



European  
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## Adopting Integrated Urban Water Management in Indian Cities (AdoptIUWM)

### SOLAPUR

#### About the Project

**European Commission** funded project on **Adopting Integrated Urban Water Management in Indian Cities (AdoptIUWM)** is being implemented by ICLEI South Asia in partnership with ICLEI European Secretariat and Association of Flemish Cities and Municipalities (VVSG). This 3.5 year project is being undertaken in 2 cities of Rajasthan (Jaisalmer & Kishangarh in Rajasthan) and 2 cities of Maharashtra (Solapur & Ichalkaranji). The aim of the project is to build the capacity of Indian Local Authorities to undertake water sector reforms through the adoption of Integrated Urban Water Management (IUWM) principles and practices in their planning and implementation processes.

#### About Solapur

Solapur, often referred as the “Manchester of India” has been traditionally renowned for its



#### Key Issues & Challenges

- High T&D losses to the tune of 40%
- High electricity costs due to pumping of water from 100 km
- Water scarcity during summers since Ujjani Dam is the only perennial source of water, but is also getting polluted
- Illegal water connections and multiple cross connections
- Water logging and sanitation issues in slum areas
- STP for the city is not functional
- Untreated sewage discharged into Shelgi Nallah which meets Sina River leading to pollution
- Extensive water losses: 3 TMC water released from Bhima River Scheme, only 0.02 TMC reaches the city.
- No reuse or recycling
- High consumption of groundwater by industrial areas
- Discharge of untreated domestic wastewater and industrial effluents into Shelgi nallah have even led to visual impacts of pollution near Sina River like foul odour, colour.

#### Some Direct Opportunities for Integration

- Treated wastewater from STP can be sold to industries at a lower rate. In order to improve quality of treated water, additional filtration can be undertaken to suit requirements of industries
- Diversification of water portfolio by including more local level water resources
- Retrofitting SUDS into the city fabric
- Possible aquifer recharge using treated wastewater
- Stone quarries around the city can be provided with infiltration trenches

textile industries (especially for its varied designs and quality of *chaddars* and towels) with the first industry being **established as early 1877**. Solapur is well connected to Pandharpur, and Tuljapur (important religious places of Maharashtra) and also to Pune, Hyderabad, Osmanabad and Madras. **The city is a centre for handlooms and power looms with nearly 6000 operational units with Solapur accounting for nearly 12.5%<sup>1</sup> of the total factories in Maharashtra.** Solapur serves as a **transport hub for connecting Maharashtra, Karnataka and Andhra Pradesh.** Agriculture is also an important economic activity. The city has 4 ponds within Municipal boundary and is dependent on Ujjani dam (100km) and Bhima River for its water supply.

The city presently has 98 wards divided into 8 zones including 13 villages. Solapur city has a total of 220<sup>2</sup> slums (158 notified and 62 un-notified<sup>3</sup>) spread across all the 8 zones.

Area	178.57 Sq. km.
Population (Census 2011)	9,51,558
Gross Population Density 2011	5345 persons / km
Slum Population (2011)	2,18,283 (22.9% of total)
Floating Population	19,450*
Projected Population (2041)	20,41,786
Sex Ratio	978
Overall Literacy Rate	82.80%

\*As per City Sanitation Plan, Solapur, 2011-2012

### Activities undertaken in Solapur

**Project activities were initiated in Solapur in May 2013** and the Municipal Corporation has **formed Core Team and Stakeholder Committee under the Project.** Solapur Municipal Corporation (SMC) has also passed a Council Resolution showing the commitment of the City Representatives towards the Project. Data collection activities and reconnaissance visit across all wards in the city were undertaken by Project team to understand the situation on ground.

