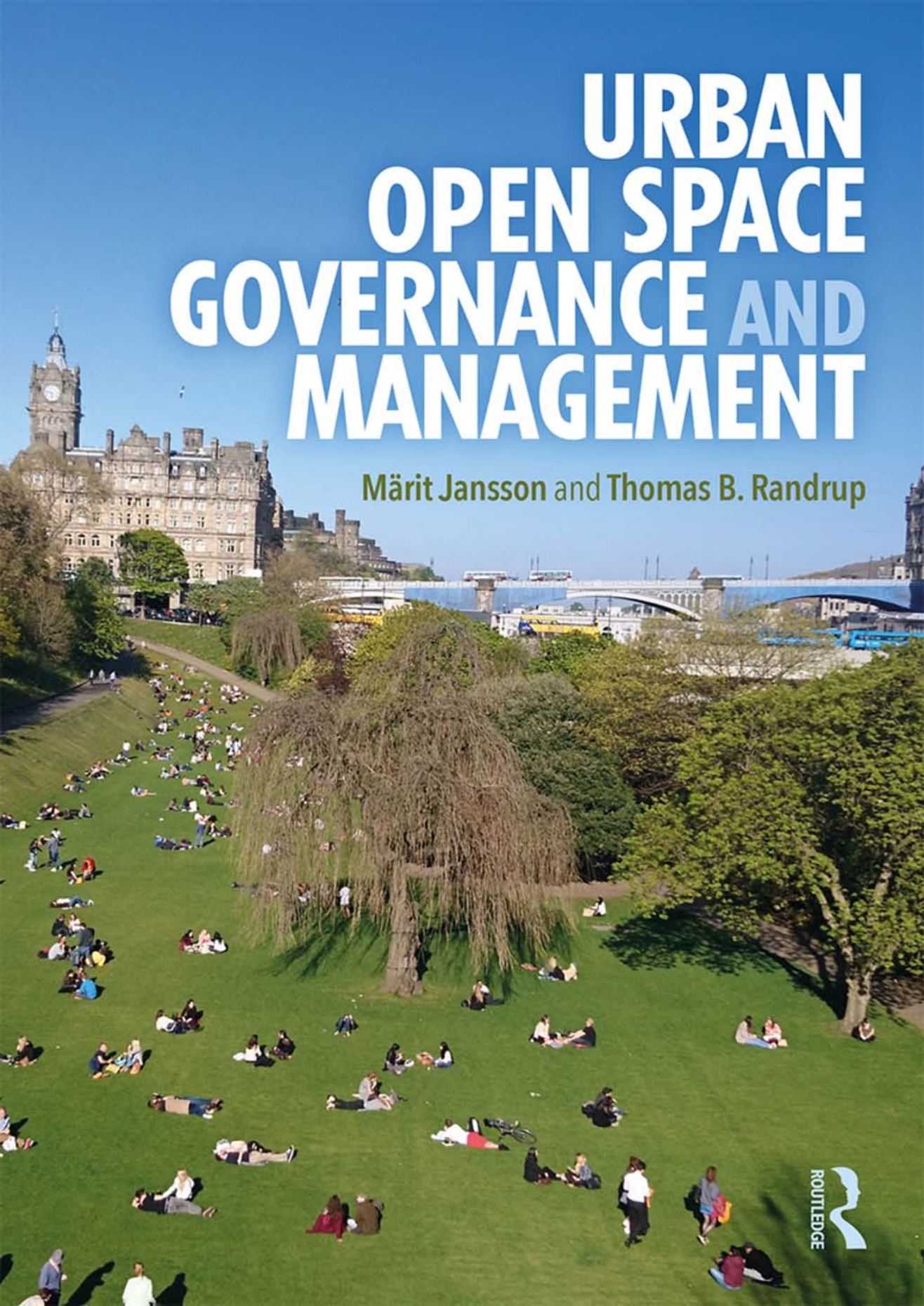
URBAN OPEN SPACE GOVERNANCE AND MANAGEMENT

Märit Jansson and Thomas B. Randrup



ROUTLEDGE

Urban Open Space Governance and Management

This edited volume defines and compares central aspects of governance and management related to urban open spaces (UOSs) such as long-term management, combined governance and management and strategic management of UOSs. Perspectives such as ethical considerations, user participation and changes in local governmental structures frame the governance and management of UOSs. Jansson and Randrup create a comprehensive resource detailing global trends from framing and understanding to finally practising UOS governance and management. They conclude by promoting positive changes, such as proactive management and strategic maintenance plans to encourage the creation of more sustainable cities.

Illustrated in full colour throughout, this book is an essential read for students and academics of landscape architecture, planning and urban design, as well as those with a particular interest in governance and management of UOSs.

Märit Jansson is a landscape architect and associate professor at the Department of Landscape Architecture, Planning and Management, Swedish University of Agricultural Sciences (SLU), Sweden. She specialises in landscape management and planning for people and their well-being, especially concerning children's perspectives and uses of outdoor environments and aspects of inclusion and participation.

Thomas B. Randrup is a professor in UOS management and head of the Governance and Management Theme Group at the Department of Landscape Architecture, Planning and Management, SLU, Sweden. He focuses on the concepts of strategic management and nature-based solutions. He was co-founding editor in chief of the journal *Urban Forestry & Urban Greening*.

Taylor & Francis
Taylor & Francis Group
http://taylorandfrancis.com

Urban Open Space Governance and Management

Edited by Märit Jansson and Thomas B. Randrup

Routledge
Taylor & Francis Group
LONDON AND NEW YORK

First published 2020
by Routledge
2 Park Square, Milton Park, Abingdon, Oxon OX14 4RN

and by Routledge
52 Vanderbilt Avenue, New York, NY 10017

Routledge is an imprint of the Taylor & Francis Group, an informa business

British Library Cataloguing-in-Publication Data
A catalogue record for this book is available from the British Library

Library of Congress Cataloging-in-Publication Data
Names: Jansson, Märit, editor. | Randrup, T. B. (Thomas B.), editor.
Title: Urban open space governance and management / edited by Märit Jansson and Thomas Randrup.
Description: Abingdon, Oxon ; New York, NY : Routledge, 2020. | Includes bibliographical references and index.
Identifiers: LCCN 2019056007 (print) | LCCN 2019056008 (ebook) | ISBN 9780367173029 (hardback) | ISBN 9780367173036 (paperback) | ISBN 9780429056109 (ebook)
Subjects: LCSH: Public spaces—Management. | Public spaces—Government policy.
Classification: LCC HT185 .U675 2020 (print) | LCC HT185 (ebook) | DDC 307.76—dc23
LC record available at https://lccn.loc.gov/2019056007
LC ebook record available at https://lccn.loc.gov/2019056008

ISBN: 978-0-367-17302-9 (hbk)
ISBN: 978-0-367-17303-6 (pbk)
ISBN: 978-0-429-05610-9 (ebk)

Typeset in Stone Serif Std
by Apex CoVantage, LLC

Contents

Figures

Tables

Boxes

Foreword by the editors

With this book, we aim to provide a basic, up-to-date overview of knowledge and practices related to urban open space (UOS) governance and management. In our daily work with students and in our research activities, we see the need for a collection of contemporary texts that describe the distinctive characteristics of the long-term perspectives in governing and managing UOS.

UOS and associated practices are increasingly recognised as key aspects in efforts to achieve sustainable development. Development of UOS through management with a long-term perspective covers a large number of issues, tasks and challenges and can take many directions. Horticultural skills, cultural insights, cooperation, partnerships, strategic thinking and leadership abilities are just a few of the expectations placed on a modern UOS manager. Moreover, many managers today are working in a changing environment within developing governance structures and at various scales, which makes this book particularly relevant.

Research and development related to UOS governance and management have started to reach significant proportions worldwide. However, related educational activities and knowledge among professionals are less widespread. The actual influence of UOS governance and management in contemporary education programmes is limited, and management of UOS on all levels, from policy to operational maintenance, is often neglected within academia. Therefore, we and our closest colleagues in the Landscape Governance and Management Theme Group at the Swedish University of Agricultural Sciences, together with dedicated colleagues from around the world, have engaged in compiling state-of-the-art knowledge, combined with novel cases and innovative proposals for future UOS governance and management in order to provide the academic community, high-level practitioners and university students with up-to-date information and food for discussion. We hope that this book will educate, support and inspire its readers to take on roles as reflective scholars, practitioners and decision makers within UOS governance and management.

Märit Jansson and Thomas B. Randrup

Acronyms

AI	Artificial Intelligence
CAD	Computer-Aided Design
ELC	European Landscape Convention
ESS	Ecosystem Services
FAO	Food and Agriculture Organization
F-VGI	Facilitated Volunteered Geographic Information
G&M	Governance and Management
GI	Green Infrastructure
GIS	Geographic Information System
IoT	Internet of Things
LBS	Location-Based Services
NbS	Nature-Based Solutions
NGO	Non-government Organisation
NPM	New Public Management
PERT	Programme Evaluation and Review Technique
PPGIS	Public Participation GIS
SDGs	Sustainable Development Goals
UOS	Urban Open Space
US	Unites States (of America)
VGI	Volunteered Geographic Information
WHO	World Health Organization

Contributors

Bianca Ambrose-Oji is an environmental sociologist at Forest Research, United Kingdom. She has worked extensively as a social forester, including work as an action researcher, consultant, practitioner, professional trainer and university lecturer. Her work concerns understanding the development of adaptive and innovative forest and green space governance.

Finn Arler is a professor at the Department of Planning, Aalborg University, Denmark. He is head of the university's Centre for Ethics in Practice and head of the research group Sustainability, Innovation and Policy.

David N. Barton is a senior research scientist at the Norwegian Institute for Nature Research, Norway. His specialisations include integrated ecological economic assessment and valuation, ecosystem accounting, decision analysis under uncertainty and payments for ecosystem services.

Anna Bengtsson is a landscape architect and assistant professor at the Department of Work Science, Business Economics and Environmental Psychology, Swedish University of Agricultural Sciences (SLU), Sweden. Her main focus is on environmental psychology, with emphasis on health-promoting outdoor design, specifically for vulnerable groups.

Arjen Buijs is an environmental sociologist at the Department of Environmental Sciences, Wageningen University and Research, the Netherlands. His work concerns the roles of users, communities and grassroots in urban green planning and management and how they relate to institutional governance networks.

Nicola Dempsey is a senior lecturer at the Department of Landscape Architecture, University of Sheffield, United Kingdom. Her focus is on place-keeping, which conceptualises the design, planning and management of places as an ongoing process.

Hanna Fors is a landscape architect and researcher at the Department of Landscape Architecture, Planning and Management, SLU, Sweden. Her work concerns user participation in public urban green space management, users' drivers for engagement and how participation affects public green space quality.

Natalie Gulsrud is an assistant professor at the Department of Geosciences and Natural Resource Management, University of Copenhagen, Denmark. Her research focus is on governance of urban green infrastructure to advance sustainable and just pathways to climate resilience.

Dagmar Haase is a professor in landscape ecology and urban ecology at the Department of Geography, Humboldt-Universität zu Berlin and guest scientist at the Helmholtz Centre for Environmental Research – UFZ, Leipzig, Germany. Her focus is on modelling urban land use change, urban system dynamics and urban tele-couplings.

Patrick Hurley is an associate professor and chair of environmental studies at Ursinus College, Pennsylvania, US. His focus is on human-forest interactions in urban and ex-urban contexts, illustrating ways that diverse groups make use of the environment, especially for recreational, cultural and spiritual benefits.

Märit Jansson is a landscape architect and associate professor at the Department of Landscape Architecture, Planning and Management, SLU, Sweden. She specialises in landscape management and planning for people and their well-being, especially concerning children's perspectives and uses of outdoor environments and aspects of inclusion and participation.

Nadja Kabisch is a postdoc at the Department of Geography, Humboldt-Universität zu Berlin, Germany, and leads the research project GreenEquityHEALTH. Her focus is on nature-based solutions and ecosystem services of urban green spaces across European cities.

Cecil Konijnendijk van den Bosch is professor of urban forestry at the University of Vancouver, British Columbia, Canada. He has authored several textbooks on urban forestry and was co-founding editor in chief of the journal *Urban Forestry & Urban Greening*.

Inger Lerstrup is an agronomist and scientific writer, with a research background at the University of Copenhagen, Denmark. Her interests include the relations between the material world, human actions and the human mind, specialising in children's outdoor environments.

Andrej Christian Lindholst is an associate professor at the Centre for Organization, Management and Administration, Aalborg University, Denmark. His current work focuses on organisational change and the broader impacts of marketisation of the public sector.

Helena Mellqvist is a landscape architect and senior lecturer at the Department of Landscape Architecture, Planning and Management, SLU, Sweden. Her focus is on people's relations to their everyday landscapes and how these relations are included in planning practices.

Peter Neal is a landscape architect, environmental planner and owner of Peter Neil Consulting Ltd., United Kingdom. His work concerns green infrastructure frameworks and the design, funding and management of urban parks and the public realm.

Stephan Pauleit is professor in strategic landscape planning and management at the Technical University of Munich, Germany. His expertise includes green infrastructure planning, adaptation strategies to climate change in the urban environment, urban forestry and trees.

Bengt Persson is a landscape architect and extension coordinator at the Department

of Landscape Architecture, Planning and Management, SLU, Sweden, specialising in cooperation between the landscape field and society. His main focus areas include urban landscape management and urban sustainable green infrastructure.

Mattias Qviström is professor in landscape architecture and chair in spatial planning at the Department of Urban and Rural Development, SLU, Sweden. His work combines landscape and planning research in order to better understand the interplay between planning and the use and character of everyday landscapes.

Thomas B. Randrup is a professor in urban open space (UOS) management and head of the Governance and Management Theme Group at the Department of Landscape Architecture, Planning and Management, SLU, Sweden. He focuses on the concepts of strategic management and nature-based solutions. He was co-founding editor in chief of the journal *Urban Forestry & Urban Greening*.

Åsa Ode Sang is a landscape architect and associate professor in landscape planning at the Department of Landscape Architecture, Planning and Management, SLU, Sweden. Her focus is on green spaces as a socioecological system, exploring the benefits and values of urban green spaces through spatial modelling.

Neil Sang is a data scientist with emphasis on spatial science at the Department of Landscape Architecture, Planning and Management, SLU, Sweden. His focus is on modelling landscape perceptions, processes and characteristics, citizen science and geodesign.

Elizabeth Shelley is a landscape architect and research assistant at the Department of Landscape Architecture, Planning and Management, SLU, Sweden. She has a specific interest in how management of UOS can affect the well-being benefits afforded by it.

Johanna Deak Sjöman is a landscape architect and postdoc at the Department of Landscape Architecture, Planning and Management, SLU, Sweden. Her work concerns green infrastructure planning and regulating ecosystem services.

Anna Steidle is a consultant and runs the Institute of Urban Landscape Management, which focuses on management of urban green spaces. She is affiliated with Technical University Munich and University of Applied Science Weihenstephan, Germany, and ZHAW Zürich, Switzerland.

Elin Pritzel Sundevall is a landscape architect and research assistant at the Department of Landscape Architecture, Planning and Management, SLU, Sweden. She has a specific interest in user perspectives in park management.

Jessica Svännel is a landscape architect and lecturer in landscape architectural analysis, planning and GIS at the Department of Landscape Architecture, Planning and Management, SLU, Sweden. As a consultant, she has supported work by municipalities on GIS, specialising in GIS for UOS management.

Nina Vogel is an urban planning expert at the Department of Landscape Architecture, Planning and Management, SLU, Sweden. Her focus is on sustainable mobility transitions, and she is serving as coordinator of SLU's Urban Futures platform.

Acknowledgements

This book is the result of almost two years of work by the Theme Group of Landscape Governance and Management at the Department of Landscape Architecture, Planning and Management, Swedish University of Agricultural Sciences (SLU). We as editors are indebted to the 29 colleagues from several countries who contributed to this publication.

We especially want to thank those in our closest working environment in the Landscape Governance & Management Theme Group at SLU. We used the book preparation process to discuss and align definitions and academic approaches and have accomplished a common understanding of what governance and management of urban open space (UOS) means to us and how it fits within a larger framework of, for example, landscape planning, landscape architecture, urban planning and management. Thanks to all who were part of this process.

We also gratefully acknowledge each of the 19 reviewers who contributed fruitful comments and insightful suggestions for improvements of the different chapters. Your contributions significantly improved the quality of this publication: Francesco Ferrini, Peter Neal, Johanna Deak Sjöman, Stephen Livesley, Mel Burton, Petra Bengtsson, Helena Mellqvist, Fredrika Mårtensson, Natalie Coquand, Johnson Chan, Lone Kristensen, Tim Delshammar, Blaz Klobucar, Ingjerd Solfjeld, Anna Sunding, Christian Lindholst, Anders Kristoffersson, Hans Skov Petersen and Johan Östberg. Thanks also to Li Xinyu, Dai Ziyun, Karin Andersson, Sofia Valentin and Deluge Partners, who contributed insights to some of the many examples we provide throughout the book and to Inger Lerstrup for initial literature reviews.

In our work to prepare this publication, we were assisted by Elizabeth Shelley and Anna Sunding. Both have been amazing and dedicated, providing crucial editorial support. We are also grateful to our head of department, Ingrid Sarlöv-Herlin, who backed us from the beginning, and to our publisher, Routledge, which supported the idea of publishing a book on UOS governance and management from the very start.

The book project has gratefully received funding from SLU through the Department of Landscape Architecture, Planning and Management (LUM funding) and the Faculty of Landscape architecture, Horticulture and Crop production Science (Best practice funding), from Sten K. Johnson Foundation and ARQ Foundation for architecture research.

The editors
Märit Jansson & Thomas B. Randrup
Alnarp, Sweden
January 2020

Part I

Framing urban open space governance and management

1 Introduction: urban open space governance and management – the long-term perspective

Thomas B. Randrup and Märit Jansson

Introduction and structure of the book

An urban open space (UOS) is mainly an unbuilt area within a populated settlement, comprising a combination of vegetated 'green', water-dominated 'blue', derelict 'brown' and/or hard-surfaced 'grey' elements. Increasingly, UOS is being perceived and documented as a vital element of the urban matrix (e.g. Qureshi et al., 2013; Wolff et al., 2018), enabling well-being for the ever-increasing urban population (e.g. Lee et al., 2015; WHO, 2016). UOSs range from playgrounds to highly maintained parks to informal and natural landscapes located in urban and peri-urban settings, and are often publicly accessible (e.g. Randrup & Persson, 2009; de Magalhães & Carmona, 2009). They are regarded as a source of numerous benefits and values, expressed as ecosystem services, for society (MEA, 2005). Governance and management of UOSs are key processes in provision of urban landscapes within an overall governmental framework and contribute to sustainable development. We perceive governance and management to be approaches that can secure long-term provision of UOS and associated benefits.

