GREEN FUTURE THROUGH GREY WATER

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1. Introduction to Grey Water

1.1. Importance of Wastewater reuse

Sustainable water resources are essential for socioeconomic development, and yet water is often misused and wasted in today's society. The responsible use and reuse of water is vital to the sustainability of the water supply and thus for the future of these areas. The treatment and reuse of wastewater is one of the best options for water conservation. The potential for wastewater reuse is not only limited to large-scale projects supplied by community wastewater treatment facilities but is also available to individual homeowners. Greywater recycling offers a way in which people can save and reuse the wastewater generated in their homes.

1.2. Classification of Wastewater

Within the realm of household wastewater, commonly referred to as "sewage," a fundamental division exists, delineating two distinct categories: blackwater and greywater.

Blackwater which originates from toilets and kitchens has gross faecal coliform contamination and generally has high concentrations of organic matter and grey water which relatively lightly-polluted wastewater stems from our daily activities, including showering, laundry, handwashing, and dishwashing. Greywater is a relatively lightly-polluted wastewater generated from activities such as taking shower, washing clothes, washing hands, washing utensils, etc. and makes up to 70% of the water used daily. It largely contains suspended solids, dissolved soap and a negligible quantity of bacteria. It is called greywater because if stored for even short periods of time, the water will often cloud and turn grey in colour.

2. Sources of Grey water

The various sources for grey water are as follows:

- Washing clothes
- Washing utensils

- Bathing
- Handwash
- Washing utensils

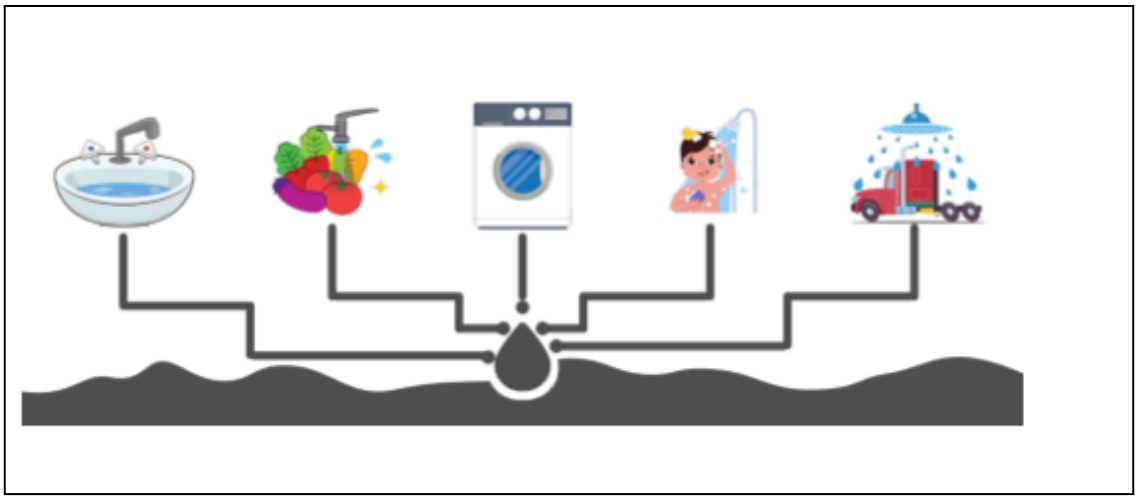


Figure 1 Different sources of grey water collection

3. Literature Review

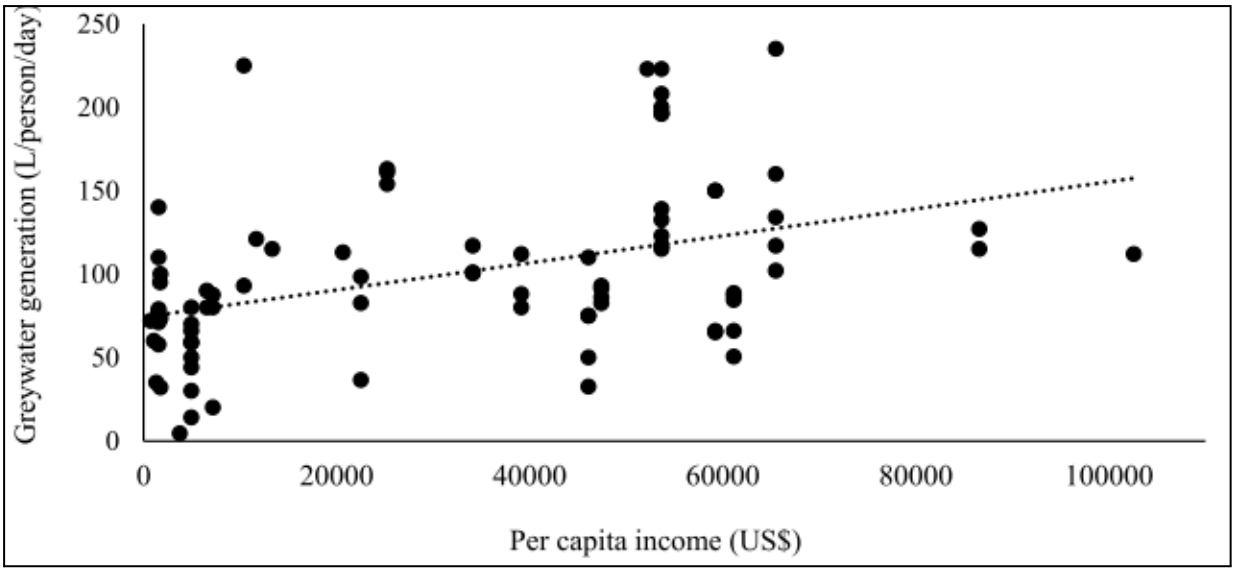


Figure 2 Relationship between greywater generation and per capita income in USA

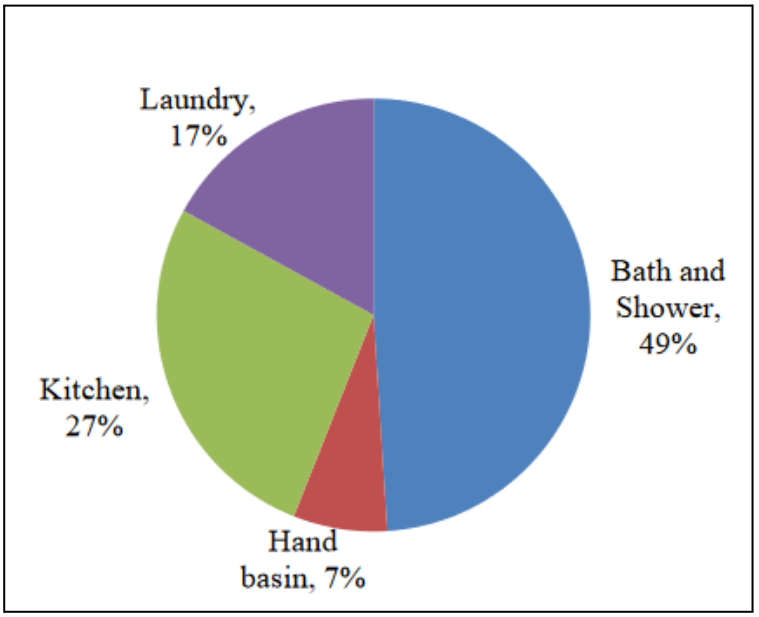


Figure 3 Treatment of greywater for reusing in non-portable purpose to conserve water in India.[7]

Table 1 Distribution of total domestic water consumption

Percentage (%)	Utilization of Domestic Water in different sectors in Household Activities							
	Drinking and cooking	Toilet Flushing	Gardening and others	Houses cleaning purpose	Bath and shower	Hand Basin	Kitchen or Dishwashing	Laundry
	3	**26**	**2**	**6**	**31**	**4**	**17**	**10**
					Net Grey Water = 62			