The first **Stakeholder Workshop**, held in September 2013 in Solapur brought the stakeholders on one platform and introduced them to the need for an

<sup>1</sup> As per City Development Plan - Solapur, 2006

<sup>2</sup> As per Solapur Municipal Corporation

<sup>3</sup> As per City Sanitation Plan, Solapur, 2011-2012

integrated approach as a solution to the existing water woes. It came forth during the workshop that **the city acknowledges that there is need to regulate the high NRW losses (@40%) as leakage control is equivalent to tapping a new source. The city also faces water scarcity issues as Ujjani dam (100km) is the only perineal water source.**

A **Focus Group Discussion (FGD)** was conducted in the city to understand and map the urban water cycle (through spatial mapping exercise). Discussions on the Awareness generation Plan for Solapur and long-listing of potential pilot projects that can be taken up in Year 2 of the project were undertaken.



*Participants in Focus Group Discussion (FGD) discussing the need for awareness generation and capacity building in the city*

A **State Level Meeting** was organized to inform the State Government of the issues being faced by the city and the steps being planned under the project. This meeting held in January 2014 was chaired by **Deputy Secretary, Water Supply and Sanitation Department, Govt. of Maharashtra (WSSD, GoM) and attended by Undersecretary, WSSD, GoM as well the officials from SMC and Ichalkaranji Municipal Council.**



*State Level Meeting for AdoptIUWM Project held in Mumbai*

**One of the key outcomes of the State level meeting was the consensus on the need for forming a State level IUWM Committee.**

Recently, a **Water Quality Testing Workshop** was conducted in Solapur by ICLEI South Asia in partnership with Development Alternatives for hands on training in water quality monitoring. Engineers from SMC, local NGOs and Institutional representatives were trained to understand the significance of water quality parameters and how these can be monitored.

**A portable water quality testing kit was provided to the city under the project** which can be used by NGOs and Institutions to help SMC and citizens monitor water resources in and around the city.



*Stakeholders getting hand on experince in of Water Quality Testing*

The **second stakeholder workshop** would be conducted in Solapur in coming months to prepare a set of IUWM based Actions for the city and to finalize pilot project for implementation.

## Status of Services in Solapur

### Water Supply

Water is supplied to the city by **Solapur MC from three main sources - Ekrukhh Tank, Bhima River Scheme and Ujjani Scheme. Ekrukhh tank** is located 6km to the north of the city and has a capacity of 22.5 MLD reduced to 10 MLD due to developments upstream of the tank. Ekrukhh tank dries up during summer.

**Bhima River Scheme** has installed capacity of 108 MLD but only 40 to 45 MLD is available. Of the 3 TMC released from the scheme, only 0.02 MLD reaches Takli reservoir. Rest is taken up by farmers or is lost during the 15 day long travel.



*Ujjani Dam: Only perennial Source, water is shared with Pune and Pimpri Chinchwad*

**Ujjani Scheme** is designed to provide 80 MLD but only 50 to 60 MLD is available to SMC. Ujjani dam is located 100km from the city and hence, T&D losses and pumping costs are high.

During summers, the total available supply for the city comes down to around 80 MLD. During this lean period, SMC starts supplying water once in 3 days instead of once in 2 days

Total Water Supply to city	110 MLD*
Major Sources of Supply	Bhima & Ujjani Scheme
Per Capita Quantum of Water Supplied	116 lpcd (69 lpcd after T&D losses)
T&D Losses	40%
Total Water Connections	83936
% HHs with Connections	44.5%
Metering	338 connections Flat rate Tariff System
Water Treatment Plant	27.5 MLD Bhawani Peth on Ekrukhh Lake 108 MLD capacity at Bhima River (Used 40 to 50 MLD) 80MLD at Ujjani, 20 MLD from this goes to MIDC
Projected Water Demand for 2041 (135 lpcd and 20% T&D losses)	327 MLD

\* 110 MLD based on SMC discussions. Total water availability from all sources varies between 98 to 115.5 MLD

It is estimated that approximately 3-4.5 MLD is made available through groundwater resources. During summers, nearly 20% of the total 10,000 borewells become defunct.



Bheema River Source



Ekrukha Tank

Solapur was ranked at 302 out of the 423 cities in country (34th out of 38 cities in Maharashtra State): RED CATEGORY: Solapur city requires immediate remedial actions for sanitation.



Zone-wise water supply scheme in Solapur

**Water Table** in the city is declining and hard rock area limits recharge potential. Bores around Shelgi nallah, N and NW part of the city are saline due to overabstraction, thick black soil and mixing of wastewater effluents<sup>4</sup>.

