



Pilot Project: Assessment of Rooftop Rainwater Harvesting Potential for 25 Buildings in Solapur and Demonstration

Under

Integrated Rural Urban Water Management for Climate Based Adaptations in Indian Cities (IAAdapt)

Aim

To assess the potential of roof top rain water harvesting for ground water recharge for 25 SMC buildings and implementation at one location.

Issue

Solapur city is located in a drought prone zone of Maharashtra. Urbanization, reduced rainfall and NRW losses has put a lot of stress on existing water resources and therefore it is necessary to consider alternate sources through rainwater harvesting (RWH). Uncontrolled abstraction of ground water has resulted in decline of ground water table in Solapur. As a priority, government buildings should be considered for RWH and demonstration to citizens for promoting this.

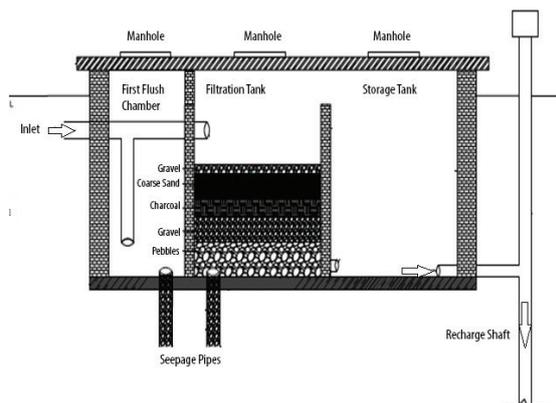
Approach and Technology

About 27 buildings of Solapur Municipal Corporation including shopping complexes, schools were assessed for their roof top RWH potential and camp school of SMC was selected for pilot scale implementation. The total roof top rainwater harvesting potential of these buildings is estimated to be more than 6600 cu.m. annually. Through this project, roof tops of three schools in a single complex are used to collect rain water that is used for ground water recharge after filtration.

Ground Water Recharge System



Roof top covered for ground water recharge



For ground water recharge using rain water from roof tops, a collection and filtration system along with a recharge shaft is placed at camp school of SMC. The filtration tank consists of 3 compartments include provision for 1st flush, actual filtration with gravel, charcoal, sand and storage for recharge which is connected to a 150 ft deep recharge shaft. The system needs a physical check for vandalism daily, while the filtration unit needs to be cleaned every year. All leakages should be repaired and roof tops cleaned before the monsoons every year and the first flush should be washed out.

Results and Discussion

Average water demand of the three schools is about 1200 l/d (437.66 m³/year) each. The total roof top area covered through this system is about 19,800 sq. ft having potential of recharging ground water of 675 m³/year. This will be about 58% of the total annual water demand of the selected schools. However, it is to be noted that the total roof tops of these three schools has potential of recharging ground water to the extent of about 70.66% of the total annual water demand (if the entire roof top is used) which can benefit about 250-300 students.

This project will also be used to conduct awareness activities and promote RWH for ground water recharge. As the system is located in school/government building it must be properly protected from vandalism. In order to support the Jalshakti mission of Government of India such models could be replicated based on detailed assessment.



Disclaimer

This work was carried out with the aid of a grant from the International Development Research Centre, Ottawa, Canada. The views expressed herein do not necessarily represent those of IDRC or its Board of Governors.



Pilot Project: Low Cost Wastewater Treatment Plant – Constructed Wetland at Talehipparga village

Under

Integrated Rural Urban Water Management for Climate Based Adaptations in Indian Cities (IAapt)

Aim

To develop a replicable pilot scale low cost sewage treatment plant for the treatment of Waste Water entering into the Ekrukh (Hipparga) Lake from village Tale Hipparga at Solapur.

