

RESEARCH PLAN

Name of Finalist 1:

Name of Finalist 2:

Name of Finalist 3:

Title of project: To recycle grey water from households for use in gardens

Category: STEM / Environmental Studies

Country:

AIM

To design a simple “Do-it-yourself” filtration system to recycle grey water at home for re-use in the garden.

HYPOTHESIS

Grey water from the bath, shower and washing machines can be cleaned using a simple filtration system and reused in the garden. In an average household, recycling grey water would reduce its total water usage by 25-50%.

PROBLEM

Water shortage is a world-wide problem. If we look at statistics; the annual rainfall level in Africa is about 50% lower than the world average. Africa is ranked as the 30th driest country in the world. Climate changes due to global warming also affect rainfall patterns.

These challenges are becoming more evident; Africa has been experiencing low rainfall for the last 5 years, resulting in severe droughts in several provinces, being hit the hardest.

INTRODUCTION

It is important that everyone starts to look at ways of conserving water. In this study, I want to investigate ways in which we, everyday people can try and save water.

In our homes two types of waste water are generated: grey water and black water.

Greywater is wastewater from non-toilet plumbing fixtures such as showers, basins and taps.

Black water is water that has been mixed with waste from the toilet.

At present, most homes use potable (drinkable) water for almost everything in the house and garden. A large percentage of household water can be conserved.

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This project shall investigate the feasibility of recycling grey water in an average household. As black water contains harmful pathogens, I shall exclude it from this exercise

If a system can be implemented, that can collect grey water and clean it to a level that is ‘fit for use’ in the garden, then water usage can be reduced by 20-30%. I shall look at recycling all grey water from bathrooms and washing machines. The big picture is to conserve earth’s resources, but the advantage to homeowners would be financial as well.

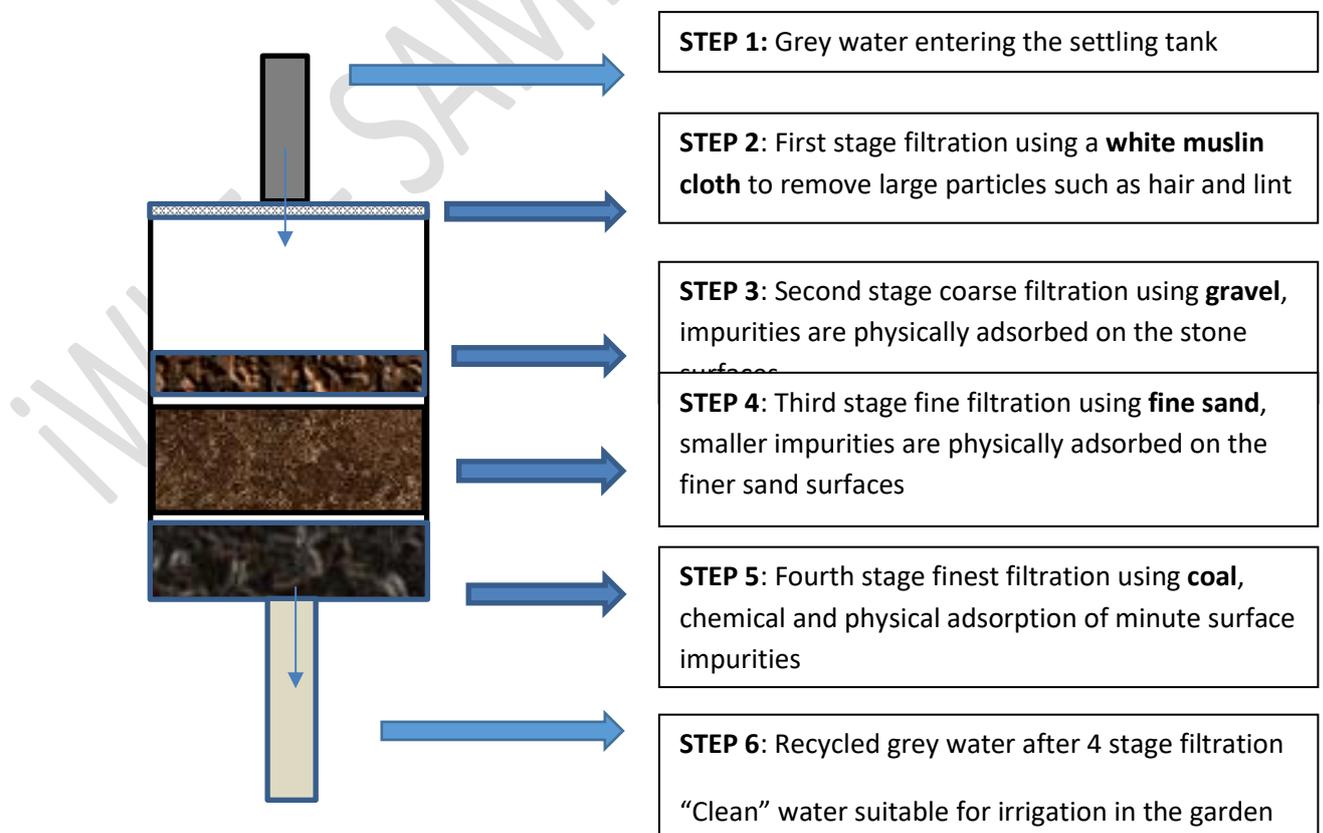
There are many companies marketing products for recycling water, but these are expensive to purchase, install and maintain. My proposal would be to design a system that is simple, cost effective and, “do-it-yourself” (DIY). These factors would be critical to the success of this project; as it has to appeal to the average homeowner.

During research, I came across a website called “greendiary.com”, from this I got the idea to build a simple “DIY” filtration system to recycle grey water in the home.

The easiest way would be to look at collecting grey water and filtering it through gravity feed system, as no expensive plumbing changes, and pumps would be required.

PROCEDURE

The diagram below shows the stepwise filtration procedure that I undertake to follow:



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VARIABLES

This method was chosen to ‘clean’ the grey water; the intention is that at each filtration stage, from coarse to fine, more and more impurities will be removed, resulting in a better quality “recycled water”, at the end of the process.

The **dependent variable** will be sufficiently ‘clean’ water, suitable for use in gardens. The qualities that will be assessed are odour and appearance (clarity).

The **Independent variables** will be the set up and method selected to recycle the water. The efficiency of this system will depend on the type of filtration media selected, the number of filters and the quantities of media used.

These filtration variables, as shown in the diagram above, shall be tested:

- Muslin cloth
- Muslin cloth + gravel
- Muslin cloth + gravel + sand
- Muslin cloth + gravel + sand + coal

DATA ANALYSIS

An analysis will be carried out after each filtration stage. As the recycled water flows through the porous structure of the different filter medium, further impurities will be removed (either physically or chemically), yielding cleaner and clearer water.

In summary, by developing a method to recycle grey water; household water use can be reduced by 20-30%, resulting in the following benefits: -

- a reduction in the need for fresh water, and a money saving
- a reduction in the amount of waste water entering sewer systems
- a constant supply of water for the garden, even during droughts or water restrictions

BIBLIOGRAPHY

- www.greendiary.com : How to make DIY gray water system
- www.durban.gov.za : Typical household water consumption Municipality 2009
- nepadwatercoe.org : Strategic overview of the water sector in Africa 2013
- www.dwa.gov.za : Overview of the African water sector
- www.greywateraction.org : Re-use of domestic grey water for the irrigation of food crops.

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