POLICY BRIEF

A summary for decision making of key research findings

Greywater adoption to address water scarcity in Oman

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Summary

"Increasing water supply is one of the most expensive options. Water-saving technologies and reuse of onsite treated wastewater are considered as alternatives in several countries. Globally it is shown that adoption of greywater technologies is beneficial to households living in regions that experience water scarcity. The relative importance of tasks that can accommodate non-potable water plays a significant role for adoption. Currently, the adoption of greywater technologies in Muscat is quite low. Policies to encourage the use of greywater are recommended."

Background

Water scarcity is a growing concern in many cities worldwide. Cities such as Sao Paulo, Los Angeles, Cape Town, Melbourne, and Tunis, among others, are suffering from water scarcity. Previous studies showed that since 2000 more than 75 global big cities have suffered from the recurring droughts. Despite growing measures taken in some cities to develop resilience capacities that protect against drought, the persistence of water scarcity has negatively affected the urban landscape in reducing the volume of water available for inhabitants. These changes in urban landscape have in turn contributed to a complete modification of consumption and production activities.

Traditionally Omanis were pioneers in using greywater in the Aflaj. But the current low adoption of greywater in Oman, in cities, is a source of concern where average consumption is of 200 l/cap/day and an average annual subsidy on the water bill of $2,125/ household (as per 2020). At current potable water prices, greywater on site treatment cost is far higher than the current price of water. Hence the water pricing policy plays a major deterrent to reuse of greywater in Muscat and in Oman in general.

Key messages

- *The use of greywater in Oman is low. Only 4.5% of respondents in Muscat are using greywater. In Cape Town, South Africa, up to 97% of respondents use greywater.*
- *The low adoption in Muscat region is due to the supply side policy consisting of increasing desalinated seawater supplied at a highly subsidized price and the absence of plumbing codes in new buildings.*
- *When plumbing codes are implemented, the use of greywater becomes financially feasible, as the cost of treatment is 27% below the current subsidized water and wastewater prices.*
- *Greywater technology allows three times more water saving than the water saving devices. The latter would allow a maximum saving of 10% while greywater allows a saving of up to 28%*
- *A combination of both saving devices and greywater technology should be considered.*
- *Among the most important policies that would encourage greywater adoption is the plumbing codes. The government should create the standards and require new buildings to separate greywater from black water.*

Method

A study titled “Decentralized grey water treatment as alternative option for water scarcity mitigation: Comparative studies and exchange of experiences between South Africa and Oman” funded by SQU and South Africa as a collaboration project was carried out to explore the potential to use greywater in urban areas in both Oman (Muscat city) and South Africa (Cape Town).

A survey run in Muscat city in 2019 interviewed 300 villa owners out of which 60% do have gardens. Semi-structured questionnaires were used to collect data. The collected data covered information pertaining to household and technology characteristics. A similar survey was conducted in Cape Town, the same year.

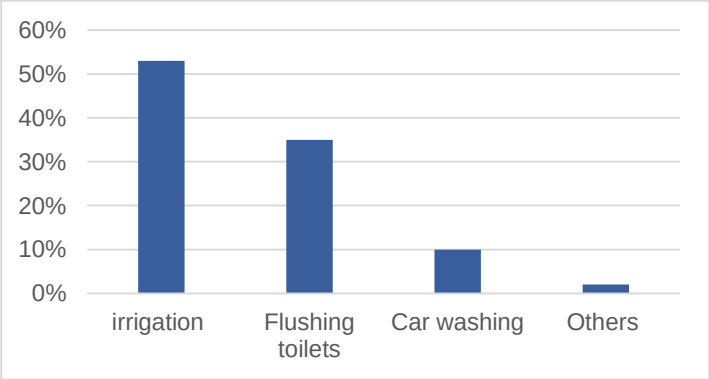
Key findings

Results showed that only 4.5% of respondents in Muscat are currently using greywater. All the respondents use the greywater exclusively for gardening. No indoor uses such as for flush toilet are reported. Households do not perceive any scarcity of water given the prevailing low price in addition to a good water service which is seldom interrupted.

In contrast in Cape Town, South Africa, 97% of the respondents use greywater. Even wealthy families do use greywater given the scarcity. Results showed that for Cape Town households living in urban settlements, the cost of greywater is 37% lower than the upper block water tariff.

