



European
Commission



Adopting Integrated Urban Water Management in Indian Cities (AdoptIUWM)

About the Project

Adopting Integrated Urban Water Management in Indian Cities (AdoptIUWM) is a project funded by European Commission and 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)** 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.

Pollution of Rivers

Panchganga River is severely polluted due to effluent and wastewater discharge at regional level. Domestic Wastewater and industrial discharge from Kolhapur city as well as Ichalkaranji have led to extensive nutrient and chemical loading of the River. This has led to extensive eutrophication of the river. This eutrophication is cleaned each year by local NGOs and IMC jointly but owing to lack of nutrient control into the river, it resurfaces every year.

Water quality monitoring of Panchganga River under environmental Status Report 2012/13 showed high BOD, very high turbidity, low DO, extremely high MPN and very high E.Coli levels in the river. One sample also showed presence of Mercury above standards. It was observed that the pollution levels in the River increased significantly after confluence with Kala nallah, especially in terms of MPN and E.Coli. Study by Pawar, 2014 shows that Panchganga River is highly polluted even in Kolhapur (upstream of Ichalkaranji).

Water quality tests for Krishna River showed high BOD levels, high turbidity and high MPN. It can be seen that Krishna River is much less polluted than Panchganga River (Environmental Status Report 2012/13).

ICHALKARANJI

Key Issues & Challenges

- Need to treat wastewater from Ichalkaranji before it enters into the nallahs and ultimately the rivers
- Awareness programmes and street shows for water supply, wastewater management and water storage through involvement of youth, schools, NGOs and institutes are needed.
- Need to promote conservation, recycling and reuse of water in industries to reduce industrial water demand, especially during summers
- Eutrophication in rivers is a key issue
- Need to take measures towards water quality monitoring and restoration of Kala Nallah
- Need to reduce water theft and water losses
- All industrial processes are not connected to the CETP. The processes/plants that are connected are not discharging 100% of their wastewater to CETP due to the costs involved.



Eutrophication of Panchganga River



About Ichalkaranji

Ichalkaranji located in Kolhapur district is a satellite city to Kolhapur. The city is known for its textile industries and has several handlooms and power looms. Ichalkaranji is also known as the 'Manchester of India'. The city is well connected through the Mumbai Bangalore NH and is located close to urban centres like Pune and Kolhapur. The city is also characterized by strong cooperative movements which have shaped the industrial base of the city.

Area	27.52 Sq. Km
Population as per Census 2011	2,87,353
Gross Population Density based on Census 2011	10441 persons/sq.km.
Projected Population till 2044	5,62,307*
Sex Ratio	926 females per 1000 males
Overall Literacy Rate	86%
Work Participation Ratio	36%

* CSP

Ichalkaranji city is experiencing a high growth in industrial sector. Textile industry is the foremost industry in Ichalkaranji followed by power looms, weaving, bleaching and dying. Many small and medium scale industries like foundries, auto ancillaries, green houses, sugar factories, agro-engineering with export orientation are also situated in and around the city. 4 textile parks are also coming up in and around Ichalkaranji. Ichalkaranji is now a prominent city on the textile map of India. Agriculture is the other prime economic activity at the district level. Ichalkaranji is also a prominent educational hub in the region.

The city has nearly 1.25 lakh looms employing nearly 1 lakh workers, of which nearly 20 to 30,000 come from outside Ichalkaranji (Floating population; CSP Ichalkaranji). The city also has 3 cooperative based spinning mills and an additional 6 new coop spinning mills are coming up in the peripheral area.

The city is divided into 25 wards and has 19 slums (of which 16 are notified). Slum population accounts for 5.6% of total population of the city.

The city forms a part of the Pachganga and Krishna River Basin and forms a part of the Deccan Plateau

region. The catchment area comprises of agricultural fields and scrublands. The city is also located close to the Western Ghats. Hence, Ichalkaranji lies close to an ecologically sensitive area.

Most of the city's textile industries discharge their effluent into the city's drainage network and nallahs. The city has 2 CETPs and treated wastewater from these CETPs is also being discharged into nallahs. These nallahs ultimately meet Panchganga River which flows into Krishna River. The city's STP is not able to treat the entire domestic wastewater generated and hence, pollution of the water resources is critical. The city witnessed a Hepatitis outbreak in 2012 which claimed several lives and PIL against Ichalkaranji Municipal Council (IMC) was filed for this. Maharashtra Pollution Control Board is now overseeing the matter and coordinating with all stakeholders to ensure safe drinking water. The city has provided for a 12 MLD CETP, 1 MLD CETP and is now abstracting water mainly from Krishna River. Panchganga Action Plan, involving cities at regional level has been prepared by Maharashtra Pollution Control Board.

Activities Undertaken in Ichalkaranji

Project activities in Ichalkaranji started in June 2013 with the first city visit. Since the start of the project, the Municipal Council has signed a **MoU with ICLEI South Asia for the project and passed a Council Resolution showing the commitment of the City Representatives towards the Project and the cause. Project Core Team and Stakeholder Committee** have been formed in the city.

