



# Domestic Water Treatment to Extend Water Supplies and Improve Irrigation



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## Introduction

The best gift we can give to the coming generation is water. Most of the Tanzania schools and other rural areas are affected with scarcity of water which hinders academic excellence and causes diseases such as cholera. More than 80% of Tanzania's population depends on climate sensitive rain-fed agriculture.

Thus our domestic water treatment system is a project which aims at ensuring proper water management and conservation by treating grey water available in the school environment using fundamental chemical principles in waste water treatment to produce water for irrigation, toilet use and construction purposes. Our water treatment system aims at treating grey water, which is the water that comes from kitchen, bathrooms and washing water.

Domestic grey water treatment is the best solution to solve the problem of water shortage ,at schools , households ,in villages , urban areas and in different manufactories as industries, this is because most of water that is used , instead of disposing it as usual , it can be treated and be brought back into use also it is the simplest method as it can be applied by anyone of low level education as it is normally taught in chemistry curriculum from primary ,ordinary and in Advanced level Education in Tanzania.

Therefore, this project will solve the problems such as scarcity of water to livestock keepers societies such as Maasai and Sukuma , poor agricultural yields in dry season due to dependence of rain water, spread of communicable diseases such as cholera and diarrhea , long distance walk in search for water (for example here in Laroi village in Arusha most Masai people walk long distance in search of water ,this delays other activities such as attending school to students).



## Method

In this project the method we have used to analyse and investigate the efficiency of our system is through chemical analysis that was achieved by technicians from ARUSHA TECHNICAL COLLEGE (ATC).

## Procedure

This project is a simple water treatment system that involves various phases in treating grey water starting with;

- Filtration. ,here different filters are used to remove different macroscopic particle like plastics , food materials and clothes .
- Sedimentation., in this chamber the water is allowed to settle ,so as heavy sediments can be formed at the bottom for discharging.
- Coagulation.in this chamber chemicals called coagulants such as polymers and iron and aluminum coagulants are used to remove all dissolved soap and other chemicals on the basis of stokes law and a clean water is obtained
- Sand filtration ,in this chamber an organized layer of gravel ,fine sand ,pebbles and Activated carbon is used to remove the odor and suspended particles from water .
- Chlorination ,in this chamber chlorine is added so as to kill bacteria left in water .finally the water is aerated and hence tested and it is ready for use.

With this method of water treatment, extraction of clean water is ensured and is the cheapest method that can be easily applied in terms of expense and operation in both rural and urban areas.



CONSTRUCTING A DOMESTIC GREY WATER TREATMENT SYSTEM



Our system was made and tested at our school and surrounding areas in laroi village , the climate is semi-arid

## Results

We have managed to apply this project in our school Arusha Science in Laroi and it has shown positive results as we have successfully reduced 75% of water cost as the water from kitchen and bathrooms have been recycled and again used for irrigation of gardens and flushing toilets, however further advancements are still being done to develop portable water.

The following are challenges that face our project

- Activated carbon accessibility is a bit difficult in the time being .
- Automation of the project needs extra knowledge and more advance electronic equipment; this has made the project to be operated manually at the time being.
- It needs some time to process and treat the water before ,it is ready to use.

## Conclusions

The outcome of our project has brought positive impacts to our community and school at large, and more interestingly we have designed this project in such a way that it can be applied anywhere in treatment of grey water.

On further achievement of our project, we are aiming at;

- Launching the project to other schools, rural areas, restaurants, hotels and households so as to solve the water problem.
- To automate the project and make it self-operating system that will reduce human interaction and increase efficiency.
- To generate income and create employment opportunities.

TESTED ATTRIBUTES	KITCHEN WATER	BATHROOM	IRRIGATION
TURBIDITY	900	300	600
PH	6.09	6.7	6-8
TSS	2700	450	2000
TDS	350	550	-
PHOSPATE	3.27	1.18	0-2
NITRATES	12.0	45	0-10
AMMONIUM	0.06	5.5	0-10
COD	435	256	-
BOD	217	128	30
OIL/GREASE	5	3	-
TEMPERATURE	24	26	-
SULPHATES	59.4	58.4	20

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