IWRM Action Hub

CASE STUDY

India: W.A.P.I.S. - Water Absorption Project for Inundated Slums

Water Absorption Project for Inundated Slums is envisioned to be an immediate & affordable solution to urban water-logging. Runoff can be managed at source rather than transporting large quantities of water to expulsion. The project merges India's Stepwells/Baoli with Japan's Crosswave U.G. Storage Technology to resolve the climate change risks in Indore, India. The project's form is adaptable as per the location, in the fringes of the city it can be a stepwell & in the CBD, it can be developed as a floodable public plaza. It can be incorporated into the Rain Water Harvesting Policy to better implement this policy in LIG and MIG areas, where space & costs are a hindrance.

Background

The Water Absorption Project for Inundated Slums targets to resolve the issue of Urban Flooding in rapidly urbanizing cities today, developed as a pilot solution for Indore, India, replicable across cities. WAPIS in Hindi means back/return, and the project aims to return rainwater back to mother earth at the place where it drops, and not let it go waste by mixing it into the sewerage drains.

The Project aims to merge the age-old wisdom of our ancestors (Baoli) and modern technology (Crosswave U.G. Storage Tank) to provide a holistic solution. This project is equipped to tackle the changing climate and adapt to the needs of the vulnerable residents of our cities.

The project was envisioned as due to rapid urbanization in cities today, we have often attempted to challenge nature and build against or on the natural slope, disturbing the natural flow of water. But as it is said in India, Water Always finds its way. Hence water tends to accumulate at the lowest geographical point and with rising rainfall intensity, the waterlogging often results in havoc in terms of sanitation, livelihood, water quality, hygiene, health & wellness, waterborne diseases, and loss of resources and possessions.

The city of Indore, selected as pilot location receives around 1100mm on average during peak monsoon in August. Further, over the last 53 years (1968-2021) there has been an increase of 21% in average rainfall. This is also in line with the National Trend of 75% increase in extreme rain events in Central India, where Indore is located.

With a population density of ~11,300 per sq.km, Indore has faced 8 severe inundation events in the past 10 years (2010-22). The city has only 25% storm water drain coverage and further, the soil is 64% clayey type, which holds water and resists percolation. This similar situation is common in India and around the world as our cities are highly urbanized and lack untouched earth for percolation and our natural drainage systems are being replaced by artificial storm water drains which haven't been able to catch up with climate

change and extensive urbanism.

The citizens of Indore's slums have been highly affected by this increased rain, especially as they live in low-lying areas or along the natural drain. Some of the interviewed citizens mentioned effects on health to the extent that a citizen almost lost his legs due to pneumonia caused by a 20-hour-long inundation event in 2020. Multiple complaints have rendered in no major change in the situation as decentralized stormwater was attempted or thought of by authorities, as reported by the citizens and the citizen representative (politician).

Created for the Slum/L.I.G. dwellers of Indore's Ram Balram Nagar, the pilot project can be replicated not only in Indore but at multiple locations across our nations keeping the original idea and transforming its physical form as per local situation and needs.

Actions taken

Community Rain Water Harvesting system by expelling terrace water to open drain channels which are directed towards the stepwell/baoli/floodable plaza. Helping better implement the upcoming rainwater harvesting policy of the city.

Reduction in water accumulation as water in the stepwell is drained first to the underground cross wave tank and post its capacity only is the step-wells capacity utilized, a total of 650 cubic m of capacity.

As the water does not accumulate on the surface, streets, terraces, etc. It prevents any sort of waterborne diseases or unhealthy sanitation situation which currently results in serious health situations and medical conditions for the residents. Better management of stormwater results in better-enabled WASH situations for the neighborhood.

The underground tank and depth of stepwell/baoli allow for better infiltration as the pilot location has a black cotton surface and subsurface soil, which prevents infiltration and promotes water holding. Further, this is relevant in urbanizing cities which are highly concretized and limit infiltration of rainwater.

This infiltration also allows recharge of the rapidly drying ground aquifers and alleviates pressure from the water supply system of the city as now aquifers can be utilized with higher confidence as they are constantly charged.

Lastly, the space created whether a stepwell or a public plaza forms much-required social spaces which are usually lacking in lower-income groups and slum areas. This also helps build a relationship with the project and space allowing for a better rollout to other parts of the city/country.

The project ensures that residents of the slums/Lower Income Group are displaced and doesn't cause disturbance to their fragile daily lives, especially post-pandemic. It not only creates a decentralized stormwater management system but also helps recharge the groundwater which is overused in the pilot location of Indore.

The project costs and its R.O.I. have been kept in mind to be implementable by the cash-strapped municipalities and also help generate revenue in the future through development charges.

Outcomes

The pilot project idea has been highly appreciated by the local citizens who look forward to its quick implementation and development. As the project does not disturb their current situation and actually adds community space to their "mundane households", they are actively interested in presenting this to their public representative(local politician).

The citizens actively aided in envisioning W.A.P.I.S. and hence the project has been able to incorporate a bottom-up governance approach, which has not only helped in the project grow but also helps the residents realize their capability and the city administration develop a positive change through bottom-up governance and citizen participation.

Further, multiple development professionals and government agency professionals have appreciated and promoted the project due to its creative and local approach to climate change and citizens' lives while creating a better WASH environment during disaster situations.

Through its implementation not only can WASH situation be better-handled post Storm Surges but the cost of laying stormwater lines and disrupting the daily lives of the area are also prevented which helps boost local economies. Local economies are the backbones of our economies today and this project aids in the prevention of their disruption during climate change events.

Overall, a resolution for inundation caused by extreme/sudden rains in urban centers has been formed which is developed with respect to the surrounding urban fabric and citizen requirements. W.A.P.I.S. also aids in the creation of a multi-purpose community space aiding in community interaction and growth. Further, the project is cost-effective and most importantly doesn't disturb the life of vulnerable residents who are afraid of displacement or disturbance to their daily wages/life by city authorities.

Lessons Learned

There should be better implementation of city infrastructure which tailor-made and not a copy-paste of usual technical guidelines or infrastructure basics. The basic principle may remain the same but the objectives and methodology should adapt as a per the situation in the country, region or local area.

Merging of past and the present helps us develop better solutions & aid in further growth of current innovations. Urban inundation has been tackled utilizing the concept of water harvesting, which is often utilized in desserts across India to conserve water. This merging allowed better resolution and further unsaid social advantages also carried on to W.A.P.I.S. even though not intended.

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