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Title : Water Security of Institutional Areas in Chennai City –
A Case Study of Anna University Campus

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India is a rapidly urbanising country and Chennai is one of its fastest growing cities. The rate of urbanisation is directly proportional to surface water and groundwater exploitation. Hence, there is a growing need for increasing management practices to meet the demand of the city.

The land use pattern of the city is continuously changing and the number of institutions and the institutional area in the city is also witnessing a continuous increase. This study deals with increasing the water availability of an educational institution, using the land and water resources of the campus, to meet a part of its demand. The Anna University, Chennai, has been chosen as the area of study. Anna University extends to 90 ha with a variety of physical features making it a good case study.

The study focuses on managing the water demand in the campus through rainwater harvesting and wastewater reuse which have proved to be some of the best measures of managing water supply and demand worldwide. Rainwater harvesting will be for both direct use of the harvested water as well as aquifer recharge for which artificial recharge sites have been identified.

The treated wastewater from the sewage treatment plant was analysed. The rooftop harvested rainwater samples were also collected and their quality was analysed. Based on the results of the analyses, the suitability of the treated wastewater and harvested rainwater were determined. It was found that the treated wastewater required more treatment to make it suitable for the identified uses. The necessary systems for the same have been suggested.

A questionnaire survey was carried out among the residents of the study area and a focus group discussion was conducted among the residents of the student's hostels, which helped in studying the the social feasibility of this study. It was found that only 33% of the residents of the staff quarters accepted the use of treated wastewater whereas 67% of the residents did not accept this method of water resource augmentation. On the other hand, 95% of the students accepted the use of treated wastewater for the purpose of flushing in toilets.

Based on the results of the survey, it was decided that harvested rainwater be distributed in the residential staff quarters and treated wastewater be supplied to the hostels for flushing in toilets alone.

The various systems required for the distribution of the augmented water within the campus were designed. The pipelines and tanks for delivering the treated wastewater from the treatment plant and its distribution in the hostels were designed using EPANET 2.0. The rainwater harvesting systems, sumps and pipelines for the storage, conveyance and distribution of the harvested rainwater in the residential staff quarters were also designed.

A cost-benefit analysis was performed to study the economic viability of the study. It was found that the use of rainwater falling in the campus and the reuse of wastewater that is treated in the sewage treatment plant in the campus will result in an annual savings of Rs. 98,00,000 which will otherwise be spent in purchasing metro water.

The results showed that the study is socially and economically feasible. These results can be extended to other institutions and this will result in a great reduction in the demand on the public water supply schemes.