for groundwater use Examine the potential for groundwater sustainably augmenting surface-based sources of water. 	20	Rs. 25 lakhs	Rs. 5 crores
3-year, high-density monitoring urban groundwater levels and quality of select towns and small cities – across hydro- geological regimes	10	Rs. 150 lakhs ⁶	Rs. 15 crores
Revival of urban water bodies including lakes and traditional water bodies and investigation of their potential for recharge	10	Rs. 300 Iakhs ⁷	Rs. 30 crores
Total	40		Rs.50 crores

With the stated goal of knowledge creation, the proposed initiative will have difficulty achieving success without the involvement and sharing of expertise of all relevant stakeholders – at the central, state and city levels. At the centre, the ministries of urban development, water resources, housing and urban poverty alleviation can play an active role in shaping the groundwater agenda going forward. Apart from commissioning research studies, the nodal agency will have to actively advocate the research amongst various stakeholders and foster a strong knowledge culture on urban groundwater. The nodal agency may also need to augment its capacity and its understanding of urban groundwater to effectively execute the proposed initiative.

The regulated and sustainable use of groundwater in India's cities remains a long-term goal. The urban groundwater research initiative is but a small investment that can trigger a better understanding of the long-term role groundwater can play in providing safe and sufficient water to India's cities.

 ⁶ Costs will vary with city size, project length, and type of institutions entrusted with the research.
 ⁷ Costs will vary with size of lake or water body considered.

2. Integrate participatory groundwater management principles in watershed development

Groundwater is a complex resource that is put to numerous competing uses and encounters numerous associated problems. India needs a standard methodology to manage groundwater efficiently. It needs a methodology that learns from the aquifer mapping exercise, and mainstreams the aquifer based groundwater management principles in the watershed development discourse.

Experiences suggest that this initiative will require an additional monetary allocation Rs. 200-400/ha in addition to existing allocation of Rs. 12-15,000/ha for watershed development. Extrapolating this additional allocation for the whole country, the overall number comes to around Rs. **50 Crores/year**, beginning from FY 2013-14.

Watershed development programmes are implemented around the country with limited understanding of aquifers. Of late, the aquifer mapping exercise plans to inform the understanding around the GW and intends to evolve principles of managing groundwater efficiently.

Arghyam has supported 4 such pilots across different hydrogeological typologies. Preliminary evidences suggest that a additional investment of Rs. 200-400/ha in addition to an existing allocation of Rs. 10-15,000/ha improves the efficiency of the watershed development programmes substantially.

This improved recharge of watershed structures results into supply augmentation and in turn helps to address drinking water security. The set of principles guiding the overall implementation is referred to as "participatory groundwater management (PGWM)" principles. The additional investment would help in implementing following value added services:

- **1.** Development a cadre of barefoot hydrogeologists to support decentralised collection of groundwater data.
- 2. Map the aquifers and help in the subsequent management of aquifers.
- **3.** Augmenting the supply of groundwater sources with a strong focus on drinking water.
- 4. Mobilizing the community and developing social regulations to manage demand.

Ms. Rohini Nilekani, Chairperson, Arghyam provided the following inputs to a pre-budget consultation of the Finance Minister with social sector representatives on 4th January, 2013.

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