

Reuse of Greywater

By Eyad Sahawneh | February 24, 2017 | Agriculture, Conservation, Sustainable Development, Water

Greywater includes water from showers, bathtubs, sinks, kitchen, dishwashers, laundry tubs, and washing machines. The major ingredients of greywater are soap, shampoo, grease, toothpaste, food residuals, cooking oils, detergents, hair etc. In terms of volume, greywater is the largest constituent of total wastewater flow from households. In a typical household, 50-80% of wastewater is greywater, out of which laundry washing accounts for as much as 30% of the average household water use. The key difference between greywater and sewage (or black water) is the organic loading. Sewage has a much larger organic loading compared to greywater.



Importance of Reuse of Greywater

If released directly into rivers, lakes and other water bodies, greywater can be a source of pollution which can affect marine life, human health, ecology etc. However, after appropriate treatment,

greywater is suitable for irrigating lawns, gardens, ornamental plants and food crops, toilet flushing, laundry washing etc. Reusing grey water for irrigation and other non-potable water applications will help in reconnection of urban habitats to the natural water cycle, which will contribute significantly to sustainable urban development.

Reuse of greywater can help in substituting precious drinking water in applications which do not need drinking water quality such as industrial, irrigation, toilet flushing and laundry washing. This will, in turn, reduce freshwater consumption, apart from wastewater generation. For water-scarce regions, countries, such as the Middle East and Africa, greywater recycling can be instrumental in augmenting national water reserves. An increased supply for water can be ensured for irrigation thus leading to an increase in agricultural productivity.

The major benefits of greywater recycling can be summarized as:

- Reduced freshwater extraction from rivers and aquifers
- Less impact from wastewater treatment plant infrastructure
- Nutrification of the topsoil
- Reduced energy use and chemical pollution from treatment
- Replenishment of groundwater
- Increased agricultural productivity
- Reclamation of nutrients
- Improved quality of surface and ground water

How is Greywater Reused?

There are two main systems for greywater recycling – centralized or decentralized. In a decentralized system, greywater collected from one or more apartments is treated inside the house. On the other hand, a centralized system collects and treats greywater from several apartments or houses in a treatment plant outside the house.

Greywater reuse treatment systems can be simple, low-cost devices or complex, expensive wastewater treatment systems. An example of a simple system is to route greywater directly to applications such as toilet flushing and garden irrigation. A popular method for greywater reuse is to drain water from showers and washing machine directly for landscaping purposes. Modern treatment systems are complex and expensive advanced treatment processes comprised of sedimentation tanks, bioreactors, filters, pumps and disinfections units.

In order to transform greywater into non-potable water source, water from baths, showers, washbasins and washing machines has to be collected separately from black water, treated and eventually disinfected for reuse. Garden irrigation is the predominant reuse method for situations

where greywater can be bucketed or diverted to the garden for immediate use. Advanced greywater recycling systems collect, filter and treat greywater for indoor applications like toilet flushing or laundry washing. Greywater from laundry is easy to capture and the treated greywater can be reused for garden watering, irrigation, toilet flushing or laundry washing.

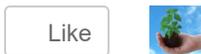
Water-efficient plumbing fixtures are vital when designing a household greywater reuse system. Some examples are low-flow shower heads, faucet flow restrictors, and low-flow toilets. Greywater systems are relatively easier to install in new building constructions as house or offices already constructed on concrete slabs or crawlspaces are difficult to retrofit.

Protection of public health is of paramount importance while devising any greywater reuse program. Although health risks of greywater reuse have proven to be negligible, yet greywater may contain pathogens which may cause diseases. Therefore, proper treatment, operation and maintenance of greywater recycling systems are essential if any infectious pathways should be intercepted.

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About Eyad Sahawneh

Eyad Sahawneh is a mechanical engineer with rich experience in construction and contracting, research and management, and industrial sector. He has professional certifications in various fields including FIDIC, International Organizations Management, Water Modeling, Energy Management, Urban Planning, etc. In addition, he furthermore, has professional membership with The Arab Countries Water Utilities Association, and Jordan Green Building Council. In recent years, Eyad is striving to achieve excellence in water and energy resources management, and its relation with the environmental framework.

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