Utilities Policy 53 (2018) 25–31

Contents lists available at ScienceDirect

Utilities Policy

journal homepage: www.elsevier.com/locate/jup

The role of water utilities in urban greening: A case study of Melbourne, Australia

Casey Furlong[a,b,*], Kath Phelan[a,c], Jago Dodson[a]

[a] Centre for Urban Research, RMIT University, Melbourne, Australia
[b] GHD Pty, Melbourne, Australia
[c] Infrastructure Victoria, Melbourne, Australia

ARTICLE INFO

Keywords:
Urban greening
Green infrastructure
Water infrastructure
Regional initiative
Liveability

ABSTRACT

Melbourne's "Greening the West" (GTW) initiative is a successful example of water utilities actively supporting urban greening through facilitating collaboration between stakeholders. GTW was convened by City West Water in 2011, to bring together 23 partner organisations to protect and enhance urban greening to support community wellbeing. This research involved interviews to determine how GTW works, its challenges, factors for success, achievements, areas for improvement, future directions, and implications. It is found that the existence of GTW has resulted in an additional one million trees planted in Melbourne's western suburbs, and has caused a significant cultural shift within local government.

1. Introduction

1.1. Importance of urban greenery in the context of urbanisation

In recent decades urban policymakers have become increasingly interested in the aspects that make urban areas pleasant and healthy to live in (Badland et al., 2014), such as open space, trees, and vegetation (Bowler et al., 2010). It is becoming widely recognised that "urban greening", used here to mean all vegetation within urban areas, can provide significant benefits for urban communities, including: environmental, economic, public health and wellbeing benefits (Kendal et al., 2016). Of particular concern to Australian policymakers, are the social benefits which can be gained from urban trees, through providing shade to reduce heat (Bowler et al., 2010), increasing exercise and reducing depression (Maller et al., 2006; Alcock et al., 2014).

Urbanisation and population growth pose significant challenges and threats to urban greening and the benefits that it provides (McDonald et al., 2008). Increasing city populations inevitably lead to a combination of geographical expansion of cities (urban sprawl) as well as densification within cities, generally leading to a loss of trees on both public and private land (Hurley et al., 2016; Amati et al., 2017). Tree loss, together with increasing numbers of vehicles, results in degraded air quality (Hasunuma et al., 2014). Impervious surfaces such as roads, contribute to the "heat island effect" where urban areas may be as much as 10 °C hotter than surrounding rural areas (Manteghi et al., 2015). Such damage is compounded by climate change, which is predicted to increase surface temperatures by 2–4 °C by 2100 (NOAAA, 2012).

Loss of urban greening results in negative impacts on human health and wellbeing. Degraded urban greenery and waterways reduce a population's likelihood to walk and cycle, as well as sense of place and pride (Donovan, 2017; Brooks et al., 2016). Poor biodiversity limits a community's opportunities for connections to nature, which has an impact on mental health (Alcock et al., 2014; Maller et al., 2006). Degraded air quality can contribute to reduced life expectancy (Correia et al., 2013). In urban areas of some developed countries such as Australia, heatwaves, which are exacerbated by urbanisation and a lack of trees, kill more people than any other natural disaster (Coates, 1996; PricewaterhouseCoopers, 2011).

The trend towards recognising the importance of protecting and enhancing urban greening is correlated with the idea of "Green Infrastructure", which implies that the natural assets within a city provide an essential service, similar to "grey infrastructure" pipes, roads, electrical and telecommunications networks (Green Surge, 2015). Green infrastructure as a term can also cause confusion because to some the term implies (a) any vegetation within a city, such as a tree in a park or private garden (Tzoulas et al., 2007), and to others it implies (b) strategically designed vegetated infrastructure such as an urban wetland (Spatari et al., 2011). As this paper primarily relates to the broader wellbeing benefits provided by any vegetation, including a typical tree in a park or private garden, the authors here adopt the more general language of "urban greening" (Phelan and Hurley, 2016).

As public stakeholders are increasingly recognising the benefits of

* Corresponding author. Centre for Urban Research, RMIT University, Melbourne, Australia.
E-mail address: casey.furlong@rmit.edu.au (C. Furlong).

https://doi.org/10.1016/j.jup.2018.06.005
Received 10 January 2018; Received in revised form 11 June 2018; Accepted 11 June 2018

urban greenery, this raises many practical questions such as: which organisations should be setting urban greening targets, who should be doing the planting and maintenance, and importantly how should the funding be raised? Funding can be raised through national/state income taxes, goods and services taxes, local land taxes and levies, or water utility bills. Some of these funding mechanisms (e.g. income taxes) are progressive in the sense that they are calculated as a proportion of income, whereas others (e.g. goods and services taxes or water bills) are typically regressive in the sense that they are applied uniformly regardless of income.

Governance of urban greening is an emerging topic within the academic literature, with consideration of the role of various public and private actors (Phelan and Hurley, 2016; Lawrence et al., 2013), and partnerships (Fors et al., 2015); this paper builds on this research.

1.2. Potential role of water utilities in urban greening

Across the world, the role and function of urban water utilities have continued to evolve over time. Water utilities were first commissioned to deliver clean water into cities (Furlong et al., 2015). Next water utilities were tasked with the removal of dirty water from cities through (separate or combined) sewerage pipes and stormwater drainage systems (Brown et al., 2009). Since the 1960s and 1970s, utilities have been expected to consider environmental protection, through the construction and continuous upgrades of sewage treatment plants (Mukhtarov, 2008). Since the 1990s water utilities in many countries have been expected to consider measures to ensure long-term water supply reliability (water security), including recycled water and desalination (Angelakis and Durham, 2008; Nair and Kumar, 2013).