<sup>4</sup> As per 'Augmentation & Improvements in Solapur Water Supply Scheme (DPR – Augmentation of Bulk water supply)', SMC under proposal

It is estimated that nearly 25,000 Tonnes of Methane is generated daily from wastewater in Ujjani and another 25,000 Tonnes Methane from the sediments in the lake body. Villagers downstream of Pune depend on groundwater due to pollution of surface water. Groundwater in the region is reported to be saline and hard (400 to 800mg/litre, standards 300mg/litre).

**Performance Assessment System (PAS)** Data shows total 7891 water connections exist in slum areas. Scheme for up-gradation of 9 Solapur slums (as pilot project) has been prepared under RAY (Rajiv Awas Yojna) and 4 other slums are being upgraded under IHSDP.

**Sewerage**

The coverage of sewerage network comes to nearly 51.05% (281.3 km network for 551km of road length)<sup>5</sup>. The remaining area is covered by septic tanks and community facilities.

**The city has 54 MLD STP at Degaon which is defunct since 1985. Entire wastewater of the city is being discharged into Shelgi nallah which joins Sina River and pollutes it. New STP is proposed to treat wastewater entering Shelgi nallah.**

Wastewater Generation @ 75% of water supply	88 MLD (52.8 MLD excluding T&D losses)
Wastewater Generation in 2041	220.51 MLD (excl T&D losses)
Sewage Treatment Plant	54 MLD. Defunct since 1985

**The city has nearly 34,184 septic tanks (18% of total HHs).** Overflows from septic tanks enter open drains. Leakage from septic tanks also causes groundwater contamination. Septic tanks are cleaned once in 3 to 5 years and the sullage is often disposed off near open drains.

A total of 225 open defecation spots (as per CSP report) due to the inadequate facilities as well as defunct community toilets in slum areas.

<sup>5</sup> Based on Solapur Municipal Corporation records, accessed last on March, 2014 at [http://www.solapurcorporation.com/ch\\_gat.asp](http://www.solapurcorporation.com/ch_gat.asp) and Calculation



Sewerage Treatment Plant (STP) at Degaon

Since the STP at Degaon isn't functional since long, there is no form of formal reuse mechanism within the city. Some downstream villages are taking water from Shelgi nallah and Sina River for irrigation purposes.

MPCB (Maharashtra Pollution Control Board) has notified SMC to treat wastewater. SMC has started construction on new STP for 75 MLD. 2 more STPs have been tendered for 15 and 12.5 MLD

#### Industrial Effluent

There are 3 Industrial areas in and around the city namely Chincholi, Akkalkot and Hotagi MIDC. For industrials effluents, there are 2 CETPs<sup>6</sup> for Akkalkot MIDC and Chincholi MIDC. Both these CETPs are discharging treated wastewater in Shelgi nallah.

#### Drainage

Solapur city does not have a planned storm water network. Most drains are kuccha

**Drainage network is designed to carry runoff away from the city rather than retaining runoff for recharge.**

**City has several natural nallas which now carry wastewater** like Bidi gharkul nallah, Uppar Landki Nallah, Lower Lendki Nallah, Mill peth nallah, Sadar bajar nallah, Revan Siddheswar Nallah and Shelgi Nallah with a total length of 16 km<sup>7</sup>. Most nallahs meet Sina River and pollute it.

In some areas, these nallahs have been encroached upon. Along some stretches, columns supporting buildings have been constructed on the nallah bed.

**There are seven major and six minor water logging spots in the city.** The inner city has inadequate surface drainage which leads to rainwater stagnation at various spots.

Under Municipal byelaws, SMC has made it mandatory for buildings more than 300sqm to undertake RWH. But this is not practised due to the general misconception that implementation of RWH structure is costly.