In this book, we present UOS governance and management as these are performed, studied and taught, primarily within a Western European context but also worldwide. Experiences, findings and recommendations are described, analysed and discussed mainly in a local government context, which is often the most common governance mode for UOS management (e.g. Knuth et al., 2008; Carmona et al., 2010; Dempsey et al., 2014). However, we also relate them to other organisational and institutional contexts, such as international and national policymaking, cemetery management and management of outdoor areas around housing estates. Therefore, this book is of relevance in many contexts and parts of the world.

The book comprises 12 chapters divided into three main parts: (I) framing, (II) relations and values and (III) practice. Part I frames UOS governance and management by setting definitions of contemporary terms

and landscape approaches, explaining UOS as a historical social-ecological resource and placing it in an overall organisational framework. Part II describes the multitude of relations and values related to UOS governance and management, covering users' perspectives, ethical considerations and participation. Based on the two previous parts, the practices of UOS governance and management are presented and discussed in Part III. Part III also describes the concept of strategic management, discusses leadership and steering roles related to UOS management and provides tools and models for use in describing various aspects of UOS governance and management. The book concludes with a discussion on the future of UOS governance and management.

The origin of UOS governance and management

Historically, the importance of UOS and related development processes has increased as urban agglomerations have changed from small-scale settlements to various urban forms, including megacities. Urban areas can be defined areas, such as where man-made structures (e.g. houses, commercial buildings, roads, bridges, railways) cover a large proportion of the land surface or areas with high population density (Pickett et al., 2001). Throughout the world, the dominant pattern of migration within countries in recent decades has been from rural to urban areas. This is partly because improved technology has decreased the need for agricultural workers and partly because cities are seen as offering greater economic opportunities and better lifestyles (Rutledge et al., 2018). Today, over half the world's population lives in urban areas, and the proportion is expected to increase to 66% by 2050 (UN, 2014).

UOS management can be traced back to the Western industrialised world in the 1850s, which involved overcrowded slums and streets filled with rotting garbage, dead animals and overflowing human and animal waste. Dogs and other animals ran wild in poorer neighbourhoods, and pigs functioned as street cleaners. Cholera epidemics resulted in a death rate in London, United Kingdom, that was higher than at any time since the plague (Black Death) in 1348–1349 and caused wealthier residents in New York City, New York, United States, to flee to the countryside, while the disease ravaged the poor (Bloomberg & Frieden, 2005). This prompted designers Frederick Law Olmsted and Calvert Vaux to create Central Park in New York. They used the work on the park to demonstrate the need for reform of the social agenda and to develop means to achieve this reform by creating a public park which would improve public health for those not able to escape the city. This was one of many park developments of that period in urban centres in the Western world suffering from the harsh urban living conditions of industrialisation (see Figure 1.1). Another example, Victoria Park, was established in 1840 to meet the need for a park in the East End of London, where a rapidly growing population resulting from the development of the docks and industry had led to overcrowded housing and associated poor health and low life expectancy (Tower Hamlets, 2017). In Sweden, the 'Swedish Workers Association' was formed in Malmö in 1886, and prominent local Social Democrats thereafter founded Folkets Park (People's Park) in central Malmö. Folkets Park is believed to be the first park in the world initiated and developed by a collective

(i)

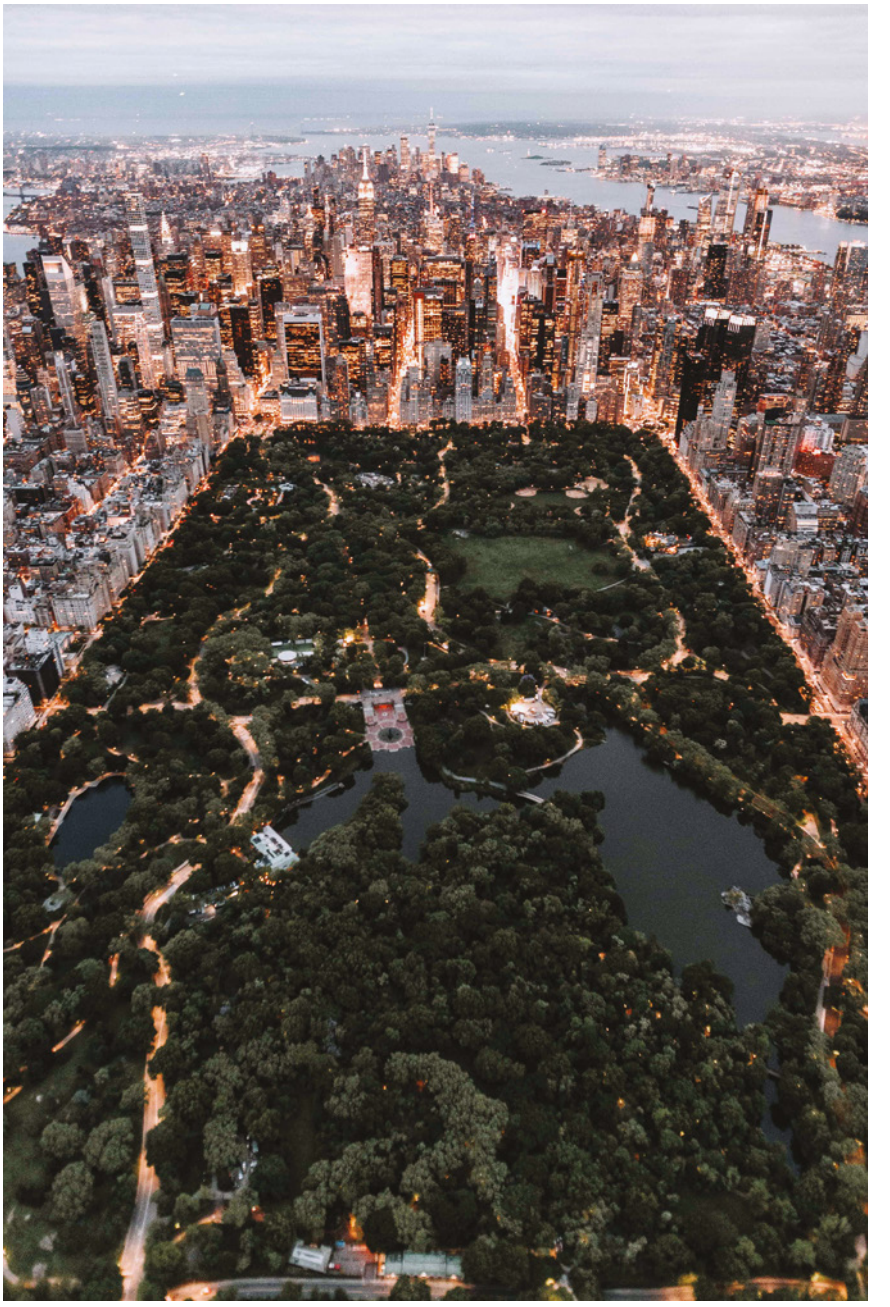


Figure 1.1 (i) The green space of Central Park in its very dense urban setting of New York City.

movement with the aim of making a significant social change. Today, the park is under the management of the local government of the City of Malmö.

Local governments and other steering bodies in the 1850s thus had clear incentives to use UOS as an instrument for creating areas promoting social benefits

(ii)

(iii)

Figure 1.1 (ii) Terraced houses bordering Victoria Park, London. (iii) Historic maintenance operations in Folkets Park, Malmö. *Source*: (i) Trent Szmolnik on Unsplash, (ii) Peter Neal, (iii) © Malmö stadsarkiv.

and human health. Contemporary governance and management approaches for UOS can be traced from those initiatives. For example, the British government created an urban planning policy to alleviate acute ill-health and create better urban living conditions for all. In the US, the Central Park Commission became New York City's first planning agency and oversaw the planning of uptown Manhattan and the management of the park (Blackmar & Rosenzweig, 2017). The value of UOS in providing and promoting public health is still recognised today – for example, in a recent World Health Organization (WHO) report on urban green spaces and health (WHO, 2016). During recent decades, more evidence of the beneficial effects of UOS has become available, scientifically linking access and use of UOS to improved mental health, reduced mortality and lower rates of obesity and risk of type 2 diabetes (WHO, 2016). This indicates the enormous potential of governance and management of UOS in providing societal value, as UOS improvements can have a positive impact on health, social and environmental outcomes for all (WHO, 2017).

Ever since the Central Park Commission became one of the first formal local UOS management agencies in the mid-19th century, governance and management responsibilities relating to UOS have tended to be dealt with primarily at the local government level (Knuth et al., 2008; de Magalhães & Carmona, 2009; Randrup & Persson, 2009; Dempsey & Burton, 2012). The United Nations' Food and Agriculture Organization (FAO) confirmed this worldwide local government approach to UOS management in its 2016 guidelines for urban and peri-urban forestry (Salbitano et al., 2016). However, other organisations are also important UOS managers today and in a historical perspective, with substantial responsibilities, including housing companies and cemetery organisations.

Despite the fact that UOS provision is seen as a means for improving public health and well-being and the overwhelming evidence for this, many local government organisations still focus on short-term gains and essential maintenance operations and make insufficient resources available for long-term governance and management that could improve public spaces (Randrup & Persson, 2009; Dempsey et al., 2014; Randrup et al., 2017). The conflict between recognition of an important societal resource and the inability to reflect this importance in management routines is the outcome of two core developments: (i) changes in UOS management organisations and (ii) new demands on UOS and their management.

Dramatic changes in recent decades

Management of UOS is ideally a matter of development of the entire UOS resource using a long-term perspective, while also operationally maintaining the space (Randrup & Persson, 2009; Dempsey et al., 2014). Thus de Magalhães & Carmona (2009) describe open space management as comprising four interlinked processes: (i) regulation of uses and conflicts between uses, (ii) maintenance routines, (iii) new investments and ongoing resourcing of public space and (iv) coordination of interventions in public space. While all of this is true and relevant from a management perspective, in Western Europe, the focus has long been on maintenance routines. This is believed to be the result of an increased intra-organisational drive to involve the market and private users (e.g. Leiren et al., 2016). For example, New

Public Management (NPM) introduced the idea that government-guided, private-sector principles are preferable to the conventional rigid public *hierarchical* bureaucracy and economic steering (e.g. Hood, 1991). Within UOS management, NPM has resulted in a trend for outsourcing, where public government agencies commission and monitor services provided by private actors (Randrup et al., 2006; Clark et al., 2016). This has resulted in a concentration on maintenance routines, with an associated lack of strategic development, including a lack of regulation of uses, coordination of interventions and long-term investments in UOS (Chan et al., 2014; Randrup et al., 2017).

Maintenance routines are primarily technical and budgetary exercises typically conducted by specialist departments. However, the increasing concentration on maintenance tasks has raised questions about how these routines are defined, the rationale that underpins them and whether their deployment is an exclusive public-sector strategy (de Magalhães & Carmona, 2009). There is thus a need not only to describe the values and benefits of UOS but also to critically discuss current and potential future management set-ups within mainly local government administrations.

New roles and demands

The NPM-led political and organisational trend for modernisation has created new roles for the public sector, the market and users. A clear trend in increased public participation has also reached UOS management and may today be seen as an overall steering mechanism in UOS governance. The report titled *Our Common Future*, often referred to as the Brundtland Report, defined 'sustainable development' as including social perspectives (WCED, 1987), The Aarhus Convention focused on interactions between the public and local governments (UN, 1998), and the European Landscape Convention (CE, 2000) emphasised the importance of public engagement.

The scope of UOS encompasses the entire urban development spectrum from peri-urban small-scale towns and sprawling, spontaneously growing cities to highly planned, urban development projects. Whether in a local government, housing company or cemetery organisation context, management organisations all tend to actively integrate individual users, user groups and enterprises in their management routines. Involving urban residents on the community level, including informing them about the value and benefits of UOS and supporting their full stewardship and responsibility for the environment around them, is now an important item on the global agenda (Salbitano et al., 2016). Therefore, overall UOS governance and management today involve at least three main parameters: the open space, the management organisation and the users (Randrup & Persson, 2009).

As a consequence of the involvement of more stakeholders, 'governance' has become a central practice, emphasising the relationships between the formal UOS organisation and other actors, including UOS users. This rapidly developing relationship between organisation and users still has the actual UOS at its core. Through the engagement of users, conventional landscape practices are evolving as the role of local government managers changes from providing ecological expertise to providing socioecological expertise. Therefore, UOS management needs to be considered and understood increasingly in the light of its governance relations.

These two core developments – i.e. the dramatic change to UOS management

organisations and the new roles and demands connected to UOS governance and management – together with the changes in physical UOS and related practices over time, form the main background to contemporary UOS governance and management.

The need for new and long-term solutions

Industrialisation in the 1800s gave way over time to the post-war modernist society and the efficient, but resource-intensive, way of living in the modern age. Today, the consequences of these changes are becoming apparent. People and nature (or culture and nature) are generally regarded as two separate entities, especially in urban contexts where technological development is rapidly eroding the understanding of mankind's dependence on nature. Two paradigms are now emerging: a wish to protect nature, reduce consumption and change the basis of human development and thereby limit economic development or, in contrast, a willingness to continue current human (and economic) development, where nature is viewed as good but its protection as a barrier to progress.

This dualism is becoming increasingly evident as people, in their everyday lives, are facing challenges from climate change and environmental destruction, such as more frequent and more intense storms, fires and increasing pollution of soil, oceans and air. There is increasing knowledge concerning climate and environmental problems, with strong evidence and a general understanding that nature is vulnerable but also holds possibilities to solve some of the challenges that urban people are experiencing. Modern UOS management operates within this dualism, and UOS is now seen as a tool for supporting biodiversity and increasing the resilience to climate change to the benefit of residents and other UOS users. At the same time, UOS management must be aware of economic frames that are becoming increasingly constrained.

Nature is critical for human survival through the various short-term and long-term solutions and values it supplies – for example, for food production, clean water and fresh air – as a buffer against pollutants and floods, as well as a resource for recreation and learning, involvement and aesthetics. These services supplied by nature are denoted 'ecosystem services' (MEA, 2005). In an urban environment, urban nature, and thereby urban ecosystem services, plays a special role since most urban residents get their 'nature experience' where they live, work and commute in their everyday lives (Schipperijn et al., 2010). This makes urban nature an important resource for people's well-being, health and recreation today, perhaps even more so today than in the 1850s.

City planners and UOS managers work with nature as a basis for fulfilling human and societal needs. Tools and concepts such as ecological planning and design, sustainable design, landscape urbanism, green infrastructure and landscape architecture are some of the approaches used by planners over past decades. The nature-based solutions (NbS) concept links the social, human, ecological and organisational aspects with nature. Thus NbS builds on the concept of ecosystem services and its categorisation of the services that nature supplies in relation to people's lives and well-being (Pauleit et al., 2017). However, NbS is more than a categorisation of values – it involves concrete solutions inspired by, supported by or copied from nature (EC, 2015), which depend on UOS management practices.

Need for new organisational approaches

The organisation of UOS governance and management is not 'nature based' at present. In fact, the way in which UOS is typically organised – for example, planned, designed, constructed and maintained – is based on linear logic (Jansson et al., 2019). This linearity relates to administrative and economic traditions rather than to the creation of UOS based on nature's inherent principles of coherent ecosystems, long-sighted development and multifaceted deliverables, which would ideally fulfil people's needs and preferences.

Furthermore, UOS governance and management approaches and responsibilities are commonly divided into several local government departments representing different sectors (de Magalhães & Carmona, 2009; Randrup & Persson, 2009). However, comprehensive, cross-departmental coordination and long-term planning are needed in order to fulfil the potential of UOS (e.g. Pauleit et al., 2017). Therefore, it is important to assess and define what is meant by UOS governance and management and the contexts in which they are relevant. Through an updated knowledge base and continuous educational activities, it will be possible to address the lack of coherence between the global urban challenges and how UOS governance and management are conducted on a local level.

References

Blackmar, E. & Rosenzweig, R., (2017). *Central Park History*. [October 2019] www.centralpark.com/visitor-info/park-history/overview/

Bloomberg, M.R. & Frieden, T.R., (2005). *Protecting Public Health in New York City: 200 Years of Leadership*. New York: The New York City Department of Health and Mental Hygiene.

Carmona, M., Heath, T., Tiesdell, S. & Oc, T., (2010). *Public Places, Urban Spaces: The Dimensions of Urban Design*. 2nd ed. Oxford: Architectural Press.

CE, (2000). *European Landscape Convention*. Council of Europe.

Chan, C-S., Marafa, L.M. & van den Bosch, C.C.K., (2014). Changing perspectives in urban park management: A longitudinal study of Hong Kong. *Managing Leisure*. **20**(1), 56–76.

Clark, P., Niemi, M. & Nolin, C., (eds.) (2016). *Green Landscapes in the European City, 1750–2010*. Abingdon: Routledge.

de Magalhães, C. & Carmona, M., (2009). Dimensions and models of contemporary public space management in England. *Journal of Environmental Planning and Management*. **52**(1), 111–129.

Dempsey, N. & Burton, M., (2012). Defining place-keeping: The long-term management of public spaces. *Urban Forestry & Urban Greening*. **11**(1), 11–20.

Dempsey, N, Smith, H. & Burton, M., (eds.) (2014). *Place-Keeping: Open Space Management in Practice*. London: Routledge.

EC, (2015). *Nature-based Solutions & Re-Naturing Cities*. European Commission.

Hood, C., (1991). A public management for all seasons? *Public Administration*. **69**(1), 3–19.

Jansson, M., Vogel, N., Fors, H. & Randrup, T.B., (2019). The governance of landscape management: New approaches to urban space development. *Landscape Research*. **44**(8), 952–965.

Knuth, L., Randrup, T.B. & Gauthier, M., (2008). Legal, policy and institutional aspects of urban and peri-urban forestry and greening. The case of West and Central Asia. *CAB Reviews: Perspectives in Agriculture, Veterinary Science, Nutrition and Natural Resources*. **3**(94), 1–13.

