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Governance of Integrated Urban Water Management in Melbourne, Australia

Casey Furlong [a, *], Kein Gan [b], Saman De Silva [a]

[a] School of Civil, Environmental and Chemical Engineering, RMIT University, Australia
[b] Melbourne Water Corporation, Australia

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ABSTRACT

The Integrated Urban Water Management (IUWM) paradigm, including concepts such as water reuse, and Sustainable Urban Drainage Systems, has become popular within Melbourne, and this has created new governance issues. This paper explores the relationship between changing governance structures and IUWM implementation. It is found that IUWM implementation has predominantly been accelerated by: a major drought, and implementing the Office of Living Victoria (OLV) as an overarching body. Efforts by the OLV have increased inter-agency collaboration, and institutionalised integrated planning. However, there is still no consensus on what the specifics of IUWM planning and infrastructure arrangements should actually look like.

1. Introduction

1.1. International context

The management of water is of crucial importance to both humanity and the natural ecosystem. Traditional urban water management involves the delivery of segregated water supply, sewerage and drainage services to residences and industry via a network of buried pipes and open channels (Marlow et al., 2013). Historically as urban populations have grown, urban water managers have systematically upgraded and increased the size and scale of water infrastructure to meet specified service targets. These upgrades generally involved the construction of new dams, river diversions, groundwater extractions, and larger sewerage and drainage pipes and channels (Mukheibir et al., 2015).

As the global population has increased dramatically over the past century many areas of the world are beginning to, or have already, passed sustainable environmental limits (Gleick, 1998). These sustainable environmental limits affect both water quality and water quantity issues (Biswas, 2004). Major water quantity issues such as droughts, ground and surface water depletion, and flooding are all affected by regions passing the limits of what local environments are able to sustain (Bouwer, 2000).

Water quality issues are generally related to various forms of manmade pollution from inadequate sewerage systems, point source pollution from industry, and diffuse pollution from agriculture. These quality issues often exacerbate water quantity issues by making existing water unsuitable for human consumption through contamination of ground and surface water resources (Carpenter et al., 1998). Human induced water quantity and quality issues contribute to the destruction of the earth's natural environment, and its ability to sustain human as well as plant and animal life (Vitousek et al., 1997).

All of these issues are now being multiplied in terms of effects, and also in terms of uncertainty, by climate change, population growth and migration, and unsustainable farming practices (Howden et al., 2007). The United Nations has predicted a global water deficit of 40% by 2030 (UN Water, 2015). Physical water challenges have created growing concern across the planet and increased attention from governments, industry and researchers (Heathcote, 2009). It has become well established that traditional water management approaches are not sufficient to deal with these emerging water challenges (Bell, 2012).

In response to these global challenges a series of major international summits were held in 1977, 1992 and 2002 (Mukhtarov, 2008). Out of these conferences emerged the wide-spread adoption of the Integrated Water Resources Management (IWRM) approach, which includes the key principles of integrated

* Corresponding author.
E-mail address: casey.furlong@rmit.edu.au (C. Furlong).

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management, seeing water from economic, social and environmental perspectives, and the participation of communities and women (Global Water Partnership, 2012). IWRM has typically been considered at either the regional or river-basin scale (Warner et al., 2008).

1.2. Water governance for Integrated Urban Water Management

In parallel to the evolution of IWRM, water challenges have also been considered specifically from an urban perspective and related ideologies have emerged such as Integrated Urban Water Management (IUWM) and Water Sensitive Urban Design (WSUD) (Furlong et al., 2015).

IUWM can be described as a strategic long-term planning approach to urban water management which considers all water services, sources, stakeholders, and impacts in order to create the best possible community outcomes (Closas et al., 2012). Implementing IUWM requires the inclusion of a greater number of actors in decision making, integration with urban planning, understanding trade-offs between multiple competing objectives, and the coordination of multiple water sources including from decentralised reuse schemes (CSIRO, 2010).

The World Bank's Water Partnership Program strongly supports the implementation of IUWM, stating that "An IUWM approach that … focuses on the integration of water supply, sanitation, and drainage with urban planning, and takes into account water resources … may provide an opportunity to avoid infrastructure lock-in in expensive traditional solutions" (Closas et al., 2012).