The first **Stakeholder Workshop** was held in November 2013 wherein all related stakeholders came together and discussed the issues faced by the city and the need for an integrated approach.



First Stakeholder Meeting for AdoptIUWM Project held in Ichalkaranji



Discharge of untreated wastewater and industrial effluents has extensively polluted Panchganga River. Large stretches of the river come under eutrophication as the water in the river starts receding. Although, efforts are taken up by local NGOs and IMC to remove eutrophication, since the nutrient input in the river is not regulated, eutrophication is an annual occurrence.



Eutrophication of Panchganga River

The project team has prepared a **Baseline Assessment Report** for the city after several meetings with relevant Depts., data collection & analysis and ward level reconnaissance surveys. A **State Level Meeting was organized to inform the State Government of the issues being faced by the city.** The meeting was chaired by Deputy Secretary, Water Supply and Sanitation Department, Government of Maharashtra. **As an outcome of the meeting, it was opined that a State level IUWM Committee should be constituted to bring all related departments on one platform.**



State level Review Meeting

Recently, a **Water Quality Testing Workshop** was conducted in Ichalkaranji in co-ordination with **Development Alternatives** for hands on experience in water quality monitoring; where representatives from Municipal Council, NGOs and other Institutions were trained to understand the significance of water quality parameters and how these parameters can be

monitored. A portable water quality testing kit was provided to IMC under the project which can be used by NGOs, Institutions, Municipality and citizens to monitor water resources in and around the city.



Hands on training in water quality testing

The second stakeholder workshop would be conducted in the coming months, to discuss set of actions for the city based on Integrated Urban Water Management and to finalize the pilot projects for implementation.

Existing Status of Services in Ichalkaranji

Water Supply

City is lifting water from two surface sources, River Panchganga and River Krishna. Both the rivers are perennial but owing to upstream abstraction, water in Panchganga subsides by winters (as the discharge reduces, the pollution concentration in the river increases making the water unusable for supply). **The city has been allocated withdrawal of 54MLD from each river (total 108 MLD) of which, the city is presently withdrawing 14 MLD from Panchganga River and 54 MLD (purchased from Irrigation Department) from Krishna River (Total 68 MLD; 63% of allocated 108MLD).** In order to utilize the entire allocated capacity, the city is constructing another WTP for 54 MLD (75% work has been completed, under UIDSSMT). During summers, abstraction from Krishna River is increased as it is the only perennial source available.

Total Water Supply to the city	43.4 MLD available after treatment
Major Source of Supply	Krishna River Panchganga River (not during summers)
Per Capita Quantum of Water Supplied	127 to 135 lpcd, as per SLB



Non-Revenue Water (NRW)	17.44% (Energy Audit Report), 14.9% as per CSP
Total Water Connections	42837
% of HHs with Water Connections	39663 HH connections (64.4% of total HHs)
Metering	10.8%
Water Treatment Plant	54 MLD, another WTP for 54 MLD under construction
Projected Water Demand for 2044	87.3 MLD (including 15% T&D losses)

Since water availability from Panchganga is questionable and receding, the city is planning to abstract water from Kalamawadi dam.

Water sector in the city suffers from issues related to water quality. Also, groundwater is used for supply by IMC but no records are maintained.

IMC acknowledges the need for metering system to be introduced for water supply but due to lack of political will and dissatisfaction amongst the citizens, metering is confined to only a few connections.

IMC lacks the infrastructure and know-how to undertake O&M of water metering hence, even the existing meters are billed on flat rate basis. Since the meters are scattered across the city, private contractors are also unwilling to take up revenue collection.

Sewerage

Wastewater generation in the city is approximately 34 MLD (CSP). The sewerage network in the city covers the core city and extends over a length of 90km. The peripheral areas only have septic tanks which empty into open drains carrying grey and black water. These open drains empty into the nallahs of the city and pollute them.

IMC only has 1 STP at present, of 20 MLD capacity. **This STP is only functioning at 15 MLD capacity and has only been providing primary treatment (CSP).** Oxidation is not being undertaken at present due to paucity of land. Most of this treated wastewater is used by the farmers for irrigation and IMC collects approximately Rs. 2000/ha from farmers for supplying treated wastewater.

Since the STP discharges treated effluent into Kala nallah which is already polluted due to industrial effluent, it is this diluted effluent which is ultimately used for irrigation by farmers. The quality of water in Kala nallah is critical and nearly 16 villages downstream of the city are impacted by this polluted discharge.

Slum areas face paucity of infrastructure provision and open defecation is common in slum areas. Public toilets and community toilets have been provided in the city, but maintenance is a key concern. There are no drains in slums and wastewater collects in open pockets along the streets.

Wastewater Generation @ 80% of water supply	34 MLD
Wastewater Generation in 2044	60.73 MLD (considering 15% T&D losses in water supply)
Coverage of Sewer network	18.15%
Coverage of Septic Tanks	40.66%
Total length of nallahs	15km



Confluence of treated wastewater from STP with Kala nallah

Additional STPs for 10 MLD and 8 MLD are being commissioned but nearly 28 MLD additional STP capacity would be required by 2044.