Lee, A.C.K., Jordan, H.C. & Horsley, J., (2015). Value of urban green spaces in promoting healthy living and wellbeing: Prospects for planning. *Risk Management and Healthcare Policy*. **8**, 131–137.

Leiren, M.D., Lindholst, A.C., Solfjeld, I. & Randrup, T.B., (2016). Capability versus efficiency: Contracting out park and road services in Norway. *International Journal of Public Sector Management*. **29**(5), 474–487.

MEA, (2005). *Millennium Ecosystem Assessment Report. Ecosystems and Human Well-being:*

Synthesis. Millennium Ecosystem Assessment. Washington, DC: Island Press.

Pauleit, S., Zölch, T., Hansen, R., Randrup, T.B. & Konijnendijk, C.C., (2017). Nature-based solutions and climate change – Four shades of green. In: N. Kabisch, A. Bonn, H. Korn & J. Stadler (eds.) *Nature-based Solutions to Climate Change in Urban Areas – Linkages of Science, Society and Policy*. Berlin: Springer Verlag.

Pickett, S.T.A., Cadenasso, M.L., Grove, J.M., Nilon, C.H., Pouyat, R.V., Zipperer, W.C. & Costanza, R., (2001). Urban ecological systems: Linking terrestrial ecological, physical, and socioeconomic components of metropolitan areas. *Annual Review of Ecology and Systematics*. **1**(32), 127–157.

Qureshi, S., Breuste, J.H. & Jim, C.Y., (2013). Differential community and the perception of urban green spaces and their contents in the megacity of Karachi, Pakistan. *Urban Ecosystems*. **16**(4), 853–870.

Randrup, T.B., Nielsen, J.B., Lindholst, C., Nuppenau, C. & Sejr, K., (2006). New trends in outsourcing public green space maintenance – The concept of integrated park management. *IFPRA World – Refereed Section*, International Federation of Parks and Recreation Administration, 8–10 March.

Randrup, T.B., Östberg, J. & Wiström, B., (2017). Swedish green space management – The manager's perspective. *Urban Forestry & Urban Greening*. **28**, 103–109.

Randrup, T.B. & Persson, B., (2009). Management of public green space in the Nordic countries – Development of a new strategic green space management regime. *Urban Forestry & Urban Greening*. **8**(1), 31–40.

Rutledge, K., McDaniel, M., Boudreau, D., Ramroop, T., Teng, S., Sprout, E., Costa, H., Hall, H. & Hunt, J., (2018). Urban area. *National Geographic Encyclopedia*. [October 2019] www.nationalgeographic.org/encyclopedia/urban-area/

Salbitano, F., Borelli, S., Conigliaro, M. & Chen, Y., (2016). *Guidelines on Urban and Peri-urban Forestry*. Paper No. 178. Rome: Food and Agriculture Organization of the United Nations, FAO.

Schipperijn, J., Ekholm, O., Stigsdotter, U.K., Toftager, M., Bentsen, P., Kamper-Jørgensen, F. & Randrup, T.B., (2010). Factors influencing the use of green space: Results from a Danish national representative survey. *Landscape and Urban Planning*. **95**(3), 130–137.

Tower Hamlets, (2017). History. *towerhamlets.gov.uk*. [October 2019] www.towerhamlets.gov.uk/lgnl/leisure_and_culture/parks_and_open_spaces/victoria_park/history.aspx

UN, (1998). *Aarhus Convention. Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters*. Aarhus: United Nations.

UN, (2014). World's population increasingly urban with more than half living in urban areas. *United Nations*. [October 2019] www.un.org/en/development/desa/news/population/world-urbanization-prospects-2014.html

WCED, (1987). *Our Common Future*. Report on the World Commission on Environment and Development. Oxford: Oxford University Press.

WHO, (2016). *Urban Green Spaces and Health*. Copenhagen: World Health Organization, Regional Office for Europe.

WHO, (2017). *Urban Green Space Interventions and Health: A Review of Impacts and Effectiveness*. Copenhagen: World Health Organization, Regional Office for Europe.

Wolff, M., Haase, D. & Haase, A., (2018). Compact or spread? A quantitative spatial model of urban areas in Europe since 1990. *PLoS One*. **13**(2), e0192326.

All figures are used with permission.

2 Defining urban open space governance and management

Märit Jansson, Nina Vogel, Hanna Fors, Nicola Dempsey, Arjen Buijs and Thomas B. Randrup

Introduction

Urban open spaces (UOSs) have multiple values, with green spaces in particular providing numerous benefits for people and society through what are often referred to as ecosystem services (MEA, 2005). The amount of ecosystem services provided depends on the physical qualities and functions of UOS, and they lead to benefits which have values for people and society (Haines-Young & Potschin, 2008) (see Chapter 8 for a definition of ecosystem services). The goal of UOS governance and management (G&M) is often to develop spaces and especially their qualities with several aspects in mind, including, for example, biodiversity and the people using the spaces.

Professionals within the field of UOS G&M work in a long-term perspective, on various scales and within various contexts, involving experience based on both practice and theory. Governance and management deal with the development and quality of most types of physical landscapes, often in urban settings (Pickett et al., 2001). Landscape professions are commonly divided into three tasks or even working phases: planning, design and management (CE, 2000; Rodiek, 2006; van den Brink et al., 2016) or possibly into two tasks: place-making (e.g. planning, design and construction) and place-keeping (e.g. management and maintenance) (Dempsey & Burton, 2012). Landscapes are usually developed in a hierarchical, chronological way, beginning with a plan set by authorities on national, regional and local levels. Such plans influence the provision of UOS – for example, defining standards, rules and regulations. From there, more detailed designs on various scales are produced and then realised through construction, planting, etc. Management practices tend to 'end' this sequence or 'linear logic' of the landscaping working process. Such processes (planning, design, management) are becoming more interrelated with long-term management, which is increasingly being considered at the planning and design stages. Thus the logic is changing as landscape practices are developing. Further, there is an increasing challenge to democratic decision making in relation to consultation and participation by interest groups, users and other stakeholders. Therefore, new

BOX 2.1: DEFINITIONS

Urban open space (UOS): Mainly unbuilt, often publicly accessible, area within a populated settlement, comprising vegetated 'green', water-dominated 'blue', derelict 'brown' and hard-surfaced 'grey' elements.

Green infrastructure (GI): The integrated, connective and cohesive network of UOS, as seen in a combined socioecological perspective.

UOS management: A strategic, inclusive and long-sighted approach of continued re-planning, re-design, re-construction and maintenance of UOS.

UOS maintenance: Operational processes and activities undertaken to maintain existing UOS.

UOS governance: Collaboration of government and non-government actors, with emphasis on power relations, decision making and resources (knowledge and funding) within a specific discourse and in accordance with relevant rules and regulations.

types of governance approaches, including co- and self-governance, are also affecting the traditional linear logic (Buijs et al., 2016). Such new approaches can evolve on various scales involving individuals, communities or entire institutions, comprising new sets of actors and practices.

From UOS management to governance approaches

UOS often comprises publicly accessible areas that are managed primarily within a local government domain (Randrup & Persson, 2009; Dempsey & Smith, 2014). Open space is commonly defined as being 'open urban public' (Shams & Barker, 2019, p. 1), emphasising the access and use of people. However, approximately 50% of what is often considered to be UOS is privately owned (Fuller & Gaston, 2009; Schmitt-Harsh et al., 2013), yet may still be accessible, physically or visually, and contribute much to the public in various ways through providing amenity and ecosystem services. Thus it is relevant to consider a scale from private to public when defining or dealing with UOS. During recent years, the prerequisites for UOS management have changed in several ways, leading to diversified governance approaches (see Box 2.1 for definitions of G&M).

With the introduction of New Public Management (NPM) (Hood, 1995) (see Box 2.2), UOS management shifted from being a government issue for mainly the management organisations (e.g. local government organisations, housing companies, cemetery managers) to being a market issue, with contractors and private enterprises playing a new role as central actors. Thereafter, it has been moving 'from government to governance', with public administrations working collaboratively with a number of actors, including UOS users (Dempsey & Smith, 2014).

The changes over time have increased the demands on UOS quality, with increased expectations for diverse and multiple functions. These expectations are also influenced by transformed societal needs connected to global megatrends: loss of biodiversity, lack of space, socioeconomic and environmental injustices as a result of climate change, urbanisation, globalisation, densification

BOX 2.2: NEW PUBLIC MANAGEMENT

NPM is a reform movement initiated in the 1980s. It assumed from the outset that available resources were limited, and therefore, the focus was on increased efficiency. NPM was about re-inventing government and used a results-based orientation in combination with privatising and outsourcing as a means of achieving higher efficiency in public government. The public was seen as a provider of public goods for the users, who may be seen as costumers of a public good.

and migration (Newman et al., 2009; EEA, 2015). They induce shifts that affect UOS use, planning and management, in practice and in theory. Through the recent focus on anthropogenic concepts, such as ecosystem services (MEA, 2005) and nature-based solutions (NbS) (e.g. Maes & Jacobs, 2015), it has been broadly acknowledged that UOSs are dynamic and require continued strategic management to meet new challenges.

Another main movement behind the shift within UOS management is the focus on public participation, which is widely supported in international conventions (e.g. UN, 1998; CE, 2000) as a way of enhancing democracy, accountability and transparency of management. Participation has long been argued as a means for social inclusion and other aspects of 'sustainable urban development'. In UOS routines, it can promote amenities and enhance social cohesion (Castell, 2010), integrate new knowledge, co-create values and offer more efficiency (Buijs et al., 2016). Participation is defined and systematised in different ways, according to the distribution of power and capacity for knowledge (Arnstein, 1969; Fung, 2006; Fors et al., 2015). However, particular responsibility still rests with local governments, as their routines, actions, encouragements and allowances are often paramount for adaptation of UOS management to the needs and requirements of local users (Carmona et al., 2008). Participation influences governments into new forms of governance, where stakeholders of various types can be represented in different types of 'governance arrangements' (Arnouts et al., 2012; Buijs et al., 2016).

These shifts, from government to governance, transformed societal needs and growing public participation, have led contemporary UOS management to an increased focus on co-development (Jansson et al., 2019). This has been illustrated in several recent studies addressing governance aspects within UOS management (e.g. Connolly et al., 2014; Molin & Konijnendijk, 2014; Dempsey et al., 2016; Dennis & James, 2016; MacKenzie et al., 2019). Combining G&M in the development of UOS can be a way of safeguarding and acknowledging different values. As the practice of UOS management is being affected by new governance arrangements, beyond established structures and actors, challenges and discussions may come to involve the distribution of power, governmental legitimacy and sustainability discourse (Jansson et al., 2019).

Definitions

Defining and conceptualising UOS management

Within a landscape context, management is defined in slightly various ways. The

European Landscape Convention (ELC) describes it as an 'action, from a perspective of sustainable development, to ensure the regular upkeep of a landscape, so as to guide and harmonize changes which are brought about by social, economic and environmental processes' (CE, 2000, p. 2). Thus the ELC focuses on upkeep but also on striving for sustainability (social, economic and environmental). This directs the attention to action, complexity and changes over time. However, 'regular upkeep' can be questioned, as it implies a focus on operations (maintenance) rather than on management in broad or strategic terms.

Jansson & Lindgren (2012, p. 142) define 'landscape management' as 'activities performed by a management organisation in order to maintain and develop existing urban green space for users'. Likewise, Dempsey & Smith (2014, p. 24) define 'place-keeping' as 'maintaining and enhancing [a place and] its quality to maximize the benefits for users'. Both definitions focus on users and the duality of maintaining and developing or enhancing UOS. According to Jansson et al. (2019), UOS management 'includes processes for implementing, maintaining and improving landscape structures, particularly physical landscapes, and people using and managing these'. This extends the focus to incorporate the fact that management also contributes to implementing or realising the design of spaces and that the management professionals and UOS users are core actors. Management of UOS is thus about more than 'maintaining' – it is also about providing UOSs which are of relevance and value from different perspectives and about adapting to actual needs and preferences over time.

Numerous studies argue the need not to limit management to maintenance and upkeep, referring to preservation of existing spaces and their qualities but to extend it to include planning and strategic approaches (Steiner, 1991; Morgan, 1991; Konijnendijk, 1999; Gustavsson et al., 2005; Randrup & Persson, 2009; Jansson & Lindgren, 2012). Therefore, particular attention has been given to the 'management organisation', which can be seen as differing from the 'management activities' performed (Gustavsson et al., 2005; de Magalhães & Carmona, 2009). (See also Chapters 9 and 11, both of which emphasise the management organisation.) Furthermore, there are close links between the design of spaces and their management. Real challenges often arise when management is not factored in at the design stage. For example, Burton et al. (2014) discuss how competition designs of open spaces do not always involve managers in the consultation process. One could argue that a consequence of this is that many of the intended features get lost or lose their function some years after construction because they have not received the required ongoing maintenance as part of the management approach.

Management of UOS thus includes both ongoing maintenance and development or enhancement of user qualities in a long-term perspective (Jansson & Lindgren, 2012; Dempsey & Smith, 2014) and is intertwined with design (Burton et al., 2014). Pulling together all responsibilities for UOS under one organisation in this way, rather than the fragmented way in which design and management are often conducted, would help ensure that management is factored in at the design stage and that management is a way of achieving design goals.

STRATEGIC MANAGEMENT Management and maintenance are terms that are often used interchangeably. Management can be used to describe the 'end stage' of the landscape development process (planning, design, construction,

management), when in fact it refers to operational maintenance. Management is also strategic, and therefore sometimes called strategic management, and includes more than maintenance, with re-planning, re-design, re-construction and continued maintenance involved (Randrup & Persson, 2009) (see Figure 2.1). Despite the common divisions between UOS management (or place-keeping) and planning and design (or place-making) within public authorities and academia, they are often intertwined in practice (Dempsey & Burton, 2012; Jansson & Lindgren, 2012). Strategic management has been supported by the development of governance approaches but also counteracted by changes, such as the market-based re-organisation through NPM (Hood, 1995). This has led to organisational changes within public park administrations, with a primary focus on operational management and a subsequent lack of strategic approaches (Randrup & Persson, 2009). (Chapter 9 provides more details on the organisation of maintenance.)

According to de Magalhães & Carmona (2009), the management of public spaces comprises four interlinked processes or tasks: (i) regulation of uses and conflicts between uses, (ii) maintenance routines, (iii) new investments and ongoing resourcing of public space and (iv) coordination of interventions in public space. The functions of UOS for people are then created and maintained in management that is either state centred, market centred or user centred. Gustavsson et al. (2005) and Randrup & Persson (2009) divide management into three organisational levels or processes: policy (decision making), tactical (professional) and operational. The operational level concerns hands-on maintenance and upkeep; the tactical level creates overviews and plans; the policy level sets the overall directions and visions. (See Figure 11.1 in Chapter 11 for a more detailed description of the three levels of UOS management.)

Randrup & Persson (2009) developed the 'park-organisation-user model', which comprises three dimensions (green spaces

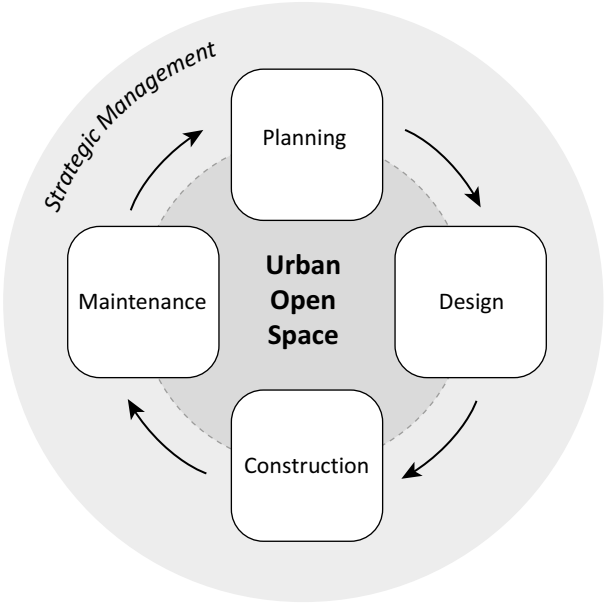


Figure 2.1 Strategic management of UOS. *Source*: Reproduced from Randrup & Persson (2009)

(or UOS), management organisations and users). The model acknowledges that all management activities concern a formal organisation (often an owner) and its relations to the UOS in question but include the users, also registered companies, charitable organisations, trusts and mutual and social enterprises. While much emphasis has been on socioecological relationships – for example, nature values for humans (Díaz et al., 2018) – the model insists that the means to establish these socioecological relationships should also be emphasised, thus illustrating and communicating UOS management (see Figure 2.2). The model has been applied to describe interconnections and interrelations between the three dimensions in relation to, for example, courtyards and playgrounds and in work related to landscape management theory (Jansson & Lindgren, 2012).

Defining and conceptualising UOS governance

'Governance' has emerged during recent decades as a way of describing the steering of public resources in a wider perspective than in 'governing by government' (Jansson et al., 2019). Arts & Visseren-Hamakers (2012, p. 4) define governance as 'the many ways in which public and private actors from the state, market and/or civil society govern public issues at multiple scales, autonomously or in mutual interaction'. Governing can be done by, with or without the state/authority. Governance in its strictest definition is in contrast to conventional government. It is characterised by a multi-centred steering system where public and private actors cooperate voluntarily in various relations rather than being enforced within a traditional hierarchy. Traditional top-down government, implying a division

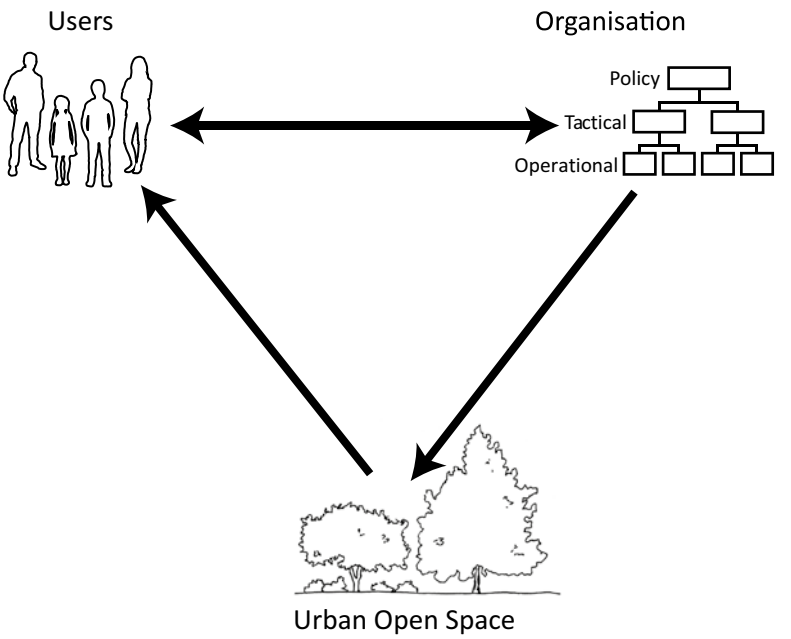


Figure 2.2 The park-organisation-user model with its three components: the organisations (managers), users and UOS. *Source*: Reproduced from Randrup & Persson (2009)

where politicians make decisions without active user involvement (Sehested, 2004), is thereby seen as outdated, illegitimate and ineffective. Instead, governance refers to new ways of steering and of organising steering processes in a postmodern society (Sehested, 2004; Arts & Visseren-Hamakers, 2012), including policy networks, public participation and public-private partnerships (Arts & Visseren-Hamakers, 2012). An important underpinning concept is that no single actor holds all the answers to a collective problem and that the actors are, therefore, dependent on collaboration (Sehested, 2004).