WSUD has similarities to IUWM in terms of its original definitions, and in terms of its practices and messages can be considered as a subset of IUWM (Furlong et al., 2015). WSUD is a term widely used in Australia to describe an approach of incorporating Sustainable Urban Drainage Systems (SUDS), also known as green infrastructure, and reuse schemes into urban planning. This is done in order to improve liveability outcomes, through providing more plants and trees in streetscapes, and environmental outcomes, through protecting waterways from the damaging effects of urban stormwater runoff (Brown et al., 2009).

Growing physical water challenges make having appropriate water governance arrangements crucially important. The Global Water Partnership defines water governance as "the range of political, social, economic and administrative systems that are in place to regulate development and management of water resources and provisions of water services at different levels of society" (Rogers and Hall, 2003).

Implementing IUWM as a planning approach, and WSUD as an objective, makes the practice of urban water management even more complex, and this in turn makes the implementation of effective governance structures even more important. Delivering IUWM requires either designing new institutions, or improving the cooperation or co-ordination between existing institutions through governance structures (Da Silva et al., 2010).

1.3. Focus of this paper

This paper will focus on the correlation between water governance structures and the implementation of IUWM. In order to explore this relationship the narrative of water governance structures in Melbourne, Australia, a city that has begun to widely implement IUWM, will be used as a case study. A series of nested infrastructure projects, and servicing strategy development case studies, have been explored as part of a wider research program. These nested case studies will not be specifically discussed but will be woven into the narrative to highlight the impact that various governance structures have had on IUWM and WSUD outcomes.

The history of Melbourne's traditional water management functions, including water supply, wastewater and drainage service provision, up until around 2011, is covered in work in this area, such as Fam et al. (2014), Byrnes (2013), Ferguson et al. (2013), and Abbot (2011). The major international research program known as "SWITCH" has also produced a case study on Melbourne's city centre, which highlighted the implementation of WSUD and water conservation efforts (Mitrotta, 2011).

However, these articles do not cover the significant governance changes which have occurred since with the establishment and then subsequent removal of the Office of Living Victoria (OLV) as an overarching water industry body. Therefore the period between 2011 and the present day is the main focus of this paper.

Previous academic work in this area by those such as Fam et al. (2014) and Ferguson et al. (2013) has used social science concepts of "transitions frameworks" and "multi-level perspectives" to discover how Melbourne was able to achieve its transition towards IUWM. These works imply a cumulative improvement in the water field away from the old, "bad" way of doing things towards the new, integrated, "good" way of doing things. Previous discussion is shaped in this way due to an idealised and simplistic view of what IUWM is. Literature related to planning in the water sector "often contains aspirational proposals and little detail on how planning is being undertaken in practice" (Malekpour et al., 2015).

IUWM, just like IWRM, can be considered as a "nirvana concept". Nirvana concepts are "attractive yet [vague] concepts … [which] typically: a) obscure the political nature of natural resources management; and b) are easily hijacked by groups seeking to legitimize their own agendas" (Molle, 2008).

Works from outside of the water management field, such as from the field of planning theory, have long put forward the view that planning is not rational, objective and scientific (Furlong et al., 2016a). In reality planning is subjective, political, and affected by personality conflicts (Lane, 2001). Lindblom (1959) famously described planning as "the science of muddling through".

It is hypothesised that the implementation of, and transition to IUWM, which involves the activities of large populations of planners, managers, and policy makers, with their own personalities and established views, is not as straight-forward a story as is represented in existing literature. In order to deliberate on this hypothesis this paper will explore the actual mechanics of water management and governance since implementing IUWM in Melbourne. Through doing this, a more balanced, nuanced, complex, and realistic picture of IUWM will be painted, and a deeper understanding of the impacts of governance arrangements on IUWM will be gained.

2. Methodology

2.1. Wider research program

This paper forms part of a larger research program investigating IUWM infrastructure planning being undertaken by RMIT University in collaboration with Water Research Australia. As part of the wider research program, 36 leading water sector experts have been consulted on a range of aspects relating to water management, planning and governance. Additionally, seven infrastructure projects, and nine servicing strategy development case studies have been conducted to compare different approaches to water planning in Melbourne over time.

These case studies are concerned with specific examples of IUWM implementation between 2008 and 2015, and were selected through collaboration with Melbourne's water utilities and the City of Melbourne. Case studies were analysed using the planning framework described in Furlong et al. (2016a) which includes the

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