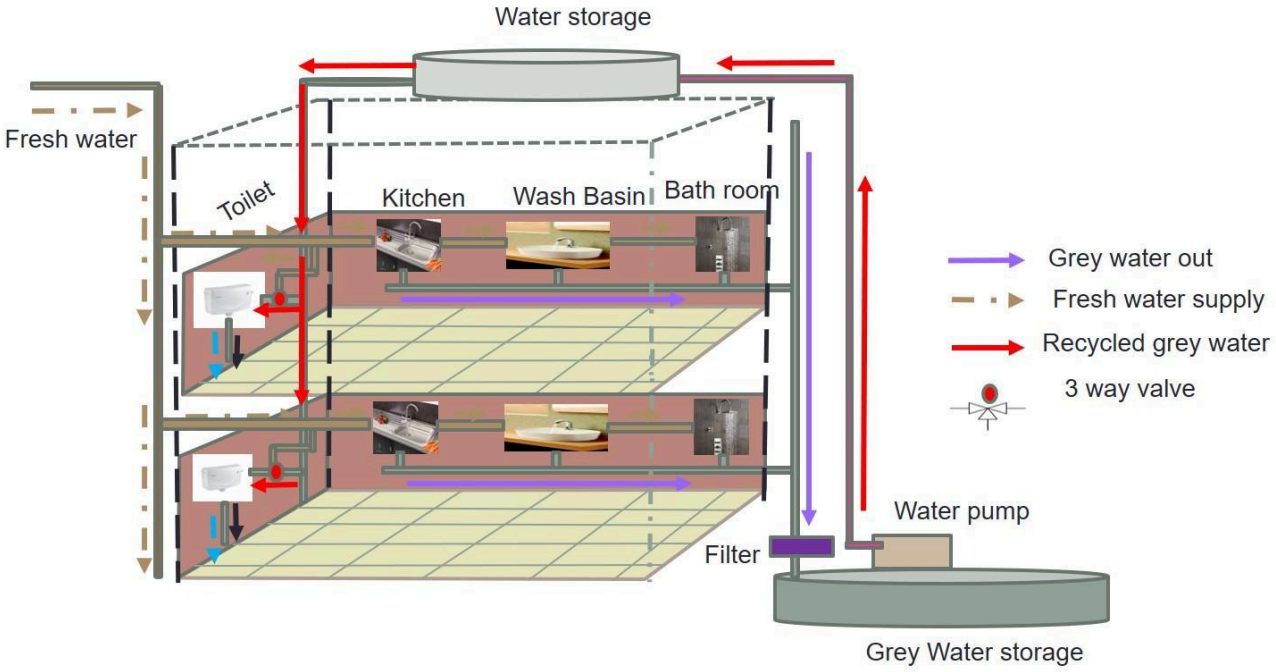
- By 2030, a minimum 21 cities in India will move towards zero groundwater level, as reported by World Bank on June 9, 2018. Metropolitan cities, like Delhi and Bengaluru, are already facing a water crisis.

4. Objectives

The present study aims to review the necessity of grey water treatment, practical technological solution for its implementation technologies and reuse of treated grey water.

5. Proposed Solution

Based upon the literature data it can be concluded that we will develop the grey water technological structure to address the current issues.



6. Economics of Savings

It is seen that by using grey water more than ¼ of water consumption is reduced as 62% is the grey water is available for utilization and we require only 26% for flushing (i.e. grey water can provide us more than double of what is required for flushing.)

7. Water Usage & Cost Estimation

Water Usage

Flush tank capacity≅10litre

For single use, half of the flush tank water is used ≅5litre

But flush is pressed 2-3 times continuously so used water≅10litre

Family members of 3-4 then, for a single time≅10×4≅40litres

In case of 2-3 usage of a family≅40×2or3≅80−120litre≅100litre in a day approximately

Water used during bathing for single use with a 20litre bucket by a family ≅20×4≅80litres

Water used for kitchen for two times a day by a family ≅20×2≅40litres

Water used for wash basin a day by a family≅5×4≅20litres

Total water used in bathing, kitchen & basin≅80+40+20≅140litres ≅100litres in a day approximately

Motor hp calculation for a 10-storey building (32m)

Height of single floor=3.2 m

For 10 storey =3.2m×10=32m

1hp can lift water around=12m

So in case of 10 storey 3hp=3×12m=36m

One Time Investment

2000 litre water tank≅Rs.20k

1000 litre water tank≅Rs.10k

Motor unit cost (3hp) =10-15k

Electrical Cost Estimation

3hp =2.24KW

If cost for electricity =Rs.10/unit

So cost of motor used one time for one hour=Rs.22/hr

For two times a day≅Rs.50/hr

Cost of electricity for a month=Rs.50×30days=Rs.1500

Water used for flush tan for a month=30×100litres=30,000litres

So 30,000 grey water cost=Rs.1500

Then 1litre grey water cost=Rs.1500/30,000

Then 100litre grey water cost for a day=Rs.(1500×100)/30,000=Rs.5a day

Means cost of 100 litre grey water is Rs. 5 a day for 3-4 family member, which have wastage of normal water & pocket friendly.

8. Conclusion

It can be concluded that grey water treatment and reuse must be taken as a promising step for the conservation of sustainable water in the present context of water scarcity across the globe in near future. The technology should be adopted based on grey water characteristics and the purpose for which treated water is to be used. The reuse of treated water can reduce our fresh water requirement for non-potable purpose such as toilet flushing, garden irrigation, floor and lawn washing etc. considerably in everyday life. Treated grey water is a substitute of fresh water to be used and the action may be taken to motivate the public for implementation of grey water treatment solution future buildings, complexes, public centers and households hold in water shortage areas.

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