Issue

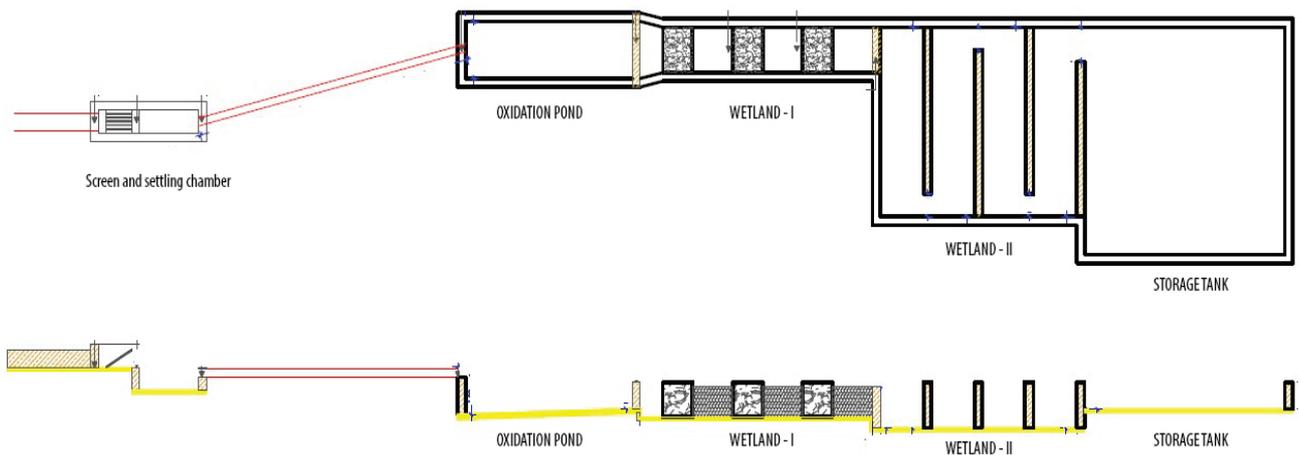
Initial analysis of water scenario of Ekrukh lake micro-catchment highlighted that almost all the villages including 3 project villages are discharging their untreated sewage (mostly gray water and sometimes overflow of septic tanks) in the neighboring water resource – Ekrukh lake. Multiple wastewater streams are seen flowing from these villages and polluting the lake water. The lake water is being used for drinking purpose by some parts of the Solapur Municipal Corporation and some villages through adjoining bore wells or open wells as well as in irrigation schemes. Lack of funds, technical manpower and infrastructure at village level make it difficult to have sophisticated STPs.

Approach and Technology

In order to treat sewage from the villages and reduce the pollution of the lake water, a low cost, low maintenance and replicable waste water treatment plant has been installed in Tale Hipparga village. Due to close proximity of the water resource, availability of land and considering local ecosystem it was proposed to install a bioremediation based constructed wetland system in which local plant species would be used to consume nutrients from the wastewater. The treated wastewater could be used for irrigation or discharged in the lake.

The constructed wetland system consists of a screen chamber, a settling chamber, an oxidation pond, a tank for gabion structure, a constructed wetland tank, furrows for constructed wetland, a cascade for aeration and a clean water tank. The implemented system has capacity of treating waste water of 18 m³/day considering about 200-225 population and 50-70 livestock which discharges their wastewater in the selected stream.

There needs to be a daily physical check for vandalism and cleaning of screens and channel. Once a week, the settling unit and water tank needs to be cleaned. De-sludging oxidation pond and extra growth of plants should be cut every 3 months. Water quality should be analysed once a year to confirm working proper functioning of the plant. Treated water can be used for irrigation.



Results and Discussion

The constructed wetland system provides a good alternative as a low cost treatment for remote areas. The initial analysis of influent and effluent water samples showed the efficiency of more than 90% and is expected to stabilize at 70-80% if maintained properly.

Parameters (28 January 2020)	Inlet (mg/l)	Outlet (mg/lit)
BOD	686	27.4
COD	1709	75
Oil and Grease	22	9.50
Suspended solids	4153	48
Ammonia nitrogen as N	84.4	42.3
Total Kjeldahl Nitrogen as N	270	108
Free Ammonia as NH ₃	103	51.5

It was also observed that the influent BOD load varies a lot from 250 to 680 mg/lit because of the cattle dung, overflow of septic tanks and flushing of already settled sludge from the open areas. It is advised to reuse this water only after disinfection.



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