Within the context of UOS, governance has been defined as 'the sphere of relations between [local] government and other actors in civil society or non-governmental sectors – including the private sector and community' (Smith et al., 2014, p. 53). Governance approaches may not always lead to visible changes in the actual UOS, but their processes are different from 'traditional' actions by government, as there are various actors involved in development, implementation and communication. Thus it may have a different legitimate bearing.

Governance in relation to UOS development can be understood by applying the concepts of 'policy arrangements' and even governance arrangements (Arnouts et al., 2012; Jansson et al., 2019). The outcomes of such arrangements are determined by the resources included, the network of actors, and their roles and relations (Arnouts et al., 2012). These arrangements take place in public domains (policy domains), where formal regulations, public interests and societal values must be considered. Decision making and implementation are operationalised through coordination and collaboration but with certain rules, legitimacy and power distribution as set through policy instruments. With the changing role and influence of the state and/or authorities, governance arrangements range from hierarchical to closed co-governance, open co-governance and self-governance, as well as from local to global (Arts & Visseren-Hamakers, 2012).

The 'policy arrangement model' (Arts et al., 2006) illustrates the core components of a governance arrangement in a policy domain and their interrelations (see Figure 2.3). The 'discourse' is the content and direction of the policy domain, 'rules of the game' include formal and informal laws, rules and regulations, 'resources' may come in many forms (e.g. spaces, competences, time, money, power) and 'actors' include public organisations, businesses, users and non-government organisations (NGOs) (Arts et al., 2006).

Molin (2014) introduced the concept of 'place-based governance' in the context of UOS, acknowledging the local connections between different actors and in relation to specific sites. The long-term development of a site may depend on whether governance arrangements can offer a well-functioning context and direction for the organisation. Through continuous involvement, actors, skills and knowledge can be developed and transferred, and building such capacities can lead to success in the long-term management of UOS.

Co-governance of UOS management: a combined approach

There are many similarities and overlaps between G&M of UOS, as both concepts place the focus on the public domain and its quality and development. The main aspects of UOS G&M can be brought together in a combined G&M model and theoretical framework (Jansson et al., 2019). The G&M model can be used to explore governance aspects of UOS management, including organisation form and development

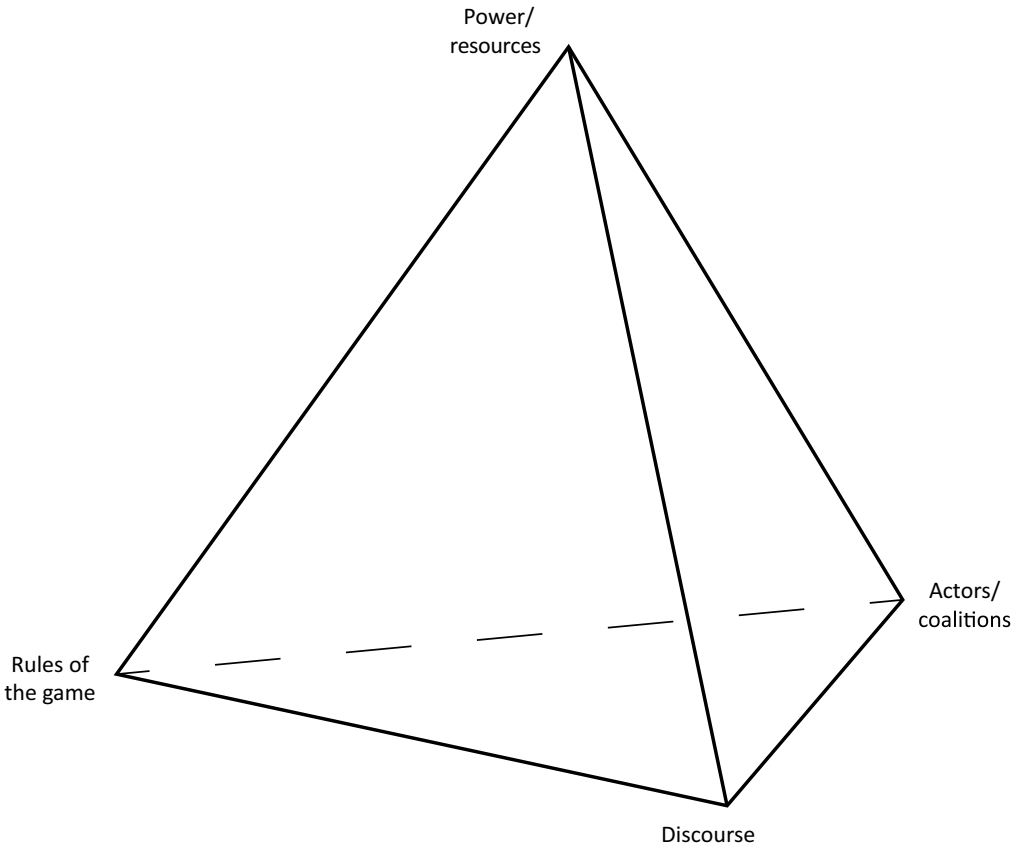


Figure 2.3 The tetrahedron of policy arrangements. *Source*: Reproduced from Arts et al. (2006)

of spaces (Figure 2.4). The G&M model is based on the core of UOS G&M in the park-organisation-user model (see Figure 2.2), the policy arrangement approach (see Figure 2.3) and the hierarchical closed and open co- and self-governance scale defined by Arts & Visseren-Hamakers (2012). It contains the three interrelated dimensions of the park-organisation-user model: 'UOS', 'public actors' and 'users/private enterprises'. The UOS in question can be private, public or somewhere in between and thus not necessarily publicly accessible. The four dimensions of the policy arrangement tetrahedron are shown via the 'rules of the game', and these are listed next to each 'actor' as arrows for user and administration 'discourses' between any relevant actors. 'Resources' are listed next to the related 'power' arrows, indicating the level of power through the thickness of the arrows (Figure 2.4). Various governance modes (Arnouts et al., 2012) can be illustrated by elaborating the arrows in the model.

SELF-GOVERNANCE Self-governance implies that management is organised and conducted by the users, with no or little involvement from the 'government' – for example, local governments or other authorities. Ideally, this implies that non-government actors steer their own affairs with a high degree of autonomy. Some boundaries or rules are often set, and the government organisation can facilitate and stimulate operations, but non-government actors are mainly responsible in this arrangement (Arnouts et al., 2012). These actors can for

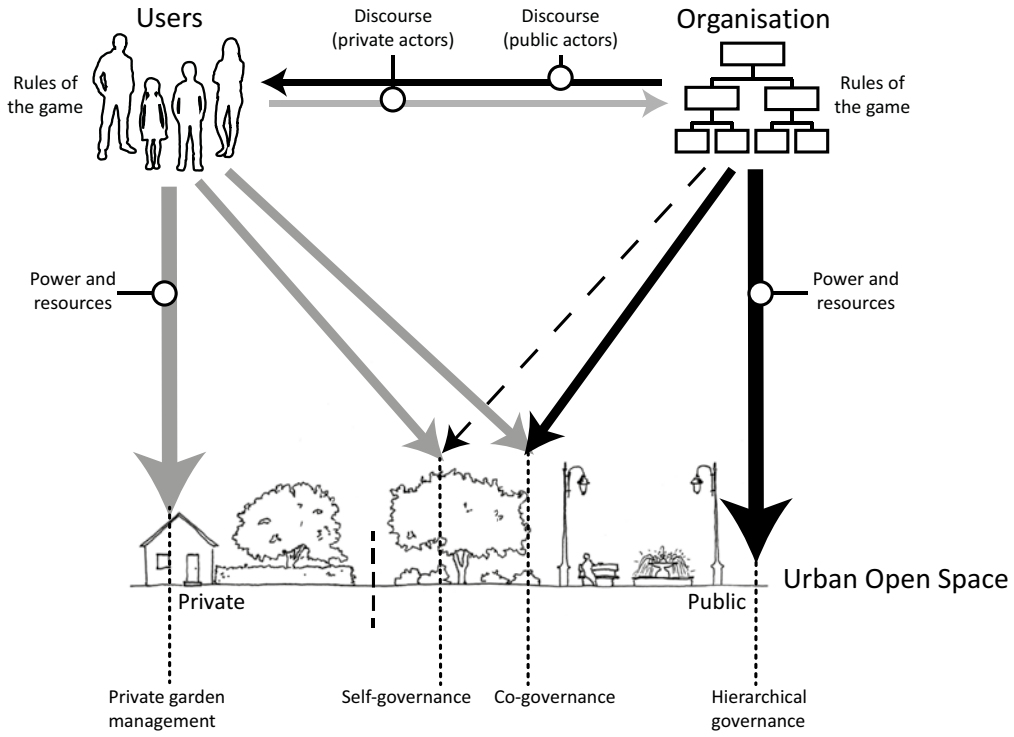


Figure 2.4 The combined G&M model. *Source*: Reproduced from Jansson et al. (2019)

example be individuals, local groups or even social enterprises, like in Manor Fields Park in Sheffield, UK (Box 2.4 and Figure 2.6).

Initiatives leading to self-governance tend to be taken by users, NGOs or other non-government actors aiming to take over the management and steering of resources from conventional governmental organisations – for example, to safeguard spaces or their quality. However, there are also examples of local governments encouraging or initiating projects leading to self-governance for financial or social sustainability reasons.

One form of self-governance is urban commons. In the diversified context of contemporary urbanisation, commoning is considered a self-organised governance practice that can contribute coping capacity for various challenges, such as austerity measures, endangered resources, inequalities and uncertain development conditions (Bollier & Helfrich, 2012; Vogel, 2017). The practice of commoning comprises the collective management of a resource by its users (its 'commoners'). In its most radical form, it can comprise protest and occupy movements, where local residents reclaim endangered urban resources (Borch & Kornberger, 2015). More moderate forms include do-it-yourself urbanism and 'sustainable stewardship', which can foster inclusiveness and community capacities and strengthen identification and belonging (Bradley, 2015). These additional values show that commons have potential mainly for social relations to a 'resource' (Euler, 2016). Claiming UOS as commons thus offers different value capacities, user relations and management practices compared with conventional UOS management. Despite the self-organised nature of commoning, there are examples of commons being established by local governments, such as the #Pixlapiren project in Helsingborg, Sweden (see Box 2.3 and Figure 2.5).

BOX 2.3: CHANGING FROM OPEN CO-GOVERNANCE TO SELF-GOVERNANCE – THREE CASES

(i)

(ii)

Figure 2.5 (i) The site at the beginning of the #Pixlapiren project and some of its new uses developed by groups of 'pixelators', (ii) location for a street art festival

(iii)

(iv)

Figure 2.5 (iii) community gardening plots and (iv) a skateboard park using the existing slope of the pier with a new surface. *Photos*: Nina Vogel

#Pixlapiren in Helsingborg, Sweden, is a local government initiative exploring new forms of co-development on a 4-hectare pier in conjunction with a large urban renewal project. It is envisioned as a 'test bed' where interested stakeholders can meet, initiate ideas and form place identities in order to strengthen local democracy

and challenge segregation problems. Development spaces ('pixels') measuring 10 m x 10 m are granted to all interested stakeholders (local residents, organisations, groups) within the eight- to ten-year project. The rules of the game are set through a contract as the basis for agreement between the actors ('pixelators') and the local government. #Pixlapiren includes the challenge to create interest and ownership among users as the local government remains in (restrained) power over 'urban common' and connected resources. Possibilities include testing democratic practices and new tools to handle changing multiple uses on-site, including urban gardening, street art, skateboarding, beach volley, waterskiing, festivals and workshops. The intention is that the pixelators will form, use and manage the space collectively in true self-governance.

Boscoincittà (the Forest in the City) is a public nature park in a peri-urban green belt in Milan, Italy. In 1974, the Milan local government granted a concession to the NGO Italia Nostra for redevelopment of 35 hectares of abandoned farmland. This area was then developed into a park as a co-governance process involving residents, NGOs and authorities. An important discourse within Boscoincittà was to counter the effects of urbanisation, increase green space connectivity and provide recreational opportunities. Financial resources were mobilised from the public, NGOs and local government so that the park could increase its scale to over 120 hectares, including woodlands, meadows, wetlands and allotment gardens, strongly contributing to green space accessibility. The number and diversity of active users involved as actors and the dominant modes of governance have changed over time. Groups of users have locally designed and managed parts of the park since 1974, and the rules of the game have changed from co-governance to self-governance. The NGO Italia Nostra is responsible for Boscoincittà's overall development and management, but several park sections are managed by groups, including students, scouts and community associations. Cooperation with administrations has been challenging for Italia Nostra, but local government has also played an important supporting role, providing resources such as land, allowances and a formal lease contract.

The nature association De Ruige Hof (the Wild Court) was established in 1986 by a group of members of the public seeking to protect spontaneously emerging nature on abandoned construction sites in south-east Amsterdam, the Netherlands. After meeting with the City of Amsterdam local government, De Ruige Hof took over the management of the De Riethoek site and a few years later also a second area, Klarenbeek. It now manages 13 hectares of nature and has about 450 members, 50 active volunteers and a budget of around €20,000 annually arising from membership contributions, donations and government support. De Ruige Hof has a management committee and employs a part-time coordinator. The aim is to bring nature and users closer together by organising a variety of activities, mostly in relation to management. This contributes to conservation and development of green space with increased biodiversity.

BOX 2.4: SELF-GOVERNANCE IN MANOR FIELDS PARK, SHEFFIELD, UK

Green Estate Ltd is a social enterprise with a commercial arm that began life as an environmental regeneration project in 1998 in the Manor Castle area in Sheffield, United Kingdom. It manages approximately 300 hectares of green space in the area, ranging from recreation grounds, parks and amenity green spaces to demolition/development sites (Figure 2.6). The social arm focuses on the management of existing UOS and engages in 'place-making' of new areas. To reduce the reliance on grant funding, Green Estate has a number of commercial activities to generate income, including UOS management, grounds maintenance, green waste recycling and composting and green roof installation. The social and the commercial arms have their own budgets, contracts and staff, including qualified and skilled landscape architects, managers and arboriculturalists.

Figure 2.6 Perennial meadow planted and maintained by Green Estate in Manor Fields Park, Sheffield. *Photo*: Peter Neal

Staff training and employment involve team members working on-site in a role similar to that of a traditional park warden but with extensive horticultural training. There is much contact with the public on matters of anti-social behaviour and inter-agency networking (e.g. police, fire service, health professionals), alongside the management and maintenance tasks. This skills base generates high-quality volunteers and 'place-keeping' work placement opportunities. Initially, Green Estate faced a lack of constructive community involvement. Therefore, there has been ongoing consultation before, during and after the completion of all Green Estate projects in the area since 1999. Funding comes from a mixture of public projects and commercial projects, allowing Green Estate to move from 100% grant funded in 2004 to 100% self-sustaining 15 years later.

CO-GOVERNANCE In co-governance, both government and non-government actors collaborate, forming either a tight-knit or more loosely organised group (Arnouts et al., 2012). This means that the authority – for example, a local government – transfers some of its power to a certain group or groups of users. Co-management of UOS in public and semi-public areas has received increasing attention during recent decades. In some cases, people have initiated co-management by engaging in the management of nearby UOS. In other cases, this has been initiated top-down – for example, by local government organisations. Co-management areas can also be created in a collaborative way, with users participating and managers facilitating actions to get the co-management established. Depending on the organisation and involvement in these collaborations, co-management can sometimes be defined as either closed (tight-knit) or open (loose-knit).

Open co-governance is the more loose-knit form of co-governance, which often has fewer different types of actors involved and less steering than closed governance. Examples of open co-governance are community gardens and co-management of green spaces (e.g. parks), where authorities collaborate with actors engaged in the maintenance practices, often people who live nearby.

A small-scale example of open co-governance is co-management zones, a concept that bears some similarities to urban commons as it involves publicly owned UOS where local ownership is built through active involvement by local residents (Colding et al., 2013). Co-management of UOS, such as community gardens, generally involves the entire green space, affecting its overall characteristics under users' own rules. Co-management zones instead give local residents the possibility to use, develop and manage some defined spaces, while public managers continue to control the main area and its characteristics and quality (Fors et al., 2018). Thus, residents can influence the area through long-term co-management activities, but the physical space where participation takes place is restricted. Involvement in co-management zones may be individual and, therefore, mainly independent of the collective organisation, which constitutes a distinct difference from urban commons. In closed co-governance arrangements, the collaboration is more tight-knit and often much more dependent on an organisation, such as a local government, taking overall responsibility. An example of closed co-governance is Burgess Park in London, UK (Box 2.5 and Figure 2.7).

BOX 2.5: CLOSED CO-GOVERNANCE IN BURGESS PARK, LONDON, UK

Burgess Park is the largest park in the London borough of Southwark. Surrounded by one-fifth of the most deprived wards in London, it is central to ambitious high-density urban regeneration. The park occupies 51 hectares and was built over three decades from the mid-1950s as a number of UOSs were brought together. Greater London Corporation gave the park and responsibility for it to Southwark Council in the mid-1980s. Numerous projects were then undertaken before Burgess Park re-opened in 2012.

