

Wastewater Reuse as an Environmentally Sound Technology: A Case Study on Sustainable Wastewater Reuse Strategy Implemented in Badulla District, Sri Lanka

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ABSTRACT

Water-related problems are increasingly recognized as one of the most immediate and serious environmental threats to humankind. Reusing wastewater in domestic agricultural lands will increase drinking water service area because of reduction in pipe borne water. A four story building with 12 apartments in the Badulla district in Sri Lanka was selected to analyze the possibility of reusing wastewater. Screening followed by filtration system was incorporated into treatment of wastewater. The treated wastewater was used for domestic agriculture in vegetable and flower farming. It was estimated that a 45% of the total water used could be used in agricultural field which can be calculated in financial terms as saving of Rs. 3,500 with reference to current tariff.

INTRODUCTION

Water-related problems are being increasingly recognized as one of the most immediate and serious environmental threats to mankind. The latest Global Environment Outlook of the United Nations Environmental program (UNEP) reports that about one third of the world's population currently lives in countries suffering from moderate-to-high water stress, where water consumption is more than 10% of renewable freshwater resources. Application of treated wastewater could be an alternative solution for reducing pipe born consumption in agricultural lands.

Improper water management accelerates the depletion of surface water and ground water resources. Point and discrete pollution sources degrade both surface and groundwater quality drastically.

OBJECTIVES OF THE STUDY

The key objective of this study is to identify the practical difficulties in reusing treated domestic wastewater for home gardening.

METHODOLOGY

A four story building with 12 apartments in the Badulla district in Sri Lanka was selected to study practical difficulties in reusing wastewater. The water consumption was recorded and the waste-water production was calculated before collecting to a plastic shell tank. A filtration system was introduced with screening as pretreatment. The above cleared water was used for the domestic agricultural purpose basically for production of vegetables and flowers (Figure 02).



Figure 01: A four story Building (12 Apartments)



Figure 02: Domestic plantation of vegetables with wastewater reuse

RESULTS AND DISCUSSION

It was found that the wastewater collection could be estimated at 45% of the total water used and 60% of the wastewater was reused in agricultural field. Therefore a 20% of drinking water for daily consumption of relevant consumer was saved which will finally contribute to expanding service coverage with more new connections.

As the partially treated wastewater introduced to agriculture contained high nutrients such as N and P, the food production was increased. Further, the environmental protection was ensured as it could minimize the surface water pollution. An additional cost of Rs. 3500/= per month could be saved based on the calculation done using the current tariff.

Successful wastewater reuse projects have to be designed to reflect the specific local conditions, such as water demand, urban growth, climatic condition, socio-economic characteristics and preference, as well as institutional and policy frameworks.

RECOMMENDATIONS

In order to promote wastewater reuse on a sustainable basis and for wider applications, some key factors shall be addressed. Firstly, proper planning of wastewater reuse is important with reference to the specific needs and conditions. This could be facilitated by incorporating wastewater reuse in local plans for water management. However, planning needs to be taken with care for all sensitive issues, including public health, stakeholders, and the viability of operation and maintenance. Secondly, economic and financial requirements are also needed to be studied in depth, as less viable schemes for wastewater reuse will create a social burden and will not last long. Thirdly, local capacities, including human resources and legal framework are also very important in achieving sustainable targets of wastewater reuse plans.

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