

## Muġitjulu Rainwater Tank and Point of Use Water Treatment System Trial

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Robyn Grey-Gardner is the Technology Transfer Officer with the Cooperative Research Centre for Water Quality and Treatment (CRCWQT) based at the Centre for Appropriate Technology Inc, Alice Springs. The CRCWQT undertakes research that seeks to provide the knowledge and innovative solutions for high quality, affordable water quality management. This project forms part of its Regional and Rural Water Supplies program, which involves end-users in the development, conduct and utilisation of research specific to regional Australia including small rural and Indigenous communities.

### ABSTRACT

*This project is of particular interest to outstations and small remote communities that seek to provide safe drinking water to a small number of dwellings. Rainwater tanks and appropriate point of use treatment systems may provide a manageable, cost effective and sustainable drinking water supply.*

*This paper describes a field trial of a rainwater tank design and a point of use water treatment technology on seven houses in Muġitjulu, Northern Territory. This paper describes the rainwater tank design, technology choice and water monitoring for the trial. The research project adopts an holistic approach which acknowledges that the sustainability of the infrastructure and technology will depend on environmental pressures, on-going repairs and maintenance and the acceptability to the users.*

### Introduction

The Muġitjulu rainwater tank and point of use treatment system trial began two years ago after the Muġitjulu community requested that rainwater tanks be included in the delivery of their NAHS housing. The community wanted to exercise their felt right to collect the water that fell on their Country, especially as it tastes better than bore water. The community agreed to participate in the trial because the information could help them secure safe, tasty water at their outstations. Planning for the project began in 2000. The planning included designing a robust system that would provide safe drinking water appropriate for remote conditions. The trial monitors specially designed rainwater tanks and piping systems on seven NAHS houses that were completed in August 2002. The water testing and system monitoring will continue until Dec 2003. Information from the trial will allow the Muġitjulu community to be fully informed of the on going costs and maintenance responsibilities required for the upkeep of the rainwater tanks and water treatment systems.

### Infrastructure Design

The rainwater tank and piping infrastructure features design elements that will keep the system working for as long as possible in the remote arid environment (Table 1).

WHAT	WHY
Wide round gutters	Effective water collection and easy to maintain
16,000 Litre storage tanks	Provide lots of water during drought times and for large household populations
Light coloured Polyethylene (Poly) tanks	Poly tanks are easy to fix, light colour keeps water temperature cooler than dark colours
Rain head protector on inlets and stainless steel screens screwed to outlets	Mosquito protection
Underground piping	Protection from environment (sun, heat, dust and animals) and vandal damage
Tamper-proof bolts on Poly tank lids	Prevent children getting into tank
One self-closing tap piped to kitchen	Convenient in kitchen, reduce water wastage
500L settling tank prior to storage tanks	Acts as an accurately sized and low maintenance interceptor
Overflow directed away from house into gravel trap	Stops flooding and pools of water or mud

Table 1

### **Water Treatment Technology**

The houses are fitted with a small water treatment system. The system is a 'Point of Use Treatment System' (POUTS), which usually fits under the sink. The system sits on the verandah outside the kitchen in the seven trial houses at Mutitjulu. This is the best location for the purposes of the trial because the water can be sampled without disturbing the householders. The Mutitjulu houses have ceramic water treatment systems for the following reasons:

- Suitable for rainwater
- Ceramic filter can be cleaned on-site using a soft brush or scourer pad
- Ceramic cartridge is easy to replace
- Ceramic filter is less prone to clogging up than other types of filters
- Ceramic filter can dry out and still perform properly
- Ceramic filter is silver impregnated which acts to kill bacteria
- System can be designed without the need for power (a gravity fed system)
- System will not deliver untreated water

### **Training Program**

The rainwater tank and ceramic filter, like all technologies present challenges to the user. The system is appropriate but not maintenance-free. To initiate knowledge sharing the householders participated in a training program run by ATWORK (training providers at Centre for Appropriate Technology Inc). The householders learnt how the system operated and understood the research project objectives.

The training program was the first step in the capacity-building component of the research. Recognising that households are likely to change, further capability strategies include the production of a locally made video in Pitjantjatjara showing steps to use and maintain the system.

### **Water Quality Monitoring**

Water quality monitoring and system testing will continue over the next two years. Microbiological water quality testing includes *E. coli*, *Giardia*, *Cryptosporidium*, *Clostridium perfringens* and faecal sterols. The water quality monitoring will provide evidence about the potential risks, how well the settling tank performs as an interceptor and the effectiveness of the treatment system. The system monitoring is designed to assess the overall performance of the system including robustness, cost effectiveness and the identification of any desirable improvements in design.

### **Conclusion**

The Mutitjulu trial will provide useful information for other Indigenous communities about the effectiveness of rainwater tanks and POUTS in providing safe, affordable drinking water. The results may enable remote communities to produce safe and reliable drinking water supplies by using small water treatment systems. Compared to conventional water treatment systems, POUTS are small, low maintenance and inexpensive to install and operate, primarily because water is treated only as required.

Further information is available in a two page article on Rainwater Harvesting, called Bushtech #4. Copies are available free of charge from The Centre for Appropriate Technology Inc. ph. 08 8951 4311.

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