A grounds maintenance contract contributes to sustaining the capital investments made, with the focus on safety, cleanliness and access. The maintenance work is contracted out by the local government to a private contractor, including a post to coordinate opportunities for structured volunteering sessions. The private contractor also employs five locally recruited apprentices annually to study horticulture, provides capital investment for new machinery and equipment and works with ecology and conservation organisations and local 'friends groups'. The local government provides capital investment for new vehicles and major plant items. The head gardeners in Southwark (employed by the contractor) are local ecology and conservation champions. Other actors involved include the local rugby club, a community theatre group, an organic allotment group and nature groups.

Figure 2.7 The western entrance of Burgess Park, London. *Photo*: Peter Neal

Depending on the local government structure, schoolyards can be included in the realm of the local (public) management protocol or, as seen in, for example, the UK, schools can manage their own grounds without local government control and management. In Sweden, schoolyard greening is sometimes conducted in a temporal closed co-governance approach (Jansson & Mårtensson, 2012). Contemporary schoolyards are often dominated by paved surfaces and mostly managed in quite conventional ways by local government managers and maintenance staff or contractors. However, green and varied schoolyards are promoted for learning and varied play, where the approach to schoolyard management and use has been emphasised as being of major importance (Malone & Tranter, 2003). This has led to an international trend of 'schoolyard greening', where activities can include 'gardening, naturalisation, habitat restoration, tree planting and other collaborative efforts to bring nature back to the school ground' (Bell & Dyment, 2008, p. 78).

Schoolyard greening can be achieved in a collaboration between various actors, including teachers and other school staff, local government planners, managers and maintenance staff, private contractors, local organisations or NGOs, parents and community, as well as with participating pupils (Jansson & Mårtensson, 2012). This is a shift in actors and power relations, creating a governance arrangement that is different from conventional schoolyard management 'by government'. These projects can often be considered closed co-governance arrangements, with the authority keeping much control in a short-term stabilisation process during the project period.

Combined understanding for strategic and inclusive development

Combined G&M of UOS has become increasingly evident and necessary, as highlighted by Dempsey & Burton (2012), Molin (2014) and Jansson et al. (2019). The practice of UOS management can be visualised in combination with a conceptual governance arrangement, where both G&M relate to physical UOS settings. Addressing G&M in combination opens up possibilities for an UOS development that is both strategic and inclusive, with increased understanding of participatory approaches, overcoming of barriers and increased organisational learning. By highlighting the interrelations between governance and management, the theoretical underpinnings and understanding of G&M processes can be strengthened, and new forms of practices in relation to UOS and their development can be encouraged.

The focus on actors and their approaches and interrelations is paramount in G&M of UOS. Users, and creation of benefits for users, must dominate the understanding of what these practices are all about (Randrup & Persson, 2009; Dempsey & Smith, 2014). Managers must also be at the core, with organisations and roles that are changing and developing along with the shift in management and the introduction of new and varying governance approaches (Fors et al., 2018). Although the shift is already a reality in many aspects, such structural changes might take time. Furthermore, the effects of these shifts are still rather poorly studied, concerning new management roles and their implications, including effects on the actual UOS relevance and quality (Fors et al., 2015).

Governance within UOS management faces challenges as the consequences of megatrends, participatory approaches and local government steering approaches. As an example, austerity has caused major challenges to local government UOS budgets in the UK (Neal, 2016). There is also variation in what drives user involvement or what might underpin a lack of involvement. Some communities in richer parts of a city may have strong social capital in terms of well-educated and well-connected people. They are likely to have a stronger capacity to deal with, for example, the rules of the game or to access financial resources than less well-connected groups in more economically deprived areas. Funding sources may dictate the governance arrangements when stipulating the conditions. In the UK, in some cases (e.g. the UK's National Heritage Lottery Fund), funding will only be awarded when effective and sustained community involvement is demonstrated. Where new governance structures and agreements are increasingly required, for example, in the UK, dwindling public-sector funding is causing some local governments to apply NGO-led management of public spaces simply in order to maintain their UOS. Thus local communities and the third sector are playing an increasingly influential role in governance, but so do also private investors (developers), leading to the partial privatisation of UOS. It is currently unclear how issues concerning the transparency of arrangements and responsibilities can be resolved (Dempsey et al., 2016).

These developments and their local and national variations call for a more coherent understanding of processes in an approach where existing theories can be brought together, as in the combined G&M model (Figure 2.4). Governance of UOS management now requires a greater dynamic in the approach to the co-development of UOSs and their qualities, compared with conventional approaches. This dynamic can include new ways of implementing design, knowledge and improvements through input and collaboration by different actors and through the possibility for constant development of UOS. This affects how UOS management can contribute to sustainable development. As governance thinking is increasingly becoming mainstream in practice, new knowledge, including well-functioning tools for its implementation and analysis, will be required.

References

Arnouts, R., van der Zouwen, M. & Arts, B., (2012). Analysing governance modes and shifts – Governance arrangements in Dutch nature policy. *Forest Policy and Economics*. **16**(C), 43–50.

Arnstein, S.R., (1969). A ladder of citizen participation. *Journal of American Institute of Planners*. **35**(4), 216–224.

Arts, B., Leroy, P. & van Tatenhove, J., (2006). Political modernisation and policy arrangements: A framework for understanding environmental policy change. *Public Organization Review*. **6**(2), 93–106.

Arts, B. & Visseren-Hamakers, I.J., (2012). Forest governance: Mainstream and critical views. *ETFRN News*. **53**, 3–10.

Bell, A.C. & Dyment, J.E., (2008). Grounds for health: The intersection of green school grounds and health-promoting schools. *Environmental Education Research*. **14**(1), 77–90.

Bollier, D. & Helfrich, S., (2012). *Wealth of the Commons. A World Beyond Market and State*. Amherst, MA: Levellers Press.

Borch, C. & Kornberger, M., (2015). *Urban Commons: Rethinking the City*. London: Routledge.

Bradley, K., (2015). Open-source urbanism: Creating, multiplying and managing urban commons. *Footprint*. **9**(16), 91–108.

Buijs, A., Elands, B., Havik, G., Ambrose-Oji, B., Cvejic, R., Debellis, Y., . . . Železnikar, Š., (2016). *Innovative Governance of Urban Green Spaces: Learning from 18 Innovative Examples*

Across Europe. Brussel: European Union's 7th Framework Program.

Burton, M., Dempsey, N. & Mathers, A., (2014). Connecting making and keeping: Design and management in place-keeping. In: N. Dempsey, H. Smith & M. Burton (eds.) *Place-Keeping: Open Space Management in Practice*. London: Routledge. 125–150.

Carmona, M., de Magalhães, C. & Hammond, L., (2008). *Public Space: The Management Dimension*. London: Routledge.

Castell, P., (2010). Involving tenants in open space management: Experiences from Swedish rental housing areas. *Urban Geography*. **31**(2), 236–258.

Colding, J., Barthel, S., Bendt, P., Snep, R., van der Knaap, W. & Ernstson, H., (2013). Urban green commons: Insights on urban common property systems. *Global Environmental Change*. **23**, 1039–1051.

Connolly, J.J.T., Svendsen, E.S., Fischer, D.R. & Campbell, L.K., (2014). Networked governance and the management of ecosystem services: The case of urban environmental stewardship in New York City. *Ecosystem Services*. **10**(December), 187–194.

CE, (2000). *European Landscape Convention*. Council of Europe.

de Magalhães, C. & Carmona, M., (2009). Dimensions and models of contemporary public space management in England. *Journal of Environmental Planning and Management*. **52**(1), 111–129.

Dempsey, N. & Burton, M., (2012). Defining place-keeping: The long-term management of public spaces. *Urban Forestry & Urban Greening*. **11**(1), 11–20.

Dempsey, N. & Smith, H., (2014). Understanding place-keeping of open space. In: N. Dempsey, H. Smith & M. Burton (eds.) *Place-Keeping: Open Space Management in Practice*. London: Routledge. 13–29.

Dempsey, N., Burton, M. & Duncan, R., (2016). Evaluating the effectiveness of a cross-sector partnership for green space management: The case of Southey Owlerton, Sheffield, UK. *Urban Forestry & Urban Greening*. **15**, 155–164.

Dennis, M. & James, P., (2016). User participation in urban green commons: Exploring the links between access, voluntarism, biodiversity and well being. *Urban Forestry & Urban Greening*. **15**, 22–31.

Díaz, S., Pascual, U., Stenseke, M., Martín-López, B., Watson, R.T., . . . et al., (2018). Assessing nature's contributions to people. *Science*. **359**(6373), 270–272.

EEA, (2015). *European Environment – State and Outlook 2015: Assessment of Global Megatrends*. Copenhagen: European Environment Agency.

Euler, J., (2016). Commons-creating society: On the radical German commons discourse. *Review of Radical Political Economics*. **48**(1), 93–110.

Fors, H., Molin, J.F., Murphy, M.A. & Konijnendijk van den Bosch, C., (2015). User participation in urban green spaces – For the people or the parks*? Urban Forestry & Urban Greening*. **3**, 722–734.

Fors, H., Nielsen, A.B., Konijnendijk van den Bosch, C. & Jansson, M., (2018). From borders to ecotones – Private-public co-management zones in urban woodland edges bordering private housing. *Urban Forestry & Urban Greening*. **30**, 46–55.

Fuller, R.A. & Gaston, K.J., (2009). The scaling of green space coverage in European cities. *Biology Letters*. **5**(3), 352–355.

Fung, A., (2006). Varieties of participation in complex governance. *Public Administration Review*. **66**(1), 66–75.

Gustavsson, R., Hermy, M., Konijnendijk, C. & Steidle-Schwahn, A., (2005). Management of urban woodland and parks – Searching for creative and sustainable concepts. In: C.C. Konijnendijk, K. Nilsson, T.B. Randrup & J. Schipperjin (eds.) *Urban Forests and Trees*. Heidelberg: Springer. 369–397.

Haines-Young, R. & Potschin, M., (2008). *England's Terrestrial Ecosystem Services and the Rationale for an Ecosystem Approach*. Overview report. Defra Project Code NR0107.

Hood, C., (1995). The "New Public Management" in the 1980s: Variations on a theme. *Accounting, Organizations and Society*. **20**(2/3), 93–109.

Jansson, M. & Lindgren, T., (2012). A review of the concept 'management' in relation to urban landscapes and green spaces: Toward a holistic understanding. *Urban Forestry & Urban Greening*. **2**, 139–145.

Jansson, M. & Mårtensson, F., (2012). Green school grounds: A collaborative development and research project in Malmö, Sweden. *Children, Youth and Environments*. **1**, 260–269.

Jansson, M., Vogel, N., Fors, H. & Randrup, T.B., (2019). The governance of landscape management: New approaches to urban space development. *Landscape Research*. **44**(8), 952–965.

Konijnendijk, C.C., (1999). *Urban Forestry in Europe: A Comparative Study of Concepts, Policies and Planning for Forest Conservation, Management and Development in and Around Major European Cities* (Ph.D. Thesis). University of Joensuu, Joensuu.

MacKenzie, A., Pearson, L.J. & Pearson, C.J., (2019). A framework for governance of public green spaces in cities. *Landscape Research*. **44**(4), 444–457.

Maes, J. & Jacobs, S., (2015). Nature-based solutions for Europe's sustainable development. *Conservation Letters*. **10**(1), 121–124.

Malone, K. & Tranter, P., (2003). Children's environmental learning and the use, design and management of school-grounds. *Children, Youth and Environments*. **13**, 87–137.

MEA, (2005). *Millennium Ecosystem Assessment Report. Ecosystems and Human Well-being: Synthesis*. Millennium Ecosystem Assessment. Washington, DC: Island Press.

Molin, J.F., (2014). *Parks, People and Places – Place-Based Governance in Urban Green Space Maintenance* (Ph.D. Thesis). University of Copenhagen, Copenhagen.

Molin, J.F. & Konijnendijk van den Bosch, C.C., (2014). Between big ideas and daily realities – The roles and perspectives of Danish municipal green space managers on public involvement in green space maintenance. *Urban Forestry & Urban Greening*. **13**, 553–561.

Morgan, G., (1991). *A Strategic Approach to the Planning and Management of Parks and Open Spaces*. Berkshire: The Institute of Leisure & Amenity Management.

Neal, P., (2016). *State of UK Public Parks*. Research Report to the Heritage Lottery Fund. London: Heritage Lottery Fund.

Newman, P., Beatley, T. & Boyer, H., (2009). *Resilient Cities*. Washington, DC: Island Press.

Pickett, S.T.A., Cadenasso, M.L., Grove, J.M., Nilon, C.H., Pouyat, R.V., Zipperer, W.C. & Costanza, R., (2001). Urban ecological systems: Linking terrestrial ecological, physical, and socioeconomic components of metropolitan areas. *Annual Review of Ecology and Systematics*. **32**(1), 127–157.

Randrup, T.B. & Persson, B., (2009). Management of public green space in the Nordic countries – Development of a new strategic green space management regime. *Urban Forestry & Urban Greening*. **8**(1), 31–40.

Rodiek, J.E., (2006). Landscape planning: Its contribution to the evolution of the profession of landscape architecture. *Landscape and Urban Planning*. **76**(1), 291–297.

Schmitt-Harsh, M., Mincey, S.K., Patterson, M., Fischer, B.C. & Evans, T.P., (2013). Private residential urban forest structure and carbon storage in a moderate-sized urban area in the Midwest, United States. *Urban Forestry & Urban Greening*. **12**(4), 454–463.

Sehested, K., (2004). Democratic consequences of urban governance – What has become of representative democracy? In: P. Bogason, S. Kensen & H.T. Miller (eds.) *Tampering with Tradition: The Unrealized Authority of Democratic Agency*. Lanham, MD: Lexington Books. 63–86.

Shams, I. & Baker, A., (2019). Barriers and opportunities of combining social and ecological functions of urban greenspaces – Users' and landscape professionals' perspectives. *Urban Forestry & Urban Greening*. **39**, 67–78.

Smith, H., Pereira, M., Hull, A. & Konijnendijk van den Bosch, C., (2014). The governance of open space decision-making around place-keeping. In: N. Dempsey, H. Smith & M. Burton (eds.) *Place-Keeping: Open Space Management in Practice*. London: Routledge. 52–75.

Steiner, F.R., (1991). *The Living Landscape: An Ecological Approach to Landscape Planning*. New York: McGraw-Hill.

UN, (1998). *Aarhus Convention. Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters*. Aarhus: United Nations.

van den Brink, A., Bruns, D., Tobi, H. & Bell, S., (2016). *Research in Landscape Architecture: Methods and Methodology*. New York: Routledge.

Vogel, N., (2017). Synergies through entanglement: Commoning entering the urban governance realm. *The Public Sector*. **43**(1), 7–18.

3 Urban open spaces and the urban matrix: elements, form and functions

Dagmar Haase, Stephan Pauleit and Thomas B. Randrup

Introduction – urban open spaces and the urban matrix

In an urban context, the landscape matrix, consisting of patches and corridors (Forman, 1995), is related to the configuration of different forms of built and open spaces and its relationships with ecological, social and economic processes across multiple scales. Knowledge of the composition and complexity of a city in terms of spaces (patches or elements) is an important foundation for understanding the city as a human-dominated habitat (Gill et al., 2008). Cities currently make up 4%–5% of the earth's surface (Schwarz, 2010; McDonald et al., 2018), and managing urban open space (UOS) within these urban landscapes takes place on several scales.

In this chapter, we use the term 'urban matrix' (Müller et al., 2010) as a starting point when presenting and defining the relationships between ecological processes and the urban landscape. The urban matrix is different from the urban landscape, as it is typically defined in a landscape ecological context (e.g. Forman, 1995). The urban matrix consists of different types of urban landscape elements, here denoted as 'spaces', which consist of varying degrees of ecological patches and corridors. Therefore, it is paramount for managing and governing UOS to introduce a basic and practice-oriented identification and systematic description of the spaces belonging to the urban matrix (Swanwick et al., 2003). The various spaces represent different units of ecological, social and economic functioning (Andersson et al., 2015), and their interactions and neighbourhood effects make up the unique character of the urban matrix (Larondelle et al., 2014). Major features of the urban form, including vegetation, waters, impervious surfaces and buildings (see Dempsey et al., 2010), together with land use, can be used to estimate both biophysical functions (Van Oudenhoven et al., 2012; Bastian et al., 2014) and social welfare functions for humans (Rall et al., 2017; Fischer et al., 2018). Defining the urban matrix and key relationships between the

urban matrix and its social and ecological processes is challenging in cities that are characterised by the high use of heterogeneous UOSs arranged in patchy spatial patterns (Pickett & Cadenasso, 2008).

A functional classification of the urban matrix is needed for a true understanding of the nature of social-ecological systems and relationships (Lausch et al., 2015; McPhearson et al., 2016). Therefore, the relationship between the urban matrix and its ecological and social functions requires closer examination of the complex urban structure, knowledge needed to guide the governance and management of UOS and processes in the urban matrix overall (Larondelle et al., 2014).

Elements, functions and structures interlinked in the concept of the urban matrix

Characteristics of the urban matrix – namely, the presence of different green, blue, brown and grey spaces – with their distinctive uses, land-cover compositions, spatial configurations, structures and processes, have an impact on both ecological functioning and human well-being (Pauleit & Breuste, 2011) (Tables 3.1 and 3.2). The term 'urban matrix' was coined by Müller et al. (2010) and, better than any other term, includes structures and functions in/at an urban patch that are created by the interaction of different surface materials, microhabitats, energy and material flows, as well as forms of use. The urban matrix terminology also provides important knowledge on how individual elements of UOS influence ecological and social (health) outcomes.

Exploring UOS services and outcomes in a matrix composition and configuration makes it possible to identify the causes and processes that distinguish cities and neighbourhoods from one another and helps to distinguish generic factors (e.g. that water is driven by gravity and amounts) from more contextualised factors (e.g. surface roughness, imperviousness and slope) that describe structure-function relationships (Larondelle et al., 2014).

