



# Changing household water consumption practices after drought in three Australian cities

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## ABSTRACT

One of the major challenges of moving toward more sustainable and water sensitive futures is to change people's everyday water consumption habits. The experience of the Millennium drought in Australia (1996–2010) and water restrictions introduced during that time intervened to change everyday water practices in specific ways creating durable change in some practices and mutable change in others. Drawing on focus groups with 62 people, in three diverse Australian cities, a rich picture of diverse water practices emerges. Using a specific social practice framework we explore the key practices of garden watering and showering and tease out the elements in each – we discuss how and why there has been more innovation and change in garden practices than shower practices. We argue that sustained water restrictions drive material change in households and these material changes appear to be more effective in changing water use than transforming water saving competencies or meanings alone. Further, we show that the commitment and resistance to water saving has a spatial context – data from three different cities allowed us to see how location, climate and policy responses interweave with everyday practices. The implication of our research is that policy interventions should be 'fit for purpose' according to social practices in spatial context.

## 1. Introduction

Australian cities and regions have unique topographical and geological structures that affect water availability, water use and conservation in diverse ways. In this paper we explore Australian householders' experiences of changing their water practices in response to the Millennium drought in the eastern cities of Brisbane and Melbourne and severe water shortage in the West Australian city of Perth, and the implications for moving toward more sustainable and water sensitive futures. These cities are case studies to explore the differing relational interplay between the socio-technical elements that constitute everyday water consumption practices.

Over recent decades, the water supplies of most major Australian cities have hit comparatively low levels, and continue to be threatened by variations in conditions caused or exacerbated by climate change (BOM, 2016; Fitzgerald et al., 2014). In Melbourne, for example, from 1998 to 2007 Victoria experienced annual rainfall 14 per cent below the 1961–1990 average, whilst the average daily maximum over this period was 0.6 °C warmer. As a result of this reduced rainfall, yearly inflows into Melbourne's major water storages 'dropped from almost full in October 1996 (97.5 per cent) to only one third full by June 2010 (33.0 per cent)' (BOM, 2016). For the past 45 years the southwest of

Western Australia 'has experienced a 10 to 20 per cent drop in winter rainfall' (BOM, 2016), which has resulted in a drying climate and impacted dam reserves (Water Corporation, 2010). The water levels of dams supplying Brisbane have dropped below 20 per cent in the last 10 years due to the increasing frequency and duration of droughts (Willis et al., 2013). Following the drought Brisbane experienced unusually heavy summer rains, which impacted significantly on dam levels and resulted in a devastating flood in 2011.

Over the course of the Millennium drought (1996–2010) state government statutory authorities responsible for water enacted a number of water conservation strategies. Water restrictions in different cities included reduced garden watering (such as, allocated watering days in summer and winter sprinkler bans with fines for non-compliance and the 140 L/155 L domestic water saving campaigns in Brisbane and Melbourne respectively). Brisbane and Melbourne reached the highest level of restrictions but those in Perth were lighter allowing householders to enjoy a 'relatively profligate water lifestyle'. Perth residents had the highest per capita consumption of any Australian city between 2003 and 2009 (Syme and Nancarrow, 2011; Water Corporation, 2010, 2011). Water conservation incentives directed toward householders in the three cities, included subsidies to fit water saving appliances (such as, aerated showerheads, dual flush

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toilets, rainwater tanks).

There were also large-scale technological interventions, so-called ‘Big Water’ solutions (Sofoulis, 2005) including the construction of desalination plants in Perth, South-East Queensland and Victoria, although at this stage only Perth’s desalination plants are permanently online (Beal et al., 2014; Fitzgerald et al., 2014; Makki et al., 2013; Melbourne Water, 2014; Sahin et al., 2015; Seqwater, 2015; Turner et al., 2010; Walton and Hume, 2011; Willis et al., 2013). Perth is distinctive for the way in which it has dealt with a prolonged drying climate. The government has pursued a policy of ‘drought-proofing’ Perth large scale technologies, such as desalination plants, ‘tapping’ deep aquifers to supplement water supply from dams, and groundwater replenishment (Frost et al., 2015; Loh and Coghlan, 2003; Water Corporation, 2010, 2011). Further, Perth’s geological and hydrological context provides many householders access to unmetered groundwater through garden bores. Although not a ‘Big Water’ solution, accessible groundwater reduces strain on potable water reserves.

The Millennium drought eased in 2010 in Melbourne and Brisbane on the east coast of Australia (BOM, 2016). By 2015, when this research was conducted, drying conditions persisted across south-western and south-eastern Australia. In the three cities in this study climate variability (as shown in Fig. 1) and government interventions have co-evolved to shape the hydro-social cycle (Linton and Budds, 2014) and create a sense of water scarcity or abundance, which, we will show, is an important part of the context of householders’ experiences over the last 15–20 years (Lindsay et al., 2017).

In this paper we compare two key water use practices – garden watering and showering – to explore commitment and resistance to water saving and the possibilities for durable adaptation to climate change. Water use in gardens is underpinned by deeply held values, cultural and social ideals and expectations. The Australian backyard is a cultural icon born of a preference for low-density suburban living in our cities (Davison, 2008; Frost et al., 2015; Head and Muir, 2007b; Syme et al., 2004). The backyard over the 20th century has been a site of production (vegetables, chickens, etc.), relaxation, recreation and social

identity and it remains integral to the ‘Australian Dream’ of a house on a quarter acre block. In recent years though the Australian backyard has changed – lot sizes are smaller and houses are bigger which has reduced the number of trees and green space in suburbs (Head and Muir, 2007b).

