

## **Greywater: What can we do?**

### **Introduction**

The availability of potable water in SA is declining at an alarming rate, as is evident in the current news headlines, and the public does not seem to take this decline seriously. Much like the electricity supply problems we have experienced in the last few years, we will soon face water shortages and restrictions. The government has tried to dissuade the public from “overuse” of water with a stepwise approach to water tariffs and billing. However, this seems to have little impact in more affluent areas within the country.

Rainwater harvesting is on the increase and government seems to have cottoned-on to the potential of this ‘solution’ by including rainwater harvesting tanks in the RDP housing. The more ‘aware and conscientious’ consumer also makes use of this option amongst consumers who can afford to make the necessary plumbing changes. These consumers tend to make use of borehole or groundwater as well. However, it is very costly to sink a borehole and make the necessary changes for the use of groundwater in an SA household (approx. R 70 000). The issue of groundwater recharge also needs to be considered with both of these options, specifically where the harvested water is used for any purpose other than irrigation.

### **Greywater integration**

The reuse of greywater is another similar solution to water supply issues but this option has not been explored or ‘advertised’ as extensively as other harvesting options. In addition, the majority of the research available on greywater is focused on reuse in terms of irrigation in SA. However, there are some studies that have incorporated greywater into household plumbing for toilet-flushing purposes. Such studies have shown potential in terms of water savings with such reuse and the costs of intergrating a greywater system into one’s household plumbing is significantly less than some of the alternatives. This being said, there is still a cost involved and the average household would not see the benefit of such integration.

### **Household use of greywater**

In addition, the aesthetic quality of the greywater, especially when stored, is a big limiting factor when it comes to household use. There are also issues around ‘policing’ the supply of greywater with a great deal of ‘discipline’ required to ensure that ‘greywater’ really is greywater. How can we ensure that the quality of the supply of greywater is consistent within any given household? The short answer is

that we can't. This variation in quality also makes generalised basic treatment solutions very difficult to manage. This means that the consumer cannot be assured of the aesthetic quality of the greywater supply and, thereby, is less likely to find greywater reuse an appealing water-saving option.

Whilst there are studies showing potential in terms of improving the aesthetic quality (taste and odour) of the greywater supply (Natha, 2014), not enough is known about the cost of the additional treatment steps required to affect this change, as well as the lifetime of the treatment system once these additional steps have been included or the costs to rehabilitate the system once it has reached its potential to 'clean' the greywater source. This is also exacerbated by the fluctuating quality of the water which makes it difficult to predict such an endpoint.

### **Greywater in the construction industry**

Studies into the reuse of greywater in the construction industry in SA are still very young and its potential, though known elsewhere, has yet to be determined in SA. The proposed use of greywater as an alternative water source in cement mixing and curing in SA has been met with trepidation on the part of large cement suppliers and rightly so. Using an 'inferior quality' water for these construction steps may result in serious health issues and even in strength and durability issues. These issues need to be taken seriously as failure in any of these departments could result in the loss of lives. Should this be the case, it would open up a series of doors to lawsuits and other legal actions being taken against the cement suppliers, building contractors and engineers involved in any one construction project.

Does this mean that greywater use in the construction industry is impossible? Not at all, it just means that much more research is needed before the industry will accept it as a viable option.

### **Greywater and green roofs**

The concept of a green roof is not foreign to SA but it is also not a widely available option and very little is known about the interaction between green roofs and water quality. Whilst a natural wetland environment has been shown to improve the quality of greywater for reuse, could not a green roof have the same ability, whilst having other added benefits to a household? Many countries have used the 'green roof' concept for decades, even centuries, with many benefits including natural insulation and water runoff attenuation. However, the majority of formal research has only focused on a new 'flat roof' installation scenario.

The average house in SA does not have a 'flat' roof, but an inclined roof (22° for the majority and 45° for old Cape Dutch Style housing). This would provide a great platform for the natural filtering of greywater but would pose problems in terms of increased load on these roofs and damp proofing required to set-up such a green roof system. Such a set-up would be very challenging to install, especially if the consumer wishes to use the 'filtered' water for other purposes after capturing it.

As far as carbon-footprint and water-footprint are involved, such a set-up would be highly beneficial, providing a natural alternative to home insulation, increasing the vegetative area of the home and, potentially, cleaning the water before it re-enters the water cycle by natural means. Again, if not installed or managed properly, such a system has the potential to cause other problems in terms of structural damage and health risks. We will need much more research to go into this possibility before it can be seriously considered as a practical or feasible option.

### **Where does this leave us?**

There are many options and ideas out there that could help us with water supply and quality in the future but all will require some sort of financial output which the average SA household can little afford. Much like the introduction of solar geysers and the rebate systems for their installation, the government or water boards would have to 'assist' if they wish to encourage greywater reuse in whichever shape or form. This will require manpower, regulations and governance to implement and, considering that water governance is already not what it should be, it does not seem likely that SA will make headway in this direction in the near future (before the SA public will be faced with water restrictions).

### **So what can we do?**

Education is the key. The SA public is becoming more aware of water shortages in the country due to recent headlines but more campaigning needs to be done to inform and encourage people or households about water reuse options (not just rainwater harvesting).