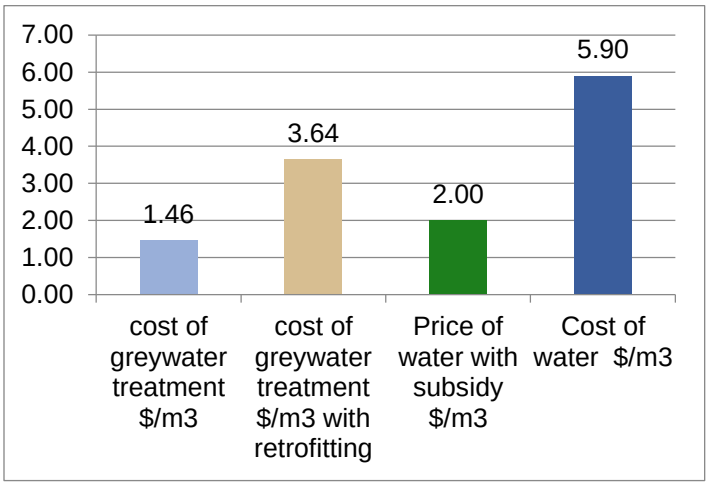
Greywater is more cost-effective than rainwater collection and borehole. Further investigations revealed that most of the collected greywater is used for irrigation purposes (53%). The second biggest use of greywater is toilet flushing. Car washing and others (washing floor etc.) account for less than 15%.

Figure 1 Use of greywater in Cape Town



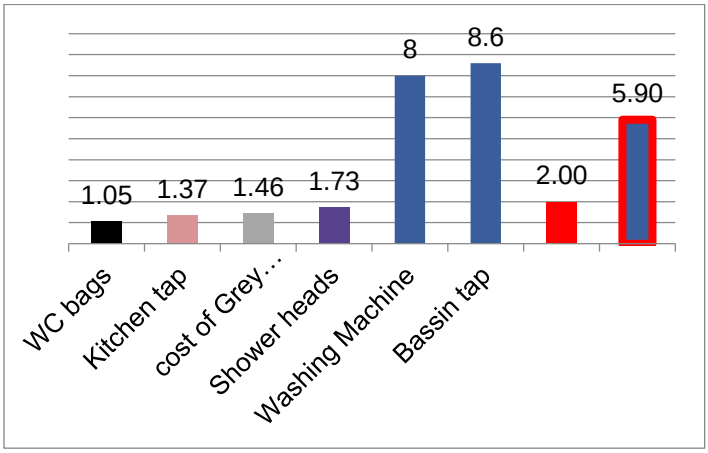
Plumbing codes are totally absent in the city. When plumbing codes are implemented, reuse of greywater becomes financially feasible, as the cost of treatment is 27% below the current subsidized water and wastewater price. However, installing a greywater system in an already built house requires retrofitting making the cost of greywater treatment 82% higher than the water and wastewater price paid by households.

Figure 2 Cost of greywater versus price of water in Muscat



The greywater technology is in disadvantage to other existing water saving devices such as WC bag and Kitchen tap. In fact, 40% of the respondents affirmed using one or several water saving devices. Greywater technology allows three times more water saving than the water saving devices. The latter would allow a saving of 10% while greywater allows a saving of up to 28% of potable water. Thus a combination of both saving devices and greywater technology should be considered.

Figure 3 Cost comparisons of greywater technology and water saving devices (cost of water in $/m^3)



Conclusions

Appropriate policies should be put in place to encourage adoption by households in Oman. Among the most important policies that would encourage greywater adoption is the plumbing codes. The government would create the standards and require all new buildings to separate greywater from black water. The greywater technology should also be specified to protect households from potential pathogen hazards.

The current water subsidy should be targeted to low income groups as well as conditional to adopt water saving devices and greywater by households. The subsidy should be linked to the reduction of the volume of potable water consumed after the installation of the saving devices/greywater. The subsidy is paid once but the water saving would last for ten years. This will result in a win-win situation where the public water authority will see a decrease in water demand and households see a reduction on their water bills. The increase of water and wastewater prices up to cost-recovery is a high effective incentive for the adoption of technologies that save water in Oman.

The public authority for water is encouraged to put greywater in the top agenda as an instrument to decrease household water demand to world level average of 90 l/cap/day. To encourage adoption of greywater technology in Oman there is a need to showcase adoption by the mosques and public buildings. Ninety five percent of the interviewees never heard about greywater technology. A well planned extension program should follow up the installations in demonstration sites. Beyond its academic and policy relevance, this study contributes at laying down new foundations that support long-term initiatives that aim at reducing the negative impacts associated with water scarcity and drought on societies.

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