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The enabling institutional context for integrated water management: Lessons from Melbourne

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ABSTRACT

There is widespread international acceptance that climate change, demographic shifts and resource limitations impact on the performance of water servicing in cities. In response to these challenges, many scholars propose that a fundamental move away from traditional centralised infrastructure towards more integrated water management is required. However, there is limited practical or scholarly understanding of how to enable this change in practice and few modern cities have done so successfully. This paper addresses this gap by analysing empirical evidence of Melbourne's recent experience in shifting towards a hybrid of centralised and decentralised infrastructure to draw lessons about the institutional context that enabled this shift. The research was based on a qualitative single-case study, involving interviews and envisioning workshops with urban water practitioners who have been directly involved in Melbourne's water system changes. It was found that significant changes occurred in the cultural-cognitive, normative and regulative dimensions of Melbourne's water system. These included a shift in cultural beliefs for the water profession, new knowledge through evidence and learning, additional water servicing goals and priorities, political leadership, community pressure, better coordinated governance arrangements and strong market mechanisms. The paper synthesises lessons from the case study that, with further development, could form the basis of prescriptive guidance for enabling the shift to new modes of water servicing to support more liveable, sustainable and resilient outcomes for future cities.

1. Introduction

Water systems in cities globally are facing environmental and societal pressures such as water scarcity, degraded waterways, flooding, changing demographics and ageing infrastructure. Water resources scholarship acknowledges that centralised water infrastructure, typically comprising large-scale pipelines, treatment plants and drainage networks, exacerbates impacts of these pressures and erodes the resilience of cities (Mitchell, 2006; Pahl-Wostl, 2007; Wong and

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Brown, 2009). Moreover, this traditional water infrastructure is usually accompanied by a technocratic management approach, based on assumptions that key variables (such as rainfall and water demand) can be predicted or controlled. This approach is now widely considered inadequate to respond to uncertainties and extremes expected with climate change and other contextual conditions (Dominguez et al., 2011; Gersonius et al., 2012; Milly et al., 2008; Pahl-Wostl, 2007; Truffer et al., 2010).

In this context, scholars argue that cities need to move away from traditional water servicing towards hybrid solutions that integrate centralised and decentralised technologies to deliver fit-for-purpose solutions (Chocat et al., 2007; Mitchell, 2006; Newman, 2001). These alternatives are based on fundamentally new principles for designing infrastructure, incorporating flexible, modular and multi-scale characteristics, making them highly adaptable in changing conditions (Ashley et al., 2005; Barbosa et al., 2012; Brandes and Kriwoken, 2006; Brown et al., 2009; Chocat et al., 2007; Dawson, 2007; Truffer et al., 2010).

While scholarship and policy rhetoric calls for this integrated water management approach, and individual technology options have been developed, modern cities have little experience incorporating new infrastructure models associated with decentralised solutions into water management practice (Gleik, 2003; Harding, 2006; Mitchell, 2006). Reported exceptions include some cities in Australia that have adopted innovative wastewater recycling, stormwater quality treatment and stormwater harvesting initiatives in response to environmental concerns and the country's recent Millennium Drought (Barker et al., 2011; Brown et al., 2013; Mitchell, 2006). The global lack of critically reported practical experience with decentralised infrastructure means there is limited understanding of how urban water servicing can be deliberately managed to support the system-wide changes required (Ferguson et al., 2013a,b; Jefferies and Duffy, 2011; Monstadt, 2009).

Literature on water resources provides some insight. Scholars have identified important factors for urban water management, including social, political, legal, economic and environmental influences (Barbosa et al., 2012; Cettner, 2012; Chocat et al., 2007; de Graaf and van der Brugge, 2010; Dolnicar et al., 2011). Hurlimann and Dolnicar (2010, 2012) highlighted the strong influence of public opinion on the success, or otherwise, of novel water servicing solutions. Brown and Farrelly (2009) reviewed barriers to delivering sustainable urban water management, revealing they are largely socio-institutional (rather than technical), including lack of practitioner capacity, ineffective institutional arrangements, insufficient community involvement and lack of political will. In light of these and other studies, scholars argue that critical evaluation of socio-institutional dimensions is essential for gaining deeper understanding about urban water system change (Blomquist et al., 2004; Brandes and Kriwoken, 2006; Brown et al., 2009, 2011; Cettner, 2012; de Graaf and van der Brugge, 2010; Pahl-Wostl, 2007).

Using Pettigrew's framing (1992), the socio-institutional dimensions identified above collectively form 'receptive' or 'non-receptive' contexts for creating long-term strategic change (an example application of Pettigrew's framework to an urban water setting is found in Cettner, 2012). A receptive institutional context is therefore critical for supporting the shift to new integrated forms of urban water management. Establishing such enabling conditions requires active attention but there is limited practical guidance in the water resources literature for deliberately supporting policy development, strategic planning and decision-making to this end (Brown and Farrelly, 2009; Ferguson et al., 2013a,b; Monstadt, 2009; Rijke et al., 2013).

This paper contributes to this gap by increasing scholarly understanding with empirical insights from a case study of water system change. Melbourne's recent shift towards integrated water management is analysed to identify the enabling institutional context features and draw key lessons. The research was based on a qualitative case study, involving interviews and workshops with urban water practitioners who were directly involved in Melbourne's water system changes. Insights from the case are presented and with further development, could form the basis of prescriptive guidance for enabling shifts to new water servicing modes to support more liveable, sustainable and resilient future cities.

2. Methods

The research took a qualitative single-case study approach (Yin, 2009), involving collection and analysis of primary and secondary data to draw insights for water resources scholarship and practice (Fig. 1).

2.1. Case selection

Since 1997, water management in Melbourne (4.1 million people) experienced significant changes during and beyond an extended drought. The system moved from purely traditional centralised infrastructure to incorporate decentralised technologies as part of an emerging commitment to integrated water cycle management and liveability outcomes (Ferguson et al., 2013b). While success in Melbourne was, in part, necessitated by water resource impacts of drought, it was major shifts in the institutional dimensions that enabled these new modes of water service delivery. Analysis of the

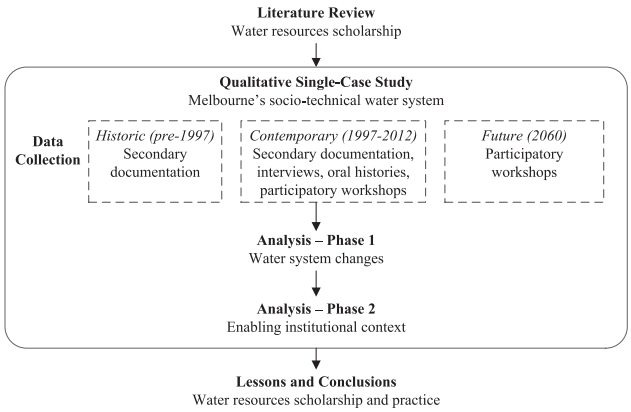

Fig. 1 – Research design.