

## Introduction of water conservation education packages: the opportunities and constraints affecting their success

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**Abstract** The Remote Area Developments Group in the Institute for Environmental Science at Murdoch University developed a video and booklet education package on water conservation. The package was developed after research, review of current efforts in water conservation, and consultation with communities showed that there was a need in this area. The package was distributed to all communities within Western Australia. Several different workshops were conducted with Indigenous Environmental Health Workers from around Western Australia in remote areas and in the Perth Metropolitan communities using the package. This paper will briefly describe the opportunities and constraints that exist for water conservation in remote Aboriginal communities in Western Australia as well as give an evaluation of the education package based on workshops, trials and survey instrument. This paper will explain the conclusions that have been drawn from the study: that a broad delivery style is the most advantageous style for remote communities, allowing the facilitator to assess the best style of delivery.

**Keywords** Education; water conservation; western Australia

### Introduction

Around 63% of Australian people live in large urban areas where the water supply is reliable, safe and is piped to their homes and it is not a major concern for health or quality of life. The majority of the indigenous people of Western Australia around 42,000 people, or 2.7% of the population (EHNCC 1997), live in small rural and remote population centres. For these indigenous Australians access to a reliable water quantity is of a high-priority, sometimes a higher priority than the levels of the water quality (Henderson and Wade, 1996). Indigenous people in remote communities are often still living in rudimentary conditions while their urban counterparts have full amenities, with low cost water supplies and behavioural practices that are somewhat inappropriate for an arid continent. As remote indigenous communities continue to develop and gain more housing infrastructure, household appliances and municipal services, their water use will increase. In some cases costly solutions may have to be implemented to augment supplies. Water conservation techniques and education could sometimes avoid the need for further augmentation.

In Western Australia there are 259 discrete Aboriginal communities, many of these communities have small satellite communities known as "outstations" or seasonal camps (EHNCC 1997). In the 259 remote communities in Western Australia there are five different types of water supply. They are groundwater supply via bores and wells, rainwater tanks, soaks, dams, piped town water supply or carted water from another location. Around 400 people each year have to live in a situation where their water supply will run out (EHNCC 1997) and 18 out of 178 communities surveyed by the Australian Construction Services in 1993, had water restrictions due to equipment breakdown, lack of storage, drought and an exhausted water source (ACS 1993). Water conservation can be vital to the livelihood, health and quality of life of Aboriginal people in remote areas of Australia.

Non-indigenous Australians have inhabited Australia for just over 210 years, in that time the water resource has been severely exploited. There has been considerable

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degradation of the nation's water resource, whereas indigenous people have lived in a sustainable manner on the continent for many thousands of years (Henderson and Wade, 1996).

In response to this degradation and exploitation, promotion of water conservation and efficiency is documented in Australia for non-indigenous people (McLaren *et al.*, 1987, Phillips 1993, Water Corporation 1998, Ho *et al.*, 1998). This is not the case for indigenous communities. There has been limited research in this area with only few examples documented (Pholeros *et al.*, 1993, Healthabitat 1999, Toyne *et al.*, 1996, Scollay 1999). Cultural and lifestyle differences between the communities that are located in remote areas or urban areas, mean that water conservation strategies will be very different. For example, in a community with a high rate of infectious disease more and longer showers are to be encouraged.

### Opportunities

There are five main approaches that can be taken to implement water conservation in remote indigenous communities. These include:

- lifestyle changes;
- maintenance of hardware;
- increasing efficiency of water usage;
- introducing new technologies; and
- ensuring that hardware introduced to communities is constructed according to guidelines or regulations.

Whether or not these approaches are appropriate to each region and community or whether they can be adopted requires an understanding of the current situation of water use patterns. A raised awareness at an individual and community level for improved practices, trialing of new technologies, changes to government policy and improving the management and maintenance of the hardware available are advantageous to the implementation of water conservation techniques.

With these factors in mind, workshops in various regional centres around Western Australia were conducted. The major conclusion was that large water savings can be made in communities. The results of the workshops can be seen in Table 1. The workshops helped to establish levels of water use in various areas. The workshops have found that level of water usage is often below that of an average metropolitan Perth household and that there are many areas where water conservation techniques can be introduced and implemented.