**Peripheral areas of the city have black cotton soil and hence, are more prone to flooding and water logging, especially in the absence of an adequate drainage network. Flooding near Shelgi nallah during monsoons is a key issue.**

In view of increased rainfall under Climate change, the city would be required to increase drainage capacity by 5 to 10% and take RWH measures to prevent water logging by facilitating percolation

**Waste Management – Solid Waste & Marble Slurry** Solapur city generates a total of 425 MT/D waste of which 364 MTD (85.65% of total waste generated) is collected. Nearly 65% of the waste is estimated to be biodegradable (CDP 2006).

Funding for Waste management is managed within the allocations under Municipal budget.

Waste Generation	425g/capita/day
Waste Generation in 2041	2143 MT of which 1393 MT would be biodegradable
Sanitary Landfill Site	Proposed

Nearly 25% of Municipal area is covered under door to door collection. There is no formal segregation of waste. Recyclable waste is picked up for recycling by 150 rag pickers at the dumping site. NGOs and Municipal staff undertake initiatives to raise awareness on waste segregation.

SMC has given 9 acres of Municipal land to develop a processing and disposal facility. No efforts for recycling of waste, other than ragpickers.

<sup>6</sup> Common Effluent Treatment Plants

<sup>7</sup> Based on Rapid Baseline Assessment - Solapur City, CRISIL, Oct. 2013

There are 2 waste disposal sites namely Tuljapur (55 acre) and Bhogaon (18 acre), in the city. Unsegregated waste from the city is brought to these dumping sites. Bhogaon site has been provided with compost pits (38x8x3) where waste is segregated and composted.

At present, only the waste from the beedi industry is being processed and manure produced is sold to grape cultivators.

**Waste to energy power generation plant of 300 MTD capacity for generating 3MW of power has been installed in the city at Tuljapur and is expected to be operational soon.**

**The new landfill site is located 1.3 kms away from Hipparga dam where the depth to ground water table is 25 to 30 ft and hence needs to be planned cautiously to avoid contamination of dam water by leachette.**

### Need for Integration Across Sectors

Solapur has a linear water cycle at present with no integration across sectors.

#### Present Scenario: Linear Water Cycle

Water is abstracted from multiple sources within and outside the city, the main one being Ujjani dam located nearly 100km from the city. City faces water scarcity due to competing uses (farmers and other users along the route take up nearly 90% of supply from the Bhima River Scheme). Septic tank overflow and grey water from HHs enters open drains. These drains empty into the nallahs, primarily Shelgi nallah which ultimately meets Sina or Bhima River. STP constructed on Shelgi nallah is defunct and entire wastewater from the city is entering River Sina without treatment.

Hence, pollution of natural drainage channels is a key issue in the city. Ponds in the city are also suffering from water pollution and erosion related issues. Encroachment in catchment area and competing users are leading to water conflicts.

WW from the city is not reused but it is lifted downstream for irrigation by local farmers for sewage farming without treatment. Hence, an indirect closing of loop takes place, although use of untreated wastewater for irrigation is extremely risky.

Other than this, there is

- No recycling or reuse of water
- Drainage system is designed to divert water away from the city, not to retain it for recharge
- Industrial units in the city are using high amount of groundwater and recycling or reuse of water is minimal
- Some initiatives towards RWH have been taken up by local NGOs

### Benefits of Integration

- **Integration across sectors can help meet water shortage by making more water available internally**
  - RWH/ SUDS
  - Treated wastewater
  - Local level water resources
- **Recycling of wastewater will help restore the natural freshwater channels and ponds**
- **Reuse of water by industries can help reduce burden on groundwater**
- **Communication between agencies and departments related to water and allied sectors can help cities dovetail projects and proposals to ensure IUWM**
- **Integration across sectors can help in integrated planning**
- **Integration of water sectors with other sectors like land use, buildings, etc. can help maximize efficient service delivery**

### Future Activities

**In subsequent years of AdoptIUWM Project the following activities would be undertaken -**

- **Stakeholders Workshop will be conducted to**
- **Formulate Actions for the city based on IUWM**
- **Finalization of 2 Pilot Projects**
- **Training programmes on IUWM in Solapur**
- **Exposure visit to Europe**
- **Implementation of Pilot Projects**
- **IUWM based Toolkit for Indian Cities**
- **Associating a Technical Consultant with the Municipality**
- **National level workshop**

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