Industrial Pollution

Many industries in the city do not have Treatment plants and are discharging their wastewater into open drains which ultimately meet nallahs like Kala nallah. There is one CETP in the city has been provided for industries in the Ichalkaranji Textile Development Cluster Pvt Ltd. This 12 MLD CETP has been functional since 2011 and discharges treated wastewater into open nallahs. No recycling or reuse



of treated effluent is undertaken. There is another CETP for Laxmi Industrial area with capacity of 1 MLD commissioned in 2013. The treated effluent is being used for bamboo plantation.

Water abstraction by industries as well as effluent discharge from industries is also a critical issue for water resources of Ichalkaranji. Industries in the city are also abstracting groundwater for consumption and softening of this groundwater is leading to discharge into nallahs, which in turn, is making the



Common Effluent Treatment Plant

nallah water hard.

Drainage

The city has an open network of drains which carry wastewater as well as runoff/storm water. These open drains suffer from clogging due to solid waste disposal in drains. Though plastic bags have been banned in the city, this has not been successfully implemented yet. **The drainage network of the city has been designed to divert runoff from the city, rather than retain it.**

The city has 3 prominent nallahs. Kala nallah is the most prominent nallah in the city. Other nallahs are Chandur nallah and Kabnur nallah and the total length of nallahs in the city is approximately 15km.

Pollution of Nallahs, Esp. Kala Nallah

Water quality monitoring of Nallahs in the city showed extremely high BOD levels (380mg/l in Kala Nallah and 350mg/l near Ichalkaranji Industrial Estate) and extremely low DO levels (Environmental Status Report 2012-13). Mercury and MPN content above standards was also found in Kala nallah and Ichalkaranji Industrial Estate.

Kala nallah is the most prominent nallah in the

city. Traditionally the king undertook dense tree plantation along the nallah and the nallah was termed Kala nallah due to the dense forests that used to exist along its banks and blocked sunlight from entering the nallah. But now the nallah has hardly any vegetation along its banks and is still black due to the wastewater from sizing and other textile industries which flows through this nallah. Treated wastewater from the STP also meets Kala nallah. The wastewater from the nallah containing nutrients as well as chemicals is used by farmers for irrigation without any treatment. This is not recommended as use of such polluted water for irrigation can lead to diseases.



Kala nallah

These nallahs meet Panchganga River which drains into Krishna River.

Waste Management – Solid Waste

Waste generation in the city is approximately 116 MTD (CSP) accounting for a per capita generation of approximately 404g/cap/day which is above standards. But the industrial base of the city might be responsible for this high waste generation. Waste collection in the city is approximately 77.5%. IMC is undertaking door to door collection from 60% HHs.

IMC is planning to use the abandoned stone quarries to develop landfill site for the city. This should be done with caution and pollution of groundwater due to leachate and pollution of nearby surface water channels/nallahs should be adequately considered.

Need for Integration Across Sectors

Ichalkaranji has a linear water cycle at present and has ample potential to transform this into a cyclic



water cycle integrating water sectors with other sectors.

Present Scenario: Linear Water Cycle

Water is abstracted from Krishna River and Panchganga River (not during summer) and is supplied to the city after treatment. Water is used at HH level and grey water is discharged into open drains, black water in septic tanks. Industrial effluent, mostly untreated/ partially treated, is also discharged in open drains. Discharge from septic tanks also enters in open drains. Open drains and nallahs carry wastewater, industrial effluent and storm water and empty into Panchganga River, thereby polluting it. No inter-linkages within water sectors or with other sectors like land use, buildings, etc. Schemes for each sector are planned in isolation.



Possibilities for Integration

- **The city has a CETP connected to the industries. Treated wastewater from this CETP can be resupplied to industries to reduce groundwater abstraction by industries.**
- **The city should try to meet 30 to 50% of its future water requirement internally using local level water resources, RWH, treated wastewater, etc.**
- **The city has several abandoned stone quarries/ low lying areas, these can be used for RWH**
- **Treated wastewater from STP should be recycled and reused in industries**
- **SUDS can be incorporated within the existing city fabric to retain more runoff**
- **Decentralized treatment plants can be installed along nallahs to revive them and restore them as freshwater streams**
- **Regional level integration with neighbouring cities to develop an integrated and comprehensive approach to river cleaning**
- **Capacity building of IMC officials to understand the concept of IUWM and take related measures**
- **Awareness generation and skill development programmes for citizens**
- **Extensive afforestation along rivers and nallahs to revive local hydrological cycle and retain more runoff within the city. This will also be useful in reducing localized flooding**
- **Integration of water sectors with other sectors like land use, buildings, etc can help maximize efficient service delivery**

Future Activities

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

- **Second Stakeholder Workshop to:**
 - Formulate set of actions based on IUWM
 - Finalize pilot projects
- **Training programmes on IUWM**
- **Exposure visit to Europe**
- **Implementation of Pilot Projects**
- **Associating a Technical Consultant with the Municipality**
- **National level workshop**

For further information please contact: ICLEI South Asia, New Delhi, Email: adoptiuwm@iclei.org