For example, RADG had installed water meters on one new house in a remote community with the support of the community and other consultants. Readings were taken on the

**Table 1** Savings calculated at two different workshops, using the "Saving Water for Healthy Communities" held at Murdoch University

Area	Estimated weekly water savings (L/household/week)	Estimated community water savings (kL/household/year)	Reference workshop
Perth Metro (house a.)	350	3.0	May 1999 Murdoch University N430 Unit
Perth Metro (house b.)	840	44	May 1999 Murdoch University N430 Unit
Meekatharra	2,100	109.2	April 1999 Environmental Health Worker Training Module
Carnarvon	21,000	25	April 1999 Environmental Health Worker Training Module
Kalumburu	35,700	1,856	April 1999 Environmental Health Worker Training Module

**Table 2** Levels of water use in different regions within Western Australia

Area	Estimated daily water use (L/household/day)	Estimated weekly water use (L/household/week)	Estimated yearly water use (kL/household/year)	Reference workshop
Perth Metro	110	350	18.200	May 1999 Murdoch University N430 Unit
Perth Metro	263.5	1845	95.94	May 1999 Murdoch University N430 Unit
Cullacabardee	662.09	4634.61538	241	May 1999 Murdoch University N430 Unit
Kalumburu	731	5,117	266.084	April 1999 Environmental Health Worker Training Module
Laverton	1,400	9,800	509.600	April 1999 Environmental Health Worker Training Module
Jigalong	3,000	21,000	1092	RADG Site visit
Average Perth household	893	6,250	325-350	

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most recent visit where it was noted that the house was occupied by a family of 2 adults and 2 children with several other children being present for much of the day. A main inlet meter to the house was installed on 30/8/99 with an initial reading of 55,370 litres. At 11 am on 16/11/99 the meter reading was 265,617 litres, which indicated a daily consumption rate of nearly 3 kL/day or about 3 times the City of Perth household daily rate. At 11 am the next day this meter read 271,745 litres which indicated a consumption of approximately 6 kL in that 24-hour period. Meters had also been installed on the indoor and outdoor toilets. The readings here were 83,769.5-84,358.8 litres and 2,203.0-2,214.0 litres indicating a consumption of 590 and 110 litres respectively or at least 100 and 20 full flushes in each case. These are high values. The indoor toilet was leaking considerably. Leakage is often the cause of high water use in remote areas because the water is highly mineralised and results in scale buildup on seals.

In the workshops there is an opportunity to teach and demonstrate maintenance techniques to participants and to show working examples of water efficient systems and how to retrofit existing systems. Hands-on teaching and demonstration is a very effective method of education and can often change the attitudes and behaviours of the participants.

### Constraints

By application of water conservation practices through the above mentioned five main areas precious water resources can be conserved in remote indigenous communities. However there are obstacles, physical and institutional, which can constrain the extent of conservation.

There is a need to use more water to improve health, provide more housing, and vegetate communities for dust suppression and to grow food. Water supply is one of the main determinants of environmental health in a community and at times reduced water use may not be beneficial, especially in communities where infectious diseases are a problem (Henderson and Wade, 1996). Therefore people can often believe that water conservation is not of a high priority.

People often do not see water conservation as a priority as there are many other areas where urgent attention is needed and these gain the limited funding or skilled personnel. The needs for health hardware, health services, youth workers and enhanced school programs are some areas which may take higher priority over water conservation.

Other institutional obstacles to water conservation are the techniques which contractors (e.g. builders and plumbers) bring to the communities. During consultation, engineers,

bureaucrats and tradespeople, without understanding the long-term impacts of technology that is implemented in communities, often respond directly to the needs felt by community residents. These needs are often perceived by engineers to be the same as those for people living in urban centres (Dallas *et al.*, 1998). This results in some conventional practices that are not suitable for conditions in many remote communities. For example, poor quality tap-water that cannot withstand the high usage and poor water quality and inappropriate internal drainage that cannot support the large number of people using the house.

High levels of hardness, dissolved salts, or conductivity of the water can constrain the physical water conservation techniques. Flow restricters, seals and aerators usually malfunction because of the build up of scale on them, which causes more problems. The National Health and Medical Research Council drinking water guideline for TDS is 500-1000 (NHMRC 1998), however these levels can cause scale formation and some communities receive water supplied with a TDS greater than 1,000.

Remote Aboriginal communities, like any organisation, have to work to a budget and this may prevent the introduction of new hardware. Some of the hardware has high maintenance needs and this may not be met in some communities due to lack of skills and implementation and the limited scope of the Remote Area Essential Service Providers tasks.