Considerable research has concentrated on water use in gardens and alternative water sources that can be used in gardens, such as rainwater tanks (Askerk and McGuirk, 2004; Delaney and Fam, 2015; Gardiner, 2010; Head and Muir, 2007a, 2007b; Moy, 2012). The high value placed on gardens in everyday life often provides intense motivation for people to recycle or collect water, for example, through installing rainwater tanks or collecting shower water in buckets, in order to sustain their gardens as places of relaxation, leisure and identity in times of water scarcity and drought (Allon and Sofoulis, 2006; Askerk and McGuirk, 2004; Gardiner, 2010; Head and Muir, 2007a, 2007b; Moy, 2012; Syme et al., 2004).

Everyday water use inside the more private domain of the household is also underpinned by deeply held values and social ideals. Within households water use is connected to cultural ideals of morality, cleanliness and public health. Changed etiquette around toilet flushing, bathing and wearing clean clothes on a daily basis have resulted in a phenomenal increase in water consumption per capita over the twentieth century (Davison, 2008). Shove’s (2003) UK work on changes in showering practices over time is particularly important in this research field. The standardisation of levels of ‘cleanliness’, ‘comfort’ and ‘convenience’ in both domestic and public realms means that bodily cleaning in Europe and Australia changed from weekly bathing to daily showering over a generation (cf. Hand et al., 2005). In recent decades the number of bathrooms in households has increased and the focus has changed from achieving hygiene to achieving well-being through showering (Quitza and Røpke, 2009). Technologies such as hot water systems and showers make everyday life easier but also facilitate the use of resources in unsustainable ways (Shove, 2003).

Garden watering and showering are two of the largest domains of water use in households and they have distinct social practices with

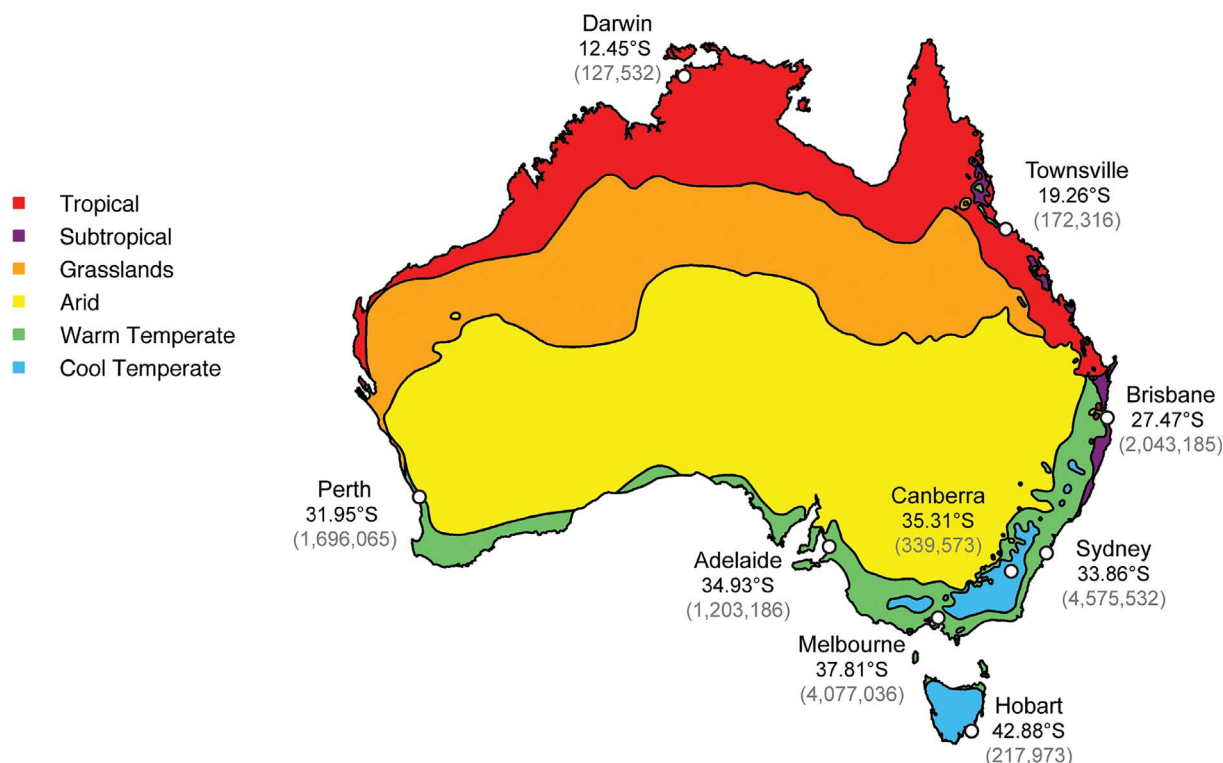


Fig. 1. Climate zones and the location of the most populous cities within Australia. Source: Ross et al. (2015).

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