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System Dynamics Projections of Environmental Issues for Domestic Water and Wastewater Scenarios in Urban Area of India

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Abstract : One of the environmental challenges in India is urban wastewater management as regulations and infrastructural development has not kept pace with the urbanization and growing population. The quality of life of people is also improving with the rapid growth of the gross domestic product. This has contributed to the enhancement in the per capita water requirement and consumption. More domestic water consumption generates more wastewater. The scarcity of potable water is making the situation quite serious, and water supply has to be regulated in most parts of the country during summer. This requires elaborate and concerted efforts to efficiently manage the water resources and supply systems. In this article, a system dynamics modelling approach is used for estimating the water demand and wastewater generation in a district headquarter city of North India. Projections are made till the year 2035. System dynamics is a software tool used for formulation of policies. On the basis of the estimates, policy scenarios are developed for sustainable development of water resources in conformity with the growing population. Mitigation option curtailing the water demand and wastewater generation include population stabilization, water reuse and recycle and water pricing. The model is validated quantitatively, and sensitivity analysis tests are carried out to examine the robustness of the model.

Keywords : system dynamics, wastewater, water pricing, water recycle
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