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Extended Abstract

“Implementing Integrated Urban Water Management in India”

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India is rapidly urbanizing. The number of towns in the country has grown from 1827 in 1901 to 5161 in 2001. However, urban water in India is plagued by varied issues – environmental issues like declining ground water levels and deterioration of water quality; social issues like the lack of awareness among citizens about proper waste disposal methods; governance issues like unplanned ad-hoc investments in increased coverage of water supply infrastructure; and, technical issues like leakage and irregular monitoring of water quality. However, there is a *lack* of credible *databases* to take holistic decisions. Further, water law in India suffers from a few grey areas ranging from questions on the ownership of water to questions on how the Indian constitution deals with the right to water. A cursory review of smaller towns in India reveals that the status of water supply and sanitation in such towns is dismal and the revenue receipts from municipal water services is also low. Current investments in water & sanitation are not adequate and town administrations are unable to spend the funds allocated to them, resulting in fragmented infrastructure growth. In addition to this, urban population is expected to grow by 17% by 2011. This is expected to severely burden the existing water infrastructure. There is also, hardly any *community involvement* in maintaining local water resources. Government effort at managing water too is fragmented due to a *multitude of departments* with overlapping responsibilities created for managing various components of the water cycle. There is therefore a need to manage water differently in these smaller towns in India.

Arghyam is a public charitable trust, supported by an endowment from Rohini Nilekani, which has been working in the water sector since 2005. In April 2007, Arghyam organized its Second Annual Conference on Urban Water. Based on a detailed study of the issues being faced in this sector, Arghyam conceptualized its Urban Water Initiative in which it proposed to use a framework called IUWM (Integrated Urban Water Management) to try and find practical & implementable solutions to water problems in Indian small towns.

IUWM rests on the four pillars of sustainability; environmental, financial (economic), technical and institutional, as well as the additional pillar of social equity. It is based on the principles of equitable, efficient water-related services for all, sustainable management of water resources, active demand management & conservation, *people-centered* governance according to the principle of subsidiarity, *data-driven decision making* and establishment of appropriate, accountable institutions. It looks at the town's water scenario in its totality, spanning the urban water cycle from *source to sink* and comprising all components in the cycle including water resource, supplies, urban drainage, sanitation, underground drainage & wastewater treatment. In addition, it intends to provide all stakeholders with a vision, framework, and comprehensive set of practical actions to enable the holistic, sustainable equitable and optimal management of available water resources.

The pilot implementation of Arghyam's IUWM programme is expected to take 3 years and consists of five stages – the pre-planning stage consisting of the identification of the pilot town and finalization of the coordination committees (so as to initiate *institutional mobilization* processes from the beginning of the project) ; the foundational stage consisting of base-line studies and a series of community mobilization activities(so as to facilitate *citizen involvement* early-on); the base-line studies (to enable *data-driven* decision making) shall be used to understand the current water resource, supply & end user situation in the pilot town; this foundational stage would be followed by the participatory visioning exercise (PVE); the outputs of the baseline studies and the PVE would be used to carry out a gap analysis and finally a tool called WEAP shall be used to model the dynamics of the water situation in the town. Based on this model, the interventions required for IUWM implementation will be designed; the interventions would then be implemented followed by sustained data-driven O&M activities, institutional strengthening and community involvement in all aspects of service delivery.

Arghyam has followed a rigorous process in finalizing the town for pilot implementation of IUWM. From an initial shortlist of 224 towns in Karnataka, it has finally zeroed down on Mulbagal, as it is characteristically representative of most towns in Karnataka. Mulbagal is a town municipal council in Kolar district.

The institutional structure for the project includes state level and district level committees consisting of officials from varied government departments. It also includes all IUWM partners who have a stake in various activities within the implementation process. These activities range from conduction of base-line studies (IISc and consultancy organizations), community mobilization (Myrada) and so on. A public support unit (PSU) consisting of technical experts has been created as an attachment to the TMC to satisfactorily coordinate implementation issues. In addition to this, ward level informal Sanghas headed by the local councilor have been created to bring the citizen's perspective to the town's water management plans.

The results of various base-line studies with interesting findings have started pouring in. Groundwater tests were carried out by IISc to assess the behavior of the groundwater system in Mulbagal and to develop models that would be used as diagnostic tools for current and future assessments. These tests reveal that the town is heavily dependent on groundwater. The water levels are shallow in most of the wells. The water level rises during the monsoon period (July to November) and declines during the non-monsoon period. However, the rise in groundwater levels during the monsoon period demonstrates wide spatial variability due to a range of reasons ranging from the presence of geological structural controls in various sections of the town to complex recharge behavior from sewage leaks, rain-water and tanks. In addition to this, the studies reveal that groundwater levels at higher topographies are shallow, in sharp contrast to classical groundwater behavior.

Water quality tests were carried out by IISc to identify potential water quality problem at the drinking water supply sources in Mulbagal. These tests reveal that the water in a large number of Mulbagal wells contain undesirable levels of sulfates, iron, chlorides, zinc, magnesium and aluminum and un-permissible levels of nitrates, E-coli, T-coli and selenium.

Energy audits of the town's water supply system were carried to understand how to maximize the amount of water that can be generated for the town's consumption at optimal efficiency. The audits indicate that more than 94 pc of the total operational expenditure of the five water pumping systems in Mulbagal is towards electricity charges. This is because the pumps operate at a low power factor and the town ends up paying a large demand penalty. In addition to this, not only are a few bore-well pumps across pumping stations dis-functional, the over-all operating efficiency across stations is also low. This situation is likely to worsen as electricity charges are likely increase in the near future.

The household level base-line study carried out by Myrada to understand water supply and sanitation issues from a citizen's perspective, reveals that water distribution varies across wards, with wards having slum-like conditions receiving lower volumes of water. Demand analysis, carried out based on this survey, reveal that wards with higher per-capita water consumption feel less satisfied with the adequacy of their water supply whereas wards with lower per-capita consumption feel that the volume of water supplied to their wards is adequate.

The findings of these tests therefore question the viability of existing water management practices in Mulbagal in providing "safe, sustainable water for all". The findings also set in context, the activities planned in Mulbagal in the coming months, in accordance with the principles of the IUWM framework. These activities include the participatory visioning exercise, the WEAP based modeling of the water situation in the town and continuous community mobilization activities.