

Stormwater and graywater offer alternative water sources, but guidelines needed on their safe use

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In the face of drought and major water shortages, the U.S. is increasingly turning to alternative water sources like stormwater and graywater, but guidelines and research on their risk to public health and the environment are needed to support decisions for safe use, says a new report from the National Academies of Sciences, Engineering, and Medicine. Graywater and stormwater could significantly supplement traditional potable water supplies using existing technology to capture and treat the waters, but there is currently limited information on the costs, benefits, risks, and regulation of such projects, the report concludes. Additional research and changes in infrastructure will be necessary to take full advantage of the potential of graywater and stormwater, the report adds.

Graywater is untreated wastewater from bathroom sinks, showers, tubs, washers, and laundry sinks, and [stormwater](#) is runoff from rainfall or snowmelt from roofs, parking areas, and land surfaces. These types of water can be collected and treated for nonpotable uses including irrigation, toilet flushing, and laundry and outdoor washing. The committee that conducted the study and wrote the [report](#) undertook a comprehensive analysis of the risks, costs, and benefits of various uses of graywater and stormwater, as well as their capture and use at household, neighborhood, and regional scales.

More research and data on stormwater and graywater quality are

necessary to assess the risks under various human exposures, particularly on the types and concentrations of pathogens that are likely to occur, the report says. Additional information is also needed on the organic chemicals in stormwater and their consequences for various uses.

The report recommends best practices and systems for the capture and use of stormwater and groundwater. In locations where it can be stored in aquifers for use during drought or dry seasons, stormwater captured at neighborhood and larger scales can significantly contribute to urban [water supplies](#). Stormwater infiltration—groundwater recharge—is commonly practiced, but the designs and regulations may not adequately protect groundwater quality, particularly for urban stormwater. Graywater reuse for nonpotable uses like toilet flushing and subsurface irrigation may provide arid regions such as Los Angeles potentially substantial water savings and a steady water source during the summer months when there is little or no rainfall. However, larger irrigation systems and indoor reuse requires more complex plumbing and treatment systems that are typically more appropriate for new multi-residential buildings and developments and for future urban planning.

Irrigation at the household scale can be achieved with simple systems that require little energy and maintenance, but the report notes that neither graywater nor stormwater should be used in arid regions to support landscaping that is not sustainable in the long term. If water conservation is the primary objective, alternative strategies like designing water-efficient landscapes to reduce or eliminate irrigation should first be examined and would provide much larger reductions in water demand in arid regions.

The report also notes that little is known about the impact of installing on-site water systems on homeowners' water-use behavior. This points to a need to study behavioral responses to conservation measures.

One of the greatest hurdles is the absence of risk-based guidelines that ensure water quality is protective of public health, the report says. Rigorous, risk-based guidelines could improve safety, reduce spending on unnecessary treatment, and assist communities that lack an existing regulatory framework for on-site water supplies. The committee recommended that the U.S. Environmental Protection Agency (EPA), a collaboration of states, or a collaboration of U.S. water organizations working with EPA develop these guidelines. Right now, there is substantial variation in on-site graywater and stormwater regulations at the state and local levels. Regulations have not evolved quickly enough to keep up with advances in technologies and their use, hindering the capacity for graywater and stormwater to significantly expand the nation's [water](#) supplies.

More information: Using Graywater and Stormwater to Enhance Local Water Supplies: An Assessment of Risks, Costs, and Benefits. (2016) [DOI: 10.17226/21866](https://doi.org/10.17226/21866)

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