### **Education package**

To overcome some of these constraints, the Remote Area Developments Group produced a package consisting of a video and booklet, which was distributed to various communities around the state. Workshops were conducted with various members of the communities. School teachers and pupils, the Community Development Employment Program workers and Environmental Health Workers were people typically involved. Feedback from some communities was received in the form of surveys. The workshops varied in delivery techniques and included conducting household water audits, training on maintenance of hardware, as well as discussions and informal lectures.

Raised awareness of water conservation issues can be brought to the community members, community management and community workers through a video, on-site workshops, CD-ROM, theatre and drama as well as posters and other art projects. Participants in the workshops felt that an educational video, on-site workshop and different art projects were the most appropriate tools for water conservation education. The participants also believed that educating the community members about the current water situation in the community would be more beneficial than changing government policy or trialing new ideas. They thought that this education, however would have to come hand in hand with increased support from the Regional Service Providers, which would include more community visits and training as well as employing more community members.

Training packages such as the RADG's "Saving Water for Healthy Homes" can also bring increased technical understanding of the problems which can occur in the community. They can introduce techniques, which are different to the conventional practices used in many institutions e.g. innovative engineering and plumbing practices.

### **Evaluation**

The education package increased awareness of the issue of water conservation in the remote communities. There were however certain limitations and issues with the kit and the practices that were used on communities, as may be seen from the following examples.

- The kit was only suitable for remote areas where water was not on a town scheme supply. It was understood from the workshops held with metropolitan communities that the value of the water is very different in remote areas. Participants in the workshops thought that their community would use more water as the population increases, and if

more houses and gardens were built, but they did not think that this increase would cause the water to run out or to be in shortage.

- Problems existed in the community education practices and the ability to include the kit in the community school. The information included in the kit needs to be integrated in the school's teaching curriculum for it to have a significant influence on household behaviour in the longer term. 78% of the respondents to the survey held this view.
- The dynamics, population, infrastructure, management and life in general, in each community or each region can differ greatly. Designing a package that is relevant to each region was beyond the scope and the budget for the development of the kit.
- The booklet and video were recorded and produced in English. In remote communities English is often only spoken in the schools and is the second language of many people. Producing packages in the local languages was also beyond the scope and budget of this project.
- The booklet had a large emphasis on literacy and numeracy that was at an advanced level. Unfortunately these levels were not suitable for many of the participants that attended the workshops. The video was not of a highly technical nature and was therefore appreciated by a wider audience.

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### Conclusions

Considering all the constraints and opportunities, recommendations and conclusions can be made regarding water conservation education and implementation strategies on remote Aboriginal communities in Western Australia. This study has found the following.

- a) Taking a broad approach to the delivery of educational practices is beneficial including a casual hands-on approach. This should include having several different delivery techniques for the education package, this will allow the facilitator to be able to tailor delivery in each community to meet the specific needs of that area.
- b) When taking a broad approach to delivering the information, activities should include hands-on activities. For water conservation these activities can include conducting water audits on site, as well as workshops, and hands-on training in repair and maintenance of plumbing fittings, appliances, pumps and piping.
- c) Any training on communities should occur with community members, workers and management. In the case of water conservation, the Essential Service Operators, Environmental Health Workers, administrators as well as teachers are the ideal recipients, so that maximum exposure of the new information and ideas can occur.
- d) Regional Service Providers should also receive training to introduce the water conservation techniques relevant to the region. Techniques can then be introduced within the repair and maintenance and training component of the services provided.
- e) Increased washing of people on communities is a necessary component of reducing disease, rate of hospitalisation and even death (Healthabitat 1999). There should be concentration on the techniques that optimise availability such as recycling wastewater and techniques that can help improve the overall health of the community i.e. house yard design to reduce watering and increase dust suppression.
- f) Information such as the RADG's "Saving Water for Healthy Communities" should be included in the curriculum of the schools in the communities, so that the children are aware of the need for water conservation and can grow up with the correct perceptions of water and its usage.
- g) The way to best convey water conservation techniques is not through calculation of actual savings; it is through hands-on training and talking through questions in a workshop style. Being able to implement water conservation techniques is not dependent on the person having adequate numeracy and literacy skills, therefore the training and

teaching of water conservation skills should not be dependent on the person being able to read or have numeracy skills, as was often the case with this workbook. The calculations could often not be completed without a calculator or adequate numeracy and literacy.

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