UOS elements and their functions

Green spaces

A great diversity of types of green space can be found in UOS, such as parks, woodlands, cemeteries, allotment gardens, playing fields, home gardens and other green units in residential areas (e.g. Cvejić et al., 2015). Together, these spaces include most of the vegetation found in urban areas, as the overall vegetation cover may reach 50%–60% (Gill et al., 2008). Consequently, users can enjoy a range of ecological, social and economic benefits and health outcomes (Haase et al., 2014). For instance, green spaces mitigate the urban heat island effect (via transpiration and shading), reduce traffic pollutants and noise and connect habitats (Weber et al., 2014a, 2014b). Whether and how green spaces can provide habitats and ecosystem services depends on their overall amount, size, distribution and connectivity but also on their internal composition and, not least, their management (Figure 3.1). For instance, the overall number of trees, their age, height, the vertical structuring of vegetation and the existence of extensively managed meadows all contribute to the overall biodiversity habitat value (Matthies et al., 2015). Therefore, measures such as percentage of green cover, cover of trees, shrubs, meadows and lawns and the overall vegetation volume are important in managing green spaces.

Table 3.1 Properties of green, blue, brown and grey elements of the urban matrix

	Green	*Blue*	*Brown*	*Grey*
Cover	Up to 50% of a city's area	Often <15% of a city's area	Often <5% of a city's area (but can be significantly more in old industrialised regions)	Up to 80% of a city's area
Scale:				
Local	Gardens, parks, allotments, woodlots, etc.	Ponds and lakes, local stormwater management	Larger and smaller lots of abandoned land	Residential (e.g. detached, semi-detached, apartments), office buildings, commercial and factory buildings, squares, plazas and pedestrian streets
Regional	Green wedges and rings, greenways	Rivers, sea, wetlands	For example, former mining areas, abandoned harbours and military ranges	Urban cores, suburbia, villages and towns in the peri-urban
Vertical layer	Trees, shrubs, herbs, lawns or meadows, flower beds	Lakes, ponds, pools, fountains, rivers, creeks, coast, wetlands, virtual water exchange, underground water	From trees and shrubs to uncovered soil or substrate, can include substantial amounts of buildings and paved spaces	High-rise, mid-rise, low-rise, (dis-) continuous, single houses, towers, streets, airports, technical infrastructure networks
Habitat diversity	Very high (wetlands, edge biotopes) to extremely low (English lawn)	Very high (wetlands, rivers) to extremely low (swimming pool)	Often high, depending on factors such as substrate, disturbance regime and successional phase	Plant diversity: limited, but peaks in outer urban areas and declines towards the city centre. Animals: specific responses but general tendency to decline from urban fringe towards city centre
Composition (number and percentage of patch types)	From large patches >1 km^2 to tiny patches and single elements <1 m^2	From large patches >1 km^2 to tiny patches and single elements <1 m^2	From large patches >500 m^2 to small patches <50 m^2	Single patches (buildings) to perimeter blocks and large complexes of industrial buildings, large sealed areas – for example large car parks, to small sealed backyards
Configuration (patch alignment and spatial distribution)	From clumped (urban forest), linear in green space and river corridors to fragmented (urban wetlands)	From clumped (lake), via linear connected (river) to fragmented (pools)	Seldom clumped (large industrial, inner-city former airfield) to fragmented (demolished properties)	From clumped (city centre, shopping mall) to fragmented (single houses)

Source: Reference for the patch concept: Forman (1995)

Table 3.2 Properties of processes and complex structures of the urban matrix

	Green	*Blue*	*Brown*	*Grey*
Energy flows	Photosynthesis, decomposition, atmospheric energy fluxes (absorption, reflection, conversion into latent heat, influencing air movements)	Evaporation, sunlight reflection and absorption (albedo), CO_2 uptake	Evaporation, sunlight reflection and absorption (albedo), emission of essentials, CO_2 uptake, O_2 release	Evaporation, sunlight reflection and absorption (albedo), light emission, noise emission
Matter flows	Soil material, sequestration storage and release of carbon, O_2, water, nutrients, pollutants	Water inflow and release, feeding of groundwater layers, nutrients, metals, pollutants.	Soil material, nutrients, metals, waste/ pollutants	Building material (concrete, stone, plastic, loam etc.), metals, pollutants
Traits (to be detectable by remote sensing)	Size, form, shape, colour, blossom, chemistry	Size, form, shape, colour, chemistry	Size, form, shape, blossom, colour, chemistry	Size, height, form, shape, colour, chemistry
Dynamics	Succession, annual growth cycles, phenology	Longer-term development of streams and lakes with processes of sedimentation change of nutrient status, morphological change, etc. Annual and day-night temperature variation	Succession, annual growth cycles, phenology	Construction, operation, vacancy, demolition
Production and reproduction	Natural processes of dispersal, establishment, adaptation, diseases and pests, hazards (storms, fires, etc.). Planning and design, planting, management		Natural processes of dispersal, establishment, adaptation, diseases and pests, hazards (storms, fires, etc.). Human interventions (use, management)	Planning and design, planting, management. Abandonment/ demolition/ replacement

Figure 3.1 A green space within the urban matrix providing ecosystem services (e.g. recreation and shading) and biocultural diversity aspects (e.g. species diversity), here shown using the example of the Burg Garden in Vienna, Austria. *Photo*: Dagmar Haase

Another non-spatial measure that can be used is leaf area index – i.e. the ratio between total leaf area and the surface area covered by vegetation. It can be an important indicator to distinguish different species for habitat quality and ecosystem services – for example, if green spaces are assessed for their capacity to cool the air. The capacity of green spaces to cool is related to their size (Bowler et al., 2010), while the dispersal of species may be enhanced by green corridors (Kowarik, 2011; Matthies et al., 2015). Green corridors can also be important for allowing fresh and cool air to infiltrate into the city and for pedestrians and cyclists moving through the city.

Blue spaces

As towns and cities depend on water, many of them are located along rivers or on the shore of a sea or lake. Many blue spaces also break up green spaces or are found located within green spaces – for example, as ponds or lakes. In particular, the linear form of rivers, canals and streams makes blue elements in cities important routes for cycling and walking (Rall et al., 2017) and important ecological urban corridors. Many blue elements in cities are either artificial or artificially modified, such as urban canals (Amsterdam, Venice) and ponds in large urban parks (Figure 3.2). Due to extensive

Figure 3.2 Blue spaces in the urban matrix, here the example of the canals of Amsterdam, Netherlands. *Photo*: Dagmar Haase

drainage operations and the conversion of natural wetlands to impermeable cover, the rhythm of the hydrological cycle has been disrupted in many urban landscapes. Urban wetlands are usually rare but play an important role in flood damage reduction, flow buffering and sediment movement dynamics (Haase & Gläser, 2009). With blue and green elements closely interlinked, urban marshes, fens or floodplains work to reduce flood risk but also improve nutrient retention and increase biodiversity in providing vital habitats for amphibians and birds, among others (Hansson et al., 2005). In coastal cities, the coast itself as a blue element of the urban matrix can be of benefit for urban residents, particularly when it is naturally shaped, accessible and flood safe so that people can use it as a recreational space. However, flood-prone coastlines with no retention space (e.g. no floodplains or coastal marshes) run a high risk of catastrophic flooding events, with detrimental consequences for human settlements.

Brown spaces

A particular type of urban space is brownfield land, here called brown space, also known as 'land currently not in use', 'previously used land', 'urban wasteland', 'derelict land' or, for agricultural areas, 'fallow land' (Atkinson et al., 2014; Püffel et al., 2018). All cities possess brown spaces, but they are often transient periods of vacancy in between use, demolition and redevelopment. Brown space refers to parcels of land

or lots in a city where the previous use, for example, for industry, transport infrastructure, housing or leisure activities has been abandoned (Siebielec et al., 2012; Püffel et al., 2018). Depending on the duration of the derelict status and the amount of unsealed open spaces, a significant coverage of green elements, such as trees, shrubs and grass vegetation, can develop, and thus brown spaces can actively contribute to promoting biodiversity and the variety of regulating and cultural services, such as microclimate regulation (Bonthoux et al., 2014; Mathey et al., 2015). Such brown spaces have also been termed 'urban wilderness' because they offer a unique opportunity to experience nature in otherwise strictly controlled urban environments (Kowarik, 2005). However, successional vegetation on brown spaces does not conform to the aesthetic preferences of many people living in urban areas (Brun et al., 2018; Mathey et al., 2018). Therefore, they are often perceived as neglected and even dangerous spaces (Rink, 2005). Despite these negative connotations, a recent comparative study has shown that brown spaces are frequently used for recreation in cities in different cultural settings all over Europe (Fischer et al., 2015). Making use of brown spaces for urban gardening purposes, even if only for a limited period of time, is also frequently seen. However, on many brown spaces, particularly when cities have tight budgets, derelict buildings and sealed surfaces may only be partly removed, and soils may be heavily contaminated (Haase, 2014). Moreover, they may not be accessible to the public, in particular when they are in private ownership.

Under conditions of population growth and a constant influx of people resulting in densification of and in cities, urban brown spaces appear in a new light as part of the urban matrix as potential places for new urban developments or as green spaces that can be integrated into the urban matrix, making neighbourhoods more exciting, desirable and healthy. In fact, there are now many examples of brown spaces as near-natural public green spaces which are attractive for urban residents to enjoy 'urban wilderness' as a specific form of urban nature (Figure 3.3).

Grey spaces

Grey spaces are the most prominent features of a city, as they form a characteristic body of technomass – i.e. the material accumulation of human production of constructs and technology in the urban landscape (Inostroza, 2014). A city's technomass can vary in density and generally provides basic functions that range from housing, services, trade and production to administration, education, health care, recreation, entertainment and arts (Haase, 2014). The grey built elements of and in a city can be characterised by their specific form, height, shape and number of storeys and the total shape of neighbourhoods (Larondelle et al., 2014; Haase et al., 2019).

The use of grey spaces for recreational and social purposes is an important and growing aspect of UOS governance and management. Ecologically important properties of the grey space in cities include their overall proportion of sealed surfaces and their volume, which have great implications for urban climates by converting solar radiation into heat and influencing light and noise emissions (Weber et al., 2014a, 2014b). Thus the spatial distribution and configuration of grey elements play a pivotal role in regulating climate conditions. For example, studies of New York City and Berlin show that sealed and built up areas close to water cool off more quickly than

Figure 3.3 Brown spaces (sealed or de-sealed) in the urban matrix, here the large brown space of the Millennium field in Leipzig, Germany. *Photo*: Dagmar Haase

similar configurations at a greater distance from, for example, seafronts, rivers and lakes (Larondelle et al., 2014). The spatial distances between buildings and the orientation of roads and streets further influence solar re-radiation and air ventilation (Erell et al., 2011). Depending on geographical location and context, the spatial configuration of grey elements can, therefore, either encourage or interfere with natural fluxes and flows. This may in turn determine the likelihood of green space fragmentation or the possibility for connective green infrastructure.

Taken together, buildings and other sealed surfaces may occupy more than 80%–90% of the surface area in dense inner-city neighbourhoods (Figure 3.4), but well below 50% in detached housing areas (Pauleit & Breuste, 2011). Even in these grey spaces, different kinds of green elements can be found, such as green roofs, façades and balconies, as well as trees in streets and squares. Depending on their amount and location, these green elements can provide important ecosystem services, such as cooling surfaces and reducing stormwater runoff (Zölch et al., 2016, 2017).

The contextual landscape of urban open space

The different components of the urban matrix introduced earlier are not equally or homogeneously distributed across a city (Larondelle et al., 2014). The spatial distribution of land-cover classes is influenced by

Figure 3.4 A typical configuration of the grey elements (buildings and hard surfaces) in the urban matrix, here in central Buenos Aires, Argentina. *Photo*: Dagmar Haase

'context variables' – for example, biophysical conditions, such as topography, climate and soil patterns – but foremost by different building and open space types that combine to form distinct hybrids of land-use categories (e.g. commercial, industrial, residential or transport land). Hybrids of land-use categories with distinct green spaces are, for example, perimeter block areas in inner-city neighbourhoods from the late 19th and early 20th centuries, with little green in courtyards and along streets, free-standing blocks of flats from the 1920s to the 1970s embedded in a matrix of varying green elements, row and detached housing areas with gardens or buildings for industrial and commercial use with large amounts of grey spaces and little green, to name a few (Pauleit & Breuste, 2011).

The spatial distribution is never static but has an important temporal dimension. This is a result of the historical past of the respective cities, reflecting outcomes of human activity, not least urban planning and UOS management (Haase, 2003). Catastrophic events, such as floods, earthquakes, fires and destruction in war can also have a great impact on urban spatial distribution.

The context and configurations of spaces in urban landscapes

Despite the different natural, historical, socio-cultural and planning contexts, urban matrices can be surprisingly similar in terms of their land-cover types (Figure 3.5). In a

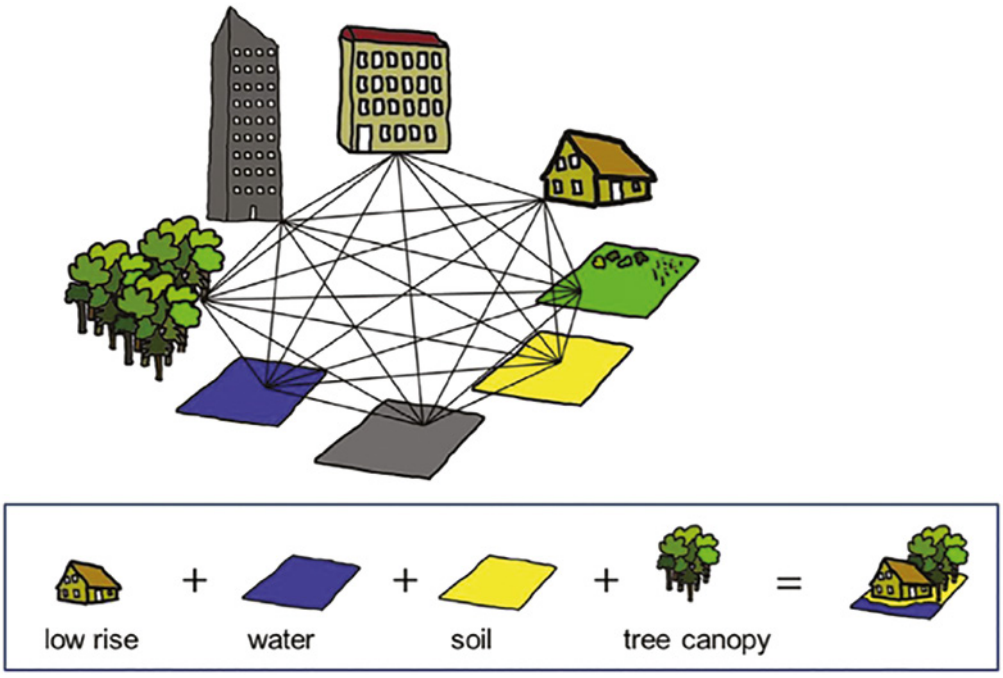


Figure 3.5 The structure of the urban matrix concept applied shows possible combinations of surface properties in cities where a maximum of four land covers (low-rise buildings, water, soil, tree canopy) are combined into one class. *Source*: Reproduced from Larondelle et al. (2014)

comparative study of Berlin and New York City, Larondelle et al. (2014) found that almost 80% of the area of both cities can be described using as few as 15 composite land-cover classes. What is more, these 15 classes show similar surface temperature patterns, despite different urban contexts in terms of climate, ecozone, size, historical development or character of the built environment. However, large differences can exist in the amount of green in urban areas. For instance, in Europe, there is a difference between more densely built and hence less green cities in Southern Europe and less dense and greener cities in Northern Europe (e.g. Fuller & Gaston, 2009; Kabisch & Haase, 2012). Similarly, tree cover averages 35% in urban areas in the United States but varies between 10% and 67% in individual cities (Nowak & Greenfield, 2012).

The spatial pattern of the urban matrix is another important feature, for instance for recreational purposes. Rivers with protected floodplains, urban forests and planned green space systems shape the overall system of green spaces in some cities, while in others such structures have not been developed. Therefore, access to green space for recreation and nature experiences can vary greatly (Kabisch et al., 2016). The previous examples show how a relatively simple and general analysis can provide relevant information for planning and management purposes. In order to ensure that the measured land covers become a service or a public good, with optimised relevance and socioecological values, analyses must also include site-level conditions and qualitative indications.