As the function of water utilities has evolved organically across the world in relation to local contexts and drivers, there are significant differences across the world in relation to the way water management responsibilities are divided between organisations (Furlong et al., 2015). Water utilities can be: integrated with local or state government departments; government owned corporations; or privately owned corporations. Water utilities can be in charge of multiple services (water, sewerage, drainage) for a small geographical area (vertically integrated) or in charge of one service (e.g. sewerage) for a large geographical area (horizontally integrated) (Furlong et al., 2017a). For the purposes of this paper, the authors define water utility to mean an organisation that is responsible for the planning and operation of one or more of the core water services of water supply, sewerage and drainage.

In a contemporary trend, water utilities are expected to also consider the use of green infrastructures, such as wetlands and rain gardens, primarily for stormwater management. This trend is related to the concepts/ideologies of Sustainable Urban Drainage Systems (SUDs), Water Sensitive Urban Design (WSUD), Integrated Urban Water Management (IUWM) and Low Impact Development (LID) (Fletcher et al., 2015; Mathews et al., 2015; Furlong et al., 2017a), as well as Climate Change Adaptation and Nature Based Solutions (Mees and Driessen, 2011). Implementation of green infrastructure is expected to lead to a variety of benefits, including improved waterway health and reduced flooding. In some cities, these options may be more economical than conventional upgrading of stormwater and sewerage systems. Notable examples of cities that have found green infrastructure to be advantageous in this regard are Philadelphia, USA (Uittenbroek et al., 2016), and Copenhagen, Denmark (Furlong et al., 2018).

The benefits and importance of vegetation within urban areas extends far beyond stormwater management, into the realm of public health (Alcock et al., 2014; Arundel et al., 2017). As governments and utilities across the globe are becoming increasingly aware of the importance of urban greening, it is important for the water utility sector to consider what role they can potentially play in protecting and increasing urban greenery in their jurisdictions (Furlong et al., 2018). On the most obvious level, water utilities (depending on local context and responsibilities) have the power and authority to support urban greening in one or more of the following ways: (1) ensuring there is adequate water supply reliability to prevent water restrictions during droughts; (2) planting on water utility land (e.g. around reservoirs and treatment plants) and buildings (e.g. green roofs) for social and environmental benefits; (3) protecting and restoring urban waterways; and (4) providing green stormwater assets, such as wetlands (Furlong et al., 2017b).

This paper explores the potential for water utilities to go further than these practices, to contribute towards protecting and enhancing urban greening across the entire public and private realm, in collaboration with local government and the community. As water utilities vary dramatically across the world in relation to functional responsibilities, geographical size, and relationship to government, the potential role for water utilities in supporting urban greening is substantially a function of local context. In order to truly explore these issues, it is important to make use of detailed case studies that document not only water utilities actions but also the specific local context and drivers that led these actions.

1.3. Melbourne as a case study on water utility intervention in urban greening

In order to explore what potential role water utilities can play in protecting and enhancing urban greening across the broader public and private realm, this paper makes use of a detailed case study on Melbourne's “Greening the West” (GTW) initiative, which was set up by City West Water in 2011. GTW brings together 23 member organisations to work collaboratively in Melbourne's west. GTW seeks to improve the health and well-being of residents through amenity, connection to nature, and urban cooling benefits, which come from increasing green space, tree canopy cover, and securing water supplies for irrigation (GTWSC, 2013).

Melbourne has four urban water utilities, all of which are state government-owned corporations. Melbourne Water operates as a bulk water and sewerage provider (e.g. manages the major dams, major pipes and major water and sewerage treatment plants) and flooding and waterway authority for the entire metropolitan area. Three water retailers provide customer water and sewerage services (e.g. customer bills, smaller transfer and reticulation pipes, pumps and some smaller sewer treatment plants), which each have jurisdiction over a particular area of Melbourne. City West Water is the water and sewerage retailer of Melbourne's western suburbs. Historically Melbourne Water has had a role in urban greening (through its role in waterways, retarding basins and wetlands), but the water retailers such as City West Water have not, which makes the GTW case study particularly interesting. In addition to this Melbourne has a Catchment Management Authority (CMA) that creates regional environmental strategies.

Melbourne has some specific characteristics that led to City West Water's intervention in urban greening. Melbourne has 32 local government municipalities, and no metropolitan authority. In comparison to the rest of the city, Melbourne's western municipalities have comparatively poor socioeconomic and public health metrics (LeadWest, 2010), as well as lower levels of green space and tree canopy cover, as shown in Fig. 1. Research suggests that tree canopy cover in the western region is in the range of 5–10%, while other regions are in the 10–30% range (ISF, 2014). Also, the Victorian Government has implemented “rate-capping" which prevents municipalities from increasing rates to pay for additional greening (Furlong et al., 2017b).

Melbourne is experiencing intense population growth, with a population expected to increase from 4.5 million in 2017, to more than 8 million in 2050 (DELWP, 2017). Therefore significant urban sprawl and densification are expected, where modest dwelling footprints surrounded by vegetation are replaced with high site coverage dwellings, resulting in net loss of vegetation and green space (Hurley et al., 2016; Amati et al., 2017).

In combination, these factors made addressing the significant deficit