CRC for
Water Sensitive Cities

Program C: Future Technologies | Project C1.3 | Project duration: July 2014 - July 2016

Fit-for-purpose water production

Overview

Clothes and car washing, toilet flushing, watering lawns, cooking and drinking are just some of the many uses of water. Not all of these call for high-quality drinking water; yet paradoxically potable water is the only kind currently supplied to most urban communities in Australia. Decentralised fit-for-purpose water production provides an excellent opportunity to sustainably, reliably and cost-effectively meet growing demands for water of various quality levels, thereby complementing centralised water supply systems. Widespread implementation of such treatment is however currently hindered by a lack of understanding of the risks for some raw water sources, in particular, stormwater; an absence of passive, low-energy consumption technologies that can reliably remove pathogens; and unknown operational and maintenance requirements for emerging technologies.

This project aims to deliver low-cost and low-energy filtration technologies that can produce fit-for-purpose water from a variety of sources including stormwater, greywater and wastewater. The focus is primarily on the required treatment of chemical and microbiological hazards in source waters to enable end uses such as unrestricted outdoor irrigation, indoor non-potable uses, and possibly in the future also potable uses.

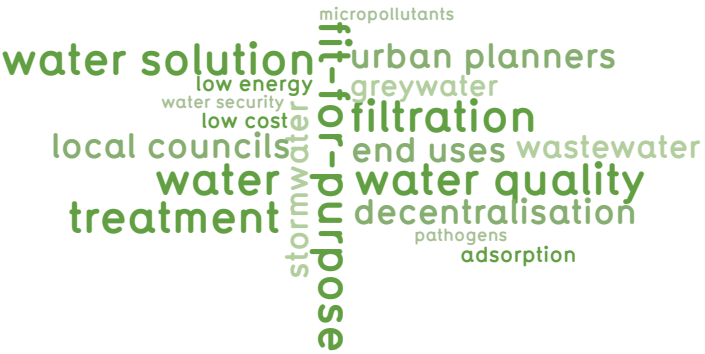
Figure 1. Biofilter monitoring (© Monash University).

Key outcomes

The project will address critical knowledge gaps in national research efforts on urban water security, which are primarily focused on centralised wastewater recycling or desalination, while stormwater and wastewater systems at local scales remain significantly under-utilised. The project will deliver a range of fit-for-purpose water technologies which, along with other systems, will be able to provide a comprehensive solution to water security problems in Australian cities and towns.

This project has only recently commenced in July 2014. The research is envisaged to be easily applicable by industry in the future. Novel treatment materials, such as those based on both adsorption and inactivation of pathogenic microorganisms, are being developed as part of this project. These systems, for example, could be incorporated into existing biofiltration systems similar to the copper-based zeolites which are being developed and tested in conjunction with Project C1.1 (Cities as Water Supply Catchments – Sustainable technologies). They could even be used at the household scale to treat greywater for irrigation or toilet flushing.

The project will continue to develop novel frameworks to robustly test new technologies coming out of Project C1.1, so that the end users can confidently utilise the designs under even the most challenging conditions. The project outcomes will ultimately assist water management agencies in implementing a wider range of water supply and treatment technologies, making their cities and towns more water resilient in the future.



An Australian Government Initiative

CRC AUSTRALIA

Project design

The first part of the project consists of a literature review investigating benefits and limitations of fit-for-purpose technologies currently used in Australia and around the world. A second stage will develop new passive treatment systems that can be employed as building blocks in modular and composite systems to provide a high level of flexibility in delivering fit-for-purpose water for a specific end use.

To provide reliable and effective treatment of pathogens and micropollutants, technologies which utilise dual process removal mechanisms (for example, adsorption and inactivation) will be given priority. Following laboratory studies, the project will apply developed novel filter materials at the field-scale by incorporating them into existing systems and establishing new pilot plants.

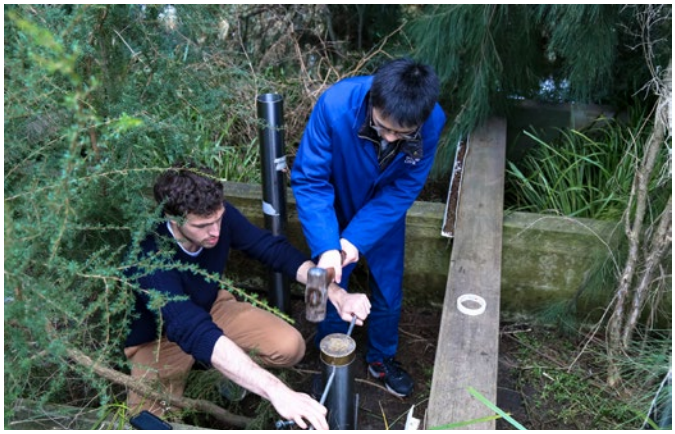
A final stage will develop validation methodologies to ensure that these systems are fulfilling their required function, and provide operational monitoring regimes which demonstrate their performance during operation.

Outlook

Within the next two years the project will develop, test and refine a suite of novel decentralised, low-energy treatment technologies that can deliver fit-for-purpose water production by drawing on the lessons learned from existing treatment systems.

Additional outputs from this project include:

- recommendations for designing and assessing fit-for-purpose technologies, including treatment trains for a range of applications and for different water sources, end uses, scales and climates
- training programs and user manuals for asset managers and end users to ensure systems are constructed correctly and continue to function into the future.



Biofilter monitoring (© Monash University).

About the Cooperative Research Centre for Water Sensitive Cities

The Cooperative Research Centre for Water Sensitive Cities (CRCWSC) brings together interdisciplinary research expertise and thought-leadership from Australia and the world to address current urban water management challenges facing our cities and regions. In collaboration with over 80 research, government and industry partners, it develops and synthesises knowledge into powerful tools and influences key players aiming to achieve sustainable, resilient and liveable water sensitive cities.

Further information

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