Figure 3.6 shows some 'typical' distributions of green and blue spaces in two

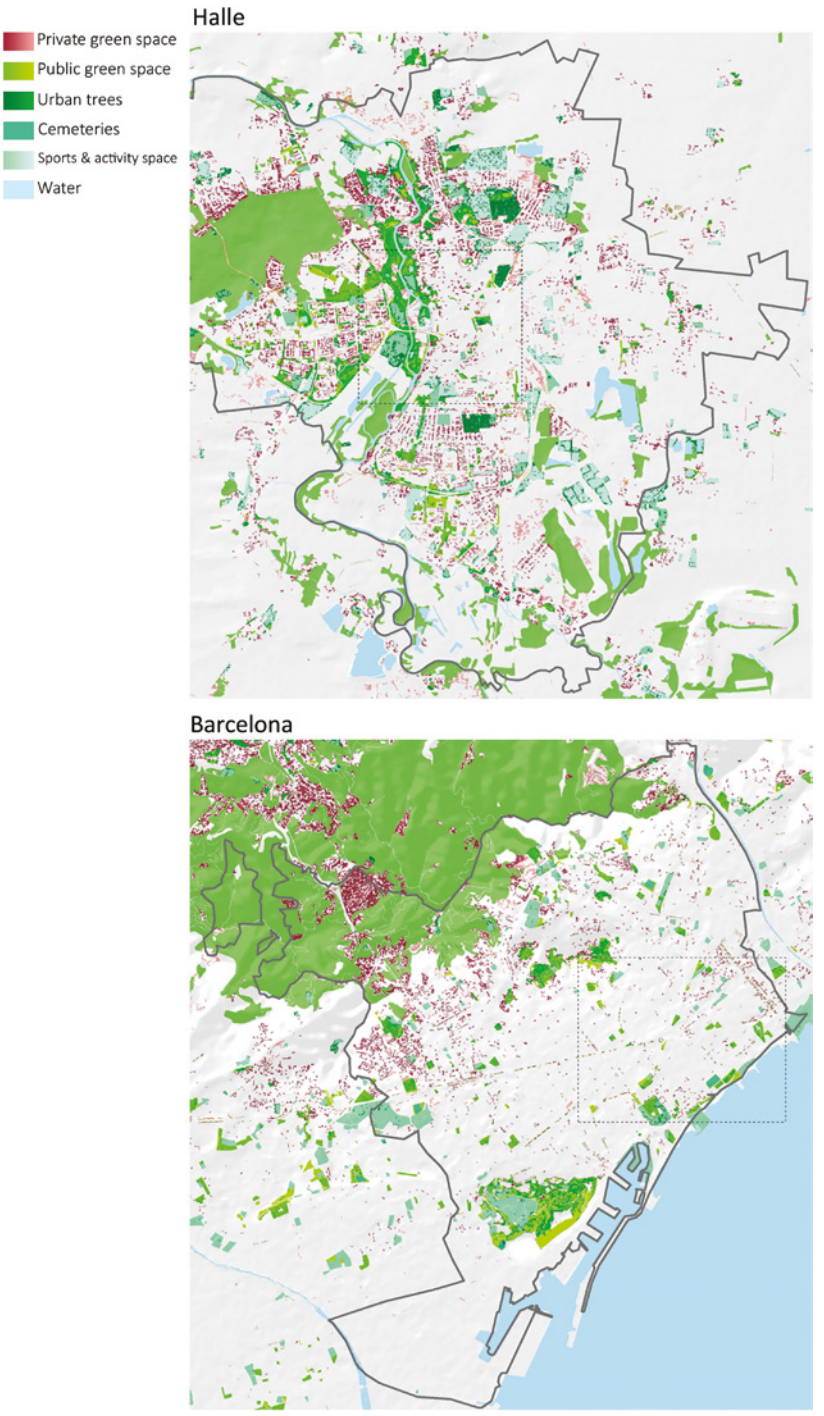


Figure 3.6 Spatial distribution of green and blue spaces in two European cities, Halle and Barcelona, in 2012. *Source*: Reproduced from Wolff & Haase (2019)

European cities. The extreme urban density of clumped grey space in Barcelona is in contrast to the scattered configuration of remnant green spaces in the intensively used agricultural landscape around Halle, Germany. Halle, with a socialist past and situated in a fertile loess area, has an important linear green-blue space with the Saale floodplain. Such connectivity of vegetated areas and habitats is crucial for the survival, dispersal and mobility of plant and animal species (Schwarz et al., 2017). The City of Barcelona is one of a group of cities in Southern Europe that reflect a different urban history pathway, with a very densely built and paved city core and green space provided only outside the city. Today, the City of Barcelona is making great efforts to link Collserola Park, the largest metropolitan park in the world, with the city (Baró et al., 2017).

Figure 3.7 presents an overview of current patterns of per capita green space in all large cities (>100,000 inhabitants) in Europe. The map shows a clear north-south gradient, with low supply of green space in large parts of Southern and South-Eastern Europe, unfortunately countries with lower per capita income. However, some cities in post-socialist countries, like the Baltic States and Poland, report high per capita urban green space values (Figure 3.7). Thus there is no simple economic explanation for the observed patterns (Wolff & Haase, 2019).

Ownership and accessibility of UOS

In addition to their composition and spatial patterns, there is another factor that has considerable impact on the accessibility of green spaces (Kabisch et al., 2016). This is the status of landownership – i.e. whether a green space is public, semi-public or private. Vast areas of institutional land owned by the state (i.e. public), such as military areas, may not be currently accessible but have much greater potential for being made accessible (e.g. on termination of military use) than, for example, private gardens. A recent study of the city of Leipzig (Haase et al., 2019) provided a first picture of the city's green cover consisting of public forests and parks, community or allotment gardens and private front and back gardens, allowing varying levels of public access (Figure 3.8). The distribution triangle shows the position of the urban districts depending on the fractional cover of green spaces assigned to these three green space types. The diagram clearly indicates that there are districts of Leipzig with low shares of public parks or allotment gardens and where front and backyard green areas are much more important.

Finally, a change in the detection of green space area and per capita green space shows that, in contrast to, for example, Chinese cities (Box 3.1), there has been no general decline or loss in green space in European cities (Kabisch & Haase, 2012; Haase et al., 2013). An analysis in Europe suggests that since 2000, urban agglomerations in Western Europe have predominantly shown an annual growth in urban green space, while residential land area has increased at a lower rate (Kabisch & Haase, 2012). The population numbers have increased since 1990, indicating that shrinking cities are less prevalent in Western Europe. In contrast, cities in Southern European countries have shown the highest positive annual change in residential land area, caused by a markedly high increase in the number of urban households, at the expense of green and other open spaces. Meanwhile, the annual changes in urban green space and in population have been negative in Eastern European cities. It can be assumed that at least some of

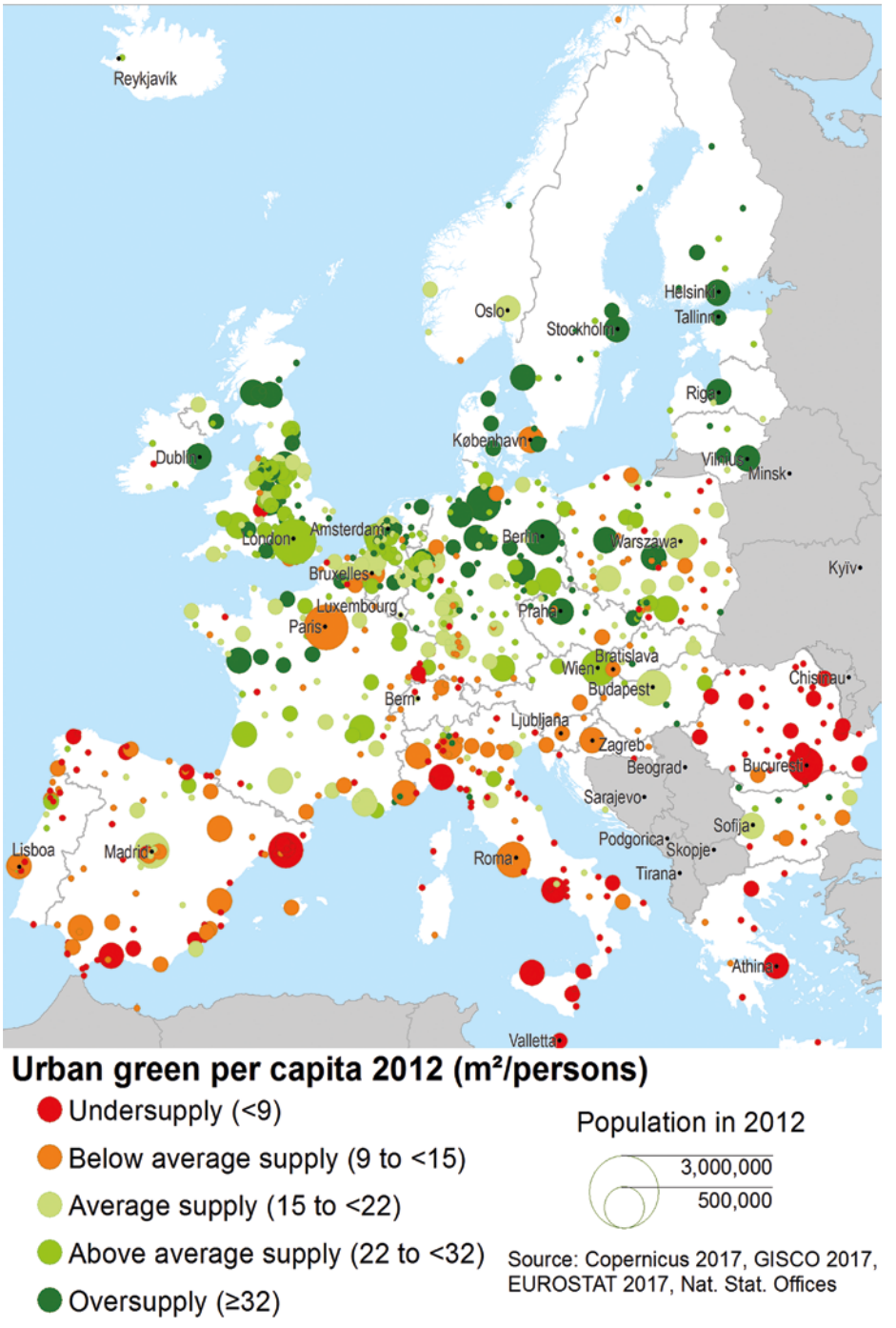


Figure 3.7 Urban green space (m^2 per capita) in different European countries, representing high supply (>32 m^2), average supply (15–22 m^2) and undersupply (<9 m^2) according to the national statistics offices of the European Union and EUROSTAT, with considerable differences across north-south and west-east gradients. *Source*: Reproduced from Wolff & Haase (2019)

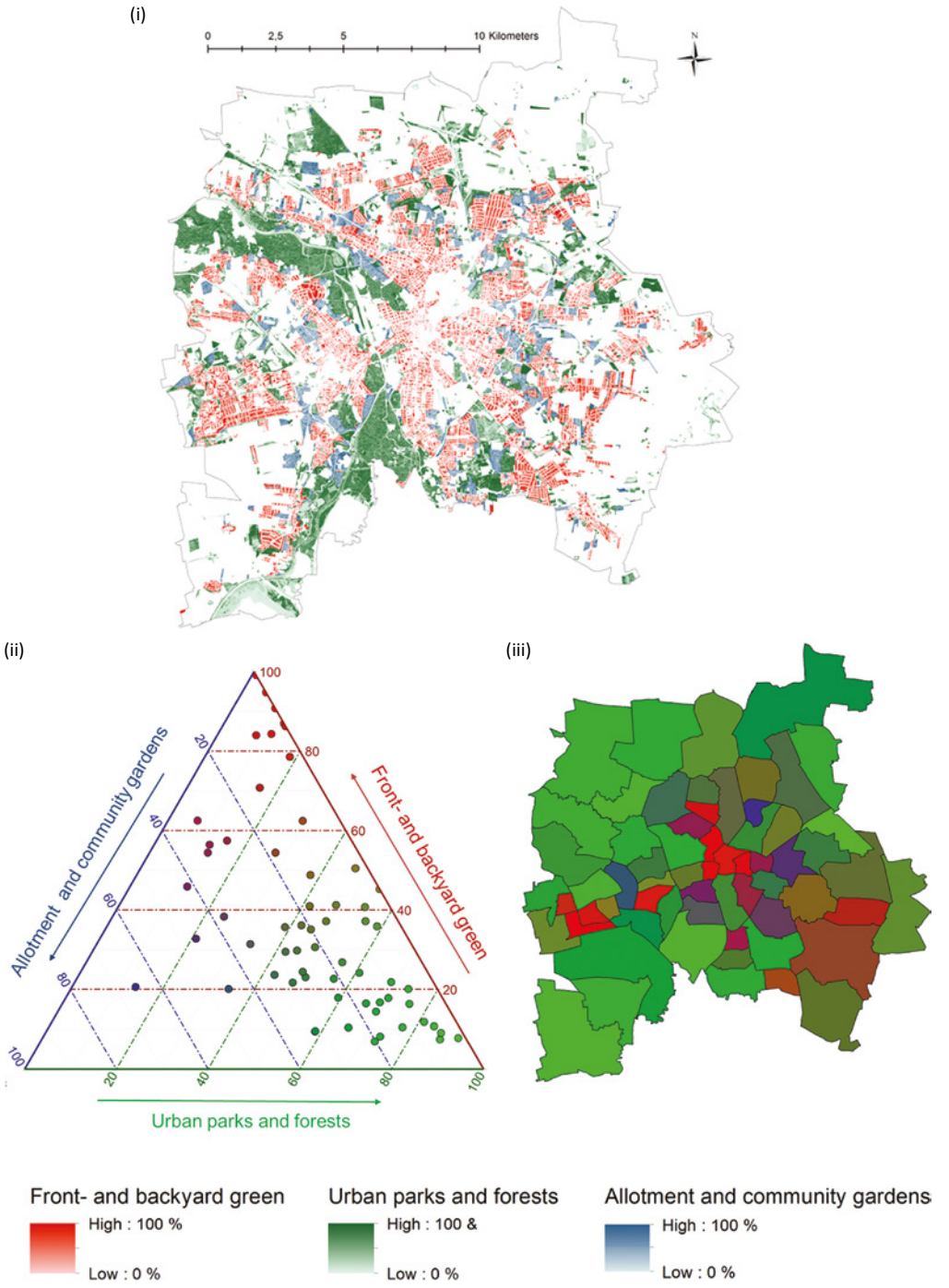


Figure 3.8 (i) Map showing fractions of vegetation in the city of Leipzig, based on a RapidEye data set in 2014 and allocation of the share of vegetation fractions per urban district in the form of a distributional triangle (ii) and a district map (iii). Green space types other than those listed were omitted from the calculations. *Source*: Reproduced from Haase et al. (2019)

BOX 3.1: CHANGING GREEN SPACE PROVISION IN BEIJING

During the past 30 years, the vegetation coverage in the city of Beijing has shown a dramatic change. In 1987, the urban vegetation coverage rate in the city was 50%, and in 2000, it had decreased to 42%. By 2007, it had raised slightly to 42.5% (Figure 3.9). As of 2018, Beijing's urban green coverage rate has reached 48.4%.

Since 2000, the city has considerably strengthened the creation of new green space and simultaneously introduced a protection policy for the old city's green spaces. In preparations for the 2008 Olympic Games, hosted by the city of Beijing, the old city demolition protection policies were well implemented.

Due to increasing urbanisation, an urban land shortage occurred. However, the local government has sought to increase the amount of urban green space through various forms of vertical greening, roof greening, balcony greening and parking greening, explaining why Beijing's urban green coverage rate reached 48.4% in 2018. Although per capita green area, including per capita public green space in Beijing, have increased in recent years, the population growth rate by far exceeds the increases in green space provision.

(i)

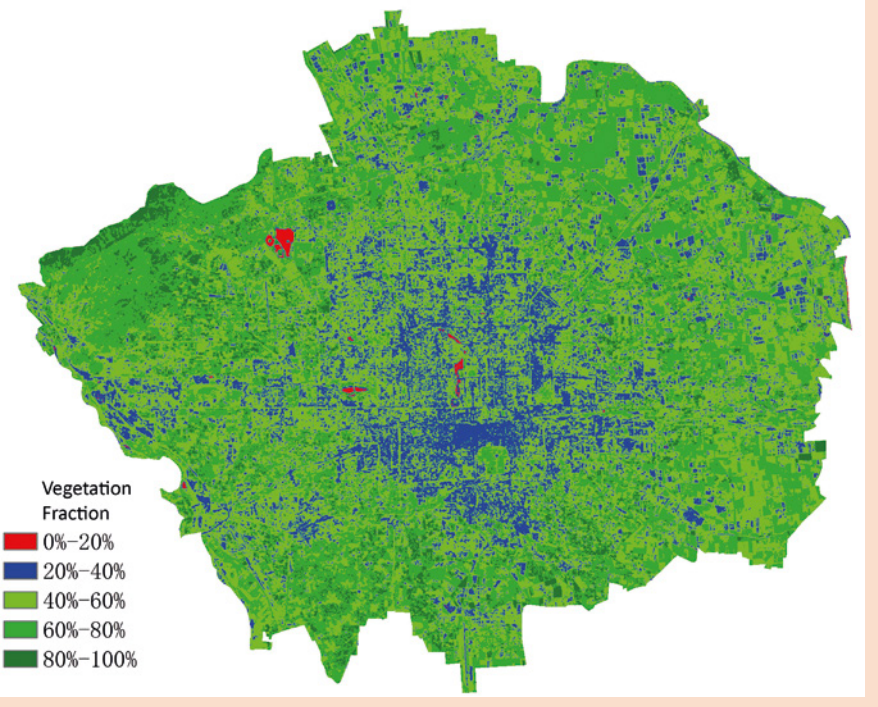
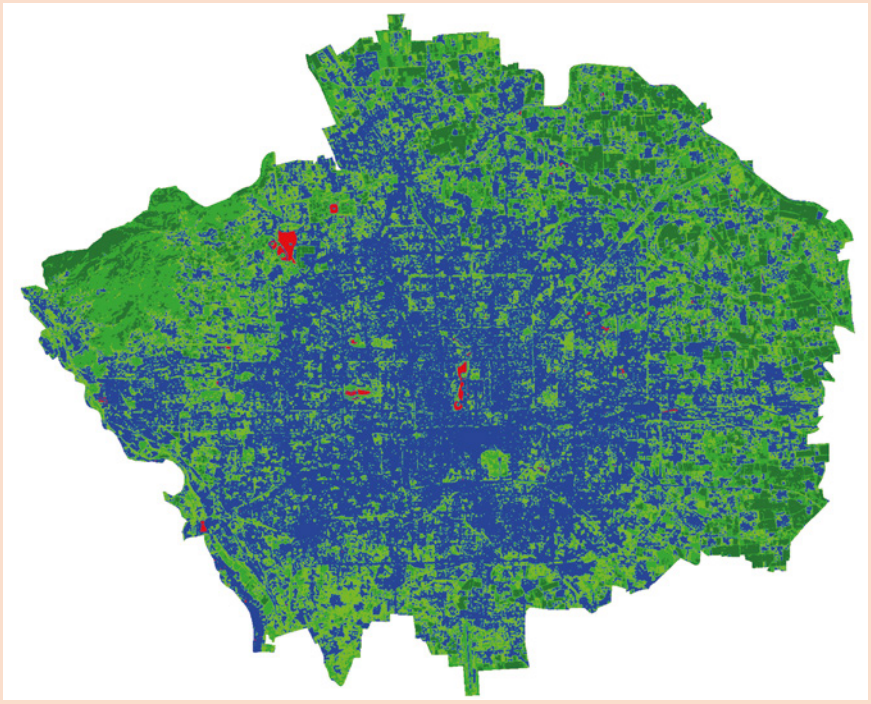


Figure 3.9 Vegetation coverage in Beijing city in (i) 1987

(ii)



(iii)

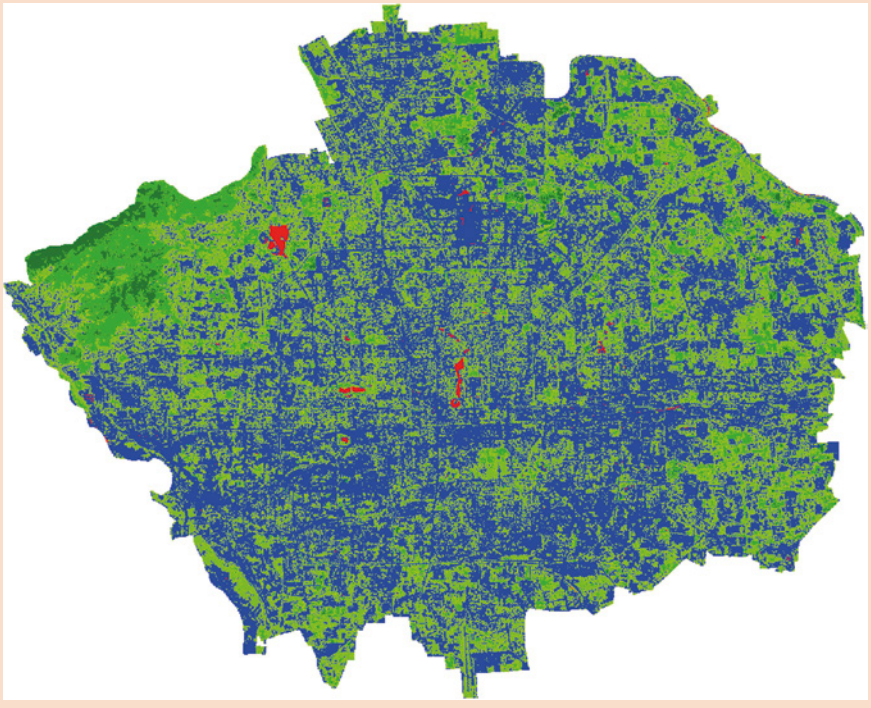


Figure 3.9 Vegetation coverage in Beijing city in (ii) 2000 and (iii) 2007. *Source*: Xinyu Li and Ziyun Dai, Beijing Institute of Landscape Architecture, China

the newly developed residential areas have replaced urban green spaces, an assumption that is supported by the relative changes in these areas (Kabisch & Haase, 2012).

