Eco. Env. & Cons. 28 (1) : 2022; pp. (362-364)
Copyright@ EM International
ISSN 0971–765X

DOI No.: http://doi.org/10.53550/EEC.2022.v28i01.054

Conceptualization of Community Washing Room for Rural water conservation

Saravanan J., Sridhar M. and Bharath M.

Department of Civil Engineering, Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology, Chennai 60 0052, T.N., India

(Received 23 May, 2021; Accepted 15 June, 2021)

ABSTRACT

In this paper we have proposed a conceptual idea for conserving Greywater in rural areas using novel 'U shaped' water storage cum recycler. We have presented the 'idea to prototype' pathway and the cost estimation for making the prototype.

Key words*: U shaped steel tube, Greywater recycling, Modular filter unit, Nanomaterials.*

Introduction

In the era of less available water and increased demand, preservation of water at usage points, has to be considered as a significant step towards sustainable water resource management. (Fulvio *et al.*, 2020). According to IS 1172-1983: Code of basic requirements for water supply, drainage and sanitation, washing activity accounts for 20 lpcd (litre per capita per day) and holds 33% of domestic water demand.

Identified Problem Statement

The observed problem statement in the context of rural areas is the prevailing water demand for cloth washing activity irrespective of the local water availability. For conserving water to tackle the climate change and water scarcity issues, we have developed a concept of community washroom in which local people's united participation is encouraged in water conservation activity, thus creates a sustainable measure for meeting water demand and water conservation.

Technical Description Community Washing Room

The proposed facility is equipped with 'U' shaped hollow tube, buried underground, having their ends above the ground level. The one end of the 'U' shaped tube acts as inlet for receiving the water emerged during the cloth washing. The other end of the tube acts as outlet, which provides the withdrawal of the stored water through solar power aided motor pump or hand pump. The inlet end is further equipped with replaceable filter unit in such a way that the incoming grey water has to pass through the filter unit before getting stored.

The filter unit is made up of perforated steel racks where each rack consists of different range of filter medium depending on the required quality of treated water. The filter unit is designed in such a way that it can be easily hanged inside the steel tube at inlet end and can be taken out easily for any repair. The filter medium which is stacked in the filter unit can be of basic sand filter type or of advanced nanomaterial-based filter medium based on the requirement. After the pre-calculated number of washes, one can start withdrawing the water

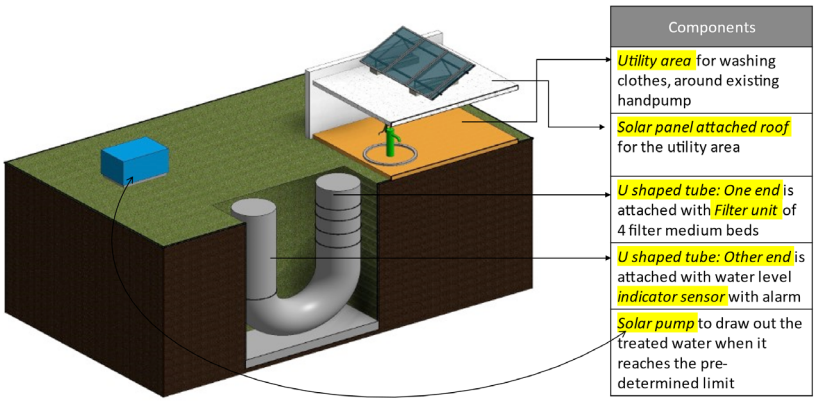

Fig. 1. Proposed U shaped water storage-cum recycler (AutoCAD Fusion)

through outlet and can use the same for other suitable domestic purposes. The status of water level in the tube can also be monitored and indicated with the help of ultrasonic sensor and IoT components. The use of steel tube stacked with filter unit can be a sustainable option in comparison with conventional underground tank for greywater recycling. The proposed model for conserving water can be implemented in village areas as well as in urban areas without intervening the existing activities and infrastructures. In addition, the proposed model proves to be an energy efficient since no need of energy in excess is required, comparing with the existing practices.

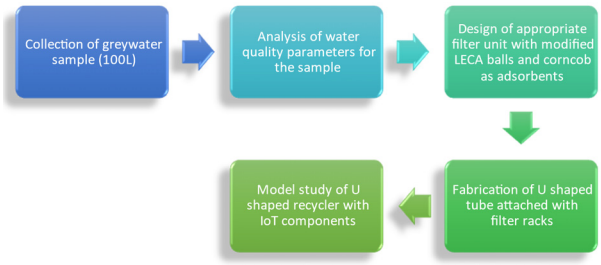

Fig. 2. Idea to prototype pathway for community washing room

'Idea to Prototype' pathway

Cost estimation for Prototype

Forecasted benefits and Conclusion

The highlights of our proposed system are:

(i) Energy required for the entire process can be derived from solar power.

(ii) Both manual and automated (through IoT) operation is possible.

(iii) No skilled supervision required for the operation. Villagers can utilize the facility on their own.

(iv) The proposed model can be implemented in villages as well as in the urban apartments for

S. No	Material	Cost per Unit	Requirement	Required Cost
1	Adsorbents (LECA)	Rs. 60/L	10 litres	Rs. 600
2	Adsorbents (Corncobs)	Rs. 50/Kg	10 Kg	Rs. 500
3	Perforated steel sheet	Rs. 55/Sq.ft	50 sq.ft; 10mm thickness; 2mm hole diameter	Rs. 2750
4	Steel metal sheet	Rs. 180/Kg	0.5mm thick metal sheet	Rs. 185
5	Mild steel bar	Rs. 45/Kg	10 mm dia MS bar	Rs. 50
6	Water Pump	Rs. 3000/0.5 HP	0.5 HP domestic water pump	Rs. 3000
7	PVC Pipes	Rs. 500/3m	20cm diameter; 1m length; 2 numbers	Rs. 500
8	PVC Elbow 90 degrees	Rs. 150/Piece	20cm diameter; 2 Numbers	Rs. 300
9	Water level sensor	Rs. 1000/ Piece	Water level indicator sensor with alarm	Rs. 1000
10	Contingency			Rs. 2000
				Rs. 10885
			Total (Roundoff)	Rs. 11000

Fig. 3. Forecasted budget of community washing room prototype

conserving the grey water without disturbing the existing elements.

In this paper we have presented the conceptual idea of community washing room for the conservation of rural produced greywater and discussed about the function of the system along with cost estimation for prototype development.

References

Fulvio B., Alice, C., Elisa, C., Luca, R., Silvia, F., Francesca, D., Ana, G., Joana, P., Anacleto, R. and Fabio, M. 2020. A review of nature-based solutions for greywater treatment: Applications, hydraulic design, and environmental benefits. *Science of the Total Environment*. 711 : 134731.