With the significant amount of green and blue spaces present in cities, UOS management is challenged from an overall planning perspective. In order to optimise the relevance and amount of socioecological services derived from, for example, green spaces, UOS management has to consider not only the spaces being managed but also the interrelationships across administrative borders and across varying ownership. For example, a tree inventory focusing only on public trees may exclude 50% of all urban tree services, and specific land uses such as playgrounds or sports fields should be assessed and analysed for their actual and future usages. A multitude of space usages relate to the expression of individual and group values and rights, requiring a distributional, procedural and interactional justice of public spaces in cities (Low, 2013). Thus it has been argued that basic societal response concepts of space supply should be used as a central part of UOS governance and management, such as green space barriers (Biernacka & Kronenberg, 2018), green space availability (Kabisch et al., 2016) and green space affordability (Penchansky & Thomas, 1981).

Green space availability is the per capita area of green space present within a defined distance from the living space of urban residents (Kabisch et al., 2016). The accessibility of public green space refers to whether the available green space is physically accessible, in terms of the distance from a residential area to the nearest public green space (Comber et al., 2008), and psychologically accessible, in terms of safety and fear about accessing a space (Biernacka & Kronenberg, 2018). Finally, the concept of interactional justice is about the quality of interpersonal interaction in a specific situation or place.

Remixing spaces: the urban matrix as place, common good and room for more collaborative planning

There is no doubt that the urban matrix has a fundamental impact on the functioning of cities. It is specific to each city; it is diverse, and it is changing. Knowledge of how the urban matrix is constructed and distributed among different elements and spaces is important for comprehensive UOS governance and management. However, knowledge of UOS often lies within specific managerial units (public, semi-public or private). A holistic picture of the entire urban matrix provides an overall contextual description of what is being managed. Therefore, a comprehensive overview of a city's urban matrix should be considered as the standpoint for all governance and management of UOS.

From an UOS management perspective, numerous megatrends prevail and influence both the distribution of the urban matrix and how the actual distribution should be interpreted and managed. Demographic shifts are leading to an ageing urban population in Western Europe, while individual lifestyles and migration to cities are creating competition for land, including UOS, for more grey space for housing and services. Current urban design already considers multi-storey and multifunctional housing with green space on the rooftops and living walls; shopping malls have residential apartments above them or even schoolyards on the top of shopping malls or school buildings. However, many green, blue and, in

particular, brown spaces are under pressure or already in danger of disappearing. With the increasingly visible effects of climate change, and with mental health problems among urban residents increasing rapidly, more high-quality green space in neighbourhoods is becoming crucial. Thus, despite housing pressure, there is a need to generate interest in, and shift demand towards, smarter, walkable, human-scale, green-blue neighbourhoods while at the same time removing barriers to their accessibility and affordability, as well as establishing new standards in collaborative planning, aiming at inclusiveness as a novel expression of return.

As shown in Figures 3.5 and 3.6, maps created to illustrate landscape processes are still usually drawn on a large scale, while they are having an influence – and being influenced – at the local or even the site level (Pickett & Cadenasso, 2008). The dilemma in managing local sites lies in relating these to a larger scale, which is spatially and administratively complex, as a management's jurisdiction is often limited to the specific ownership. For effective management, it is important to be able to take a multi-scalar approach and to understand and interpret the qualities and importance of classifications or typologies. Sector maps, overviews and systematisations are needed, but the ability to use these appropriately will depend on the context, challenge/s and scale.

The urban matrix works best for urban users when it provides mixed land uses and mixed-use neighbourhoods, with a balance of green, blue, brown and grey spaces managed across administrative borders – for example, by local government and residents together. Such heterogeneity can also distribute environmental benefits (and burdens) more equally across the urban matrix and better meet the justice visions we have for modern cities. Changes in cities can affect the composition and configuration of the urban matrix and, if done well, move cities in a more sustainable direction. Green, blue and brown spaces play an important role in urban development – for example, in revitalisations or redevelopments – when small green spaces in dense urban housing estates are created or when 'retro-fitting' streets with trees, as well as in the overall approach to the urban matrix.

References

Andersson, E., McPherson, T., Kremer, P., Frantzeskaki, N., Gomez-Baggethun, E., Haase, D., Tuvendal, M. & Wurster, D., (2015). Scale and context dependence of ecosystem service providing units. *Ecosystem Services*. **12**, 157–164.

Atkinson, G., Doick, K.J., Burningham, K. & France, C., (2014). Brownfield regeneration to greenspace: Delivery of project objectives for social and environmental gain. *Urban Forestry & Urban Greening*. **13**(3), 586–594.

Baró, F., Gómez-Baggethun, E. & Haase, D., (2017). Ecosystem service bundles from a supply-demand approach: Implications for landscape planning and management in an urban region. *Ecosystem Services*. **24**, 147–159.

Bastian, O., Grunewald, K., Syrbe, R.U., Walz, U. & Wende, W., (2014). Landscape services: The concept and its practical relevance. *Landscape Ecology*. **29**(9), 1463–1479.

Biernacka, M. & Kronenberg, J., (2018). Classification of institutional barriers affecting the availability, accessibility and attractiveness of urban green spaces. *Urban Forestry & Urban Greening*. **36**, 22–33.

Bonthoux, S., Brun, M., Di Pietro, F., Greulich, S. & Bouché-Pillon, S., (2014). How can wastelands promote biodiversity in cities? A review. *Landscape and Urban Planning*. **132**, 79–88.

Bowler, D.E., Buyung-Ali, L., Knight, T.M. & Pullin, A.S., (2010). Urban greening to cool towns and cities, a systematic review of the empirical evidence. *Landscape and Urban Planning*. **97**(3), 147–155.

Brun, M., Di Pietro, F. & Bonthoux, S., (2018). Residents' perceptions and valuations of

urban wastelands are influenced by vegetation structure. *Urban Forestry & Urban Greening*. **29**, 393–403.

Comber, A., Brunsdon, C. & Green, E., (2008). Using a GIS-based network analysis to determine urban greenspace accessibility for different ethnic and religious groups. *Landscape and Urban Planning*. **86**, 103–114.

Cvejić, R., Eler, K., Pintar, M., Železnikar, S., Haase, D., Kabisch, N. & Strohbach, M., (2015). *A Typology of Urban Green Spaces, Ecosystem Provisioning, Services and Demands*. GREEN SURGE Publication D3.1. Brussel: European Union's 7th Framework Program.

Dempsey, N., Brown, C., Raman, S., Porta, S., Jenks, M., Jones, C. & Bramley, G., (2010). Elements of urban form. In: M. Jenks & C. Jones (eds.) *Dimensions of the Sustainable City*. Future City Series, Bd 2. Dordrecht: Springer. 21–51.

Erell, E., Pearlmutter, D. & Williamson, T., (2011). *Urban Microclimate: Designing the Spaces Between Buildings*. London – Washington, DC: Earthscan.

Fischer, L.K., Brinkmeyer, D., Honold, J., van der Jagt, A., Botzat, A., Lafortezza, R., et. al., (2018). Recreational ecosystem services in European cities: Sociocultural and geographic context matters for park use. *Ecosystem Services*. **31**(C), 455–467.

Fischer, L.K., Kowarik, I., Botzat, A., Honold, J., Haase, D. & Kabisch, N., (2015). *Interaction of Biological and Cultural Diversity of Urban Green Spaces*. GREEN SURGE Publication D2.2. Brussel: European Union's 7th Framework Program.

Forman, R.T.T., (1995). *Land Mosaics: The Ecology of Landscapes and Regions*. Cambridge: Cambridge University Press.

Fuller, R.A. & Gaston, K.J., (2009). The scaling of green space coverage in European cities. *Biology Letters*. **5**(3), 352–355.

Gill, S., Handley, J., Pauleit, S., Ennos, R., Theuray, N. & Lindley, S., (2008). Characterising the urban environment of UK cities and towns: A template for landscape planning in a changing climate. *Landscape and Urban Planning*. **87**, 210–222.

Haase, D., (2003). Holocene floodplains and their distribution in urban areas – Functionality indicators for their retention potentials. *Landscape & Urban Planning*. **66**, 5–18.

Haase, D., (2014). The nature of urban land use and why it is a special case. In: K.C. Seto & A. Reenberg (eds.) *Rethinking Global Land Use in an Urban Era*. Strüngmann Forum Reports, vol. 14. Cambridge, MA: MIT Press.

Haase, D. & Gläser, J., (2009). Determinants of floodplain forest development illustrated by the example of the floodplain forest in the District of Leipzig. *Forest Ecology and Management*. **258**(5), 887–894.

Haase, D., Jänicke, C. & Wellmann, T., (2019). Delineating private greenspaces in cities based on subpixel vegetation fractions from earth observation data using spectral unmixing. *Landscape and Urban Planning*. **182**, 44–54.

Haase, D., Kabisch, N. & Haase, A., (2013). Endless urban growth? On the mismatch of population, household and urban land area growth and its effects on the urban debate. *PLoS One*. **8**(6), e66531.

Haase, D., Larondelle, N., Andersson, E., Artmann, M., Borgström, S., Breuste, J. et al., (2014). A quantitative review of urban ecosystem services assessment: Concepts, models and implementation. *AMBIO*. **43**(4), 413–433.

Hansson, L-A., Brönmark, C., Nilsson, P.A. & Åbjörnsson, K., (2005). Conflicting demands on wetland ecosystem services: Nutrient retention, biodiversity or both? *Freshwater Biology*. **50**, 705–714.

Inostroza, L., (2014). Measuring urban ecosystem functions through "Technomass" – A novel indicator to assess urban metabolism. *Ecological Indicators*. **42**, 10–19.

Kabisch, N. & Haase, D., (2012). Green space of European cities revisited for 1990–2006. *Landscape and Urban Planning*. **110**, 113–122.

Kabisch, N., Strohbach, M., Haase, D. & Kronenberg, J., (2016). Green space availability in European cities. *Ecological Indicators*. **70**, 586–596.

Kowarik, I., (2005). Wild urban woodlands, towards a conceptual framework. In: I. Kowari & S. Körner (eds.) *Wild Urban Woodlands: New Perspectives for Urban Forestry*. Heidelberg: Springer. 1–32.

Kowarik, I., (2011). Novel urban ecosystems, biodiversity, and conservation. *Environmental Pollution*. **159**, 1974–1983.

Larondelle, N., Hamstead, Z.A., Kremer, P., Haase, D. & McPhearson, T., (2014). Comparing urban structure-function relationships across cities: Testing a new general urban structure classification in Berlin and New York. *Applied Geography*. **53**, 427–437.

Lausch, A., Haase, D., Herzog, F., Syrbe, R.U., Walz, U. & Blascke, T., (2015). Indicators for process-pattern interactions in landscapes – An integrative perspective. *Ecological Modelling*. **295**, 31–41.

Low, S., (2013). Public space and diversity: Distributive, procedural and interactional justice for parks. In: G. Young & D. Stevenson (eds.) *The Ashgate Research Companion to Planning and Culture*. Surrey: Ashgate Publishing. 295–310.

Mathey, J., Arndt, T., Banse, J. & Rink, D., (2018). Public perception of spontaneous vegetation on brownfields in urban areas – Results from surveys in Dresden and Leipzig (Germany). *Urban Forestry & Urban Greening*. **29**, 384–392.

Mathey, J., Rößler, S., Banse, J., Lehmann, I. & Bräuer, A., (2015). Brownfields as an element of green infrastructure for implementing ecosystem services into urban areas. *Journal of Urban Planning and Development*. **141**(3), A4015001.

Matthies, S.A., Rüter, S., Prasse, R. & Schaarschmidt, F., (2015). Factors driving the vascular plant species richness in urban green spaces using a multivariable approach. *Landscape and Urban Planning*. **134**, 177–187.

McDonald, R.I., Colbert, M'L., Hamann, M., Simkin, R., Walsh, B. et al., (2018). *Nature in the Urban Century. A Global Assessment of Where and How to Conserve Nature for Biodiversity and Human Wellbeing*. The Nature Conservancy. Future Earth. Stockholm: Resilience Centre.

McPhearson, T., Pickett, S., Grimm, N., Niemelä, J., Elmqvist, T., Weber, C., Breuste, J., Haase, D. & Qureshi, S., (2016). Advancing urban ecology toward a science of cities. *BioScience*. **66**(3), 198–212.

Müller, N., Werner, P. & Kelcey, J., (2010). *Urban Biodiversity and Design*. Chichester, UK: Wiley-Blackwell

Nowak, D.J. & Greenfield, E.J., (2012). Tree and impervious cover in the United States. *Landscape and Urban Planning*. **107**, 21–30.

Pauleit, S. & Breuste, J.H., (2011). Land use and surface cover as urban ecological indicators. In: J. Niemelä (ed.) *Handbook of Urban Ecology*. Oxford: Oxford University Press. 19–30.

Penchansky, R. & Thomas, J.W., (1981). The concept of access: Definition and relationships to consumer satisfaction. *Medical Care*. **19**, 127–140.

Pickett, S.T.A. & Cadenasso, M.L., (2008). Linking ecological and built components of urban mosaics: An open cycle of ecological design. *Journal of Ecology*. **96**(1), 8–12.

Püffel, C., Haase, D. & Priess, J., (2018). Mapping ecosystem services on brownfields in Leipzig, Germany. *Ecosystem Services*. **30**, 73–85.

Rall, E., Bieling, C., Zytynska, S. & Haase, D., (2017). Exploring city-wide patterns of cultural ecosystem service perceptions and use. *Ecological Indicators*. **77**, 80–95.

Rink, D., (2005). Surrogate nature or wilderness? Social perceptions and notions of nature in an urban context. In: I. Kowarik & S. Körner (eds.) *Wild Urban Woodlands: New Perspectives for Urban Forestry*. Berlin: Springer Verlag. 67–80.

Schwarz, N., (2010). Urban form revisited: Selecting indicators for characterizing European cities. *Landscape and Urban Planning*. **96**(1), 29–47.

Schwarz, N., Moretti, M., l Bugalho, M., Davies, Z., Haase, D., et al., (2017). Understanding biodiversity-ecosystem service relationships in urban areas: A comprehensive literature review. *Ecosystem Services*. **27**, 161–171.

Siebielec, G., Rabl-Berger, S., Bluemlein, P., Schweiker, M., Huber, S., et al., (2012). *Brownfield Redevelopment as an Alternative to Greenfield Consumption in Urban Development in Central Europe*. Urban SMS Soil Management Strategy No. 6.1.3. Central Europe Programme/European Regional Development Fund.

Swanwick, C., Dunnett, N. & Woolley, H., (2003). Nature, role and value of green space in towns and cities: An overview. *Journal Built Environment*. **29**(2), 94–106.

Van Oudenhoven, A.P.E., Petz, K., Alkemade, R., Hein, L. & de Groot, R.S., (2012). Framework for systematic indicator selection to assess effects of land management on ecosystem services. *Ecological Indicators*. **21**, 110–122.

Weber, N., Haase, D. & Franck, U., (2014a). Zooming into the urban heat island: How do urban built and green structures influence earth surface temperatures in the city? *Science of the Total Environment*. **496**, 289–298.

Weber, N., Haase, D. & Franck, U., (2014b). Assessing traffic-induced noise and air pollution in urban structures using the concept of landscape metrics. *Landscape and Urban Planning*. **125**, 105–116.

Wolff, M. & Haase, D., (2019). Mediating sustainability and liveability – Turning points of green space supply in European cities. *Frontiers in Environmental Science, Section Land Use Dynamics*. https://doi.org/10.3389/fenvs.2019.00061.

Zölch, T., Henze, L., Keilholz, P. & Pauleit, S., (2017). Regulating urban surface run-off through nature-based solutions – An assessment at the micro-scale. *Environmental Research*. **157**, 135–144.

Zölch, T., Maderspacher, J., Wamsler, C. & Pauleit, S., (2016). Using green infrastructure for urban climate-proofing: An evaluation of heat mitigation measures at the micro-scale. *Urban Forestry & Urban Greening*. **20**(1), 305–316.

All figures are used with permission.

4 Organisations related to urban open spaces

Bengt Persson, Peter Neal, Anna Steidle and Thomas B. Randrup

Introduction

Contemporary urban open space (UOS) governance and management is a result of many years of organisational development (Lindholst, 2017). While organisational development traditionally concerns the ongoing development, change and performance of organisations (e.g. Shimoni, 2019; van der Jagt & Lawrence, 2019), this chapter focuses on the historical development of the sector, which to date has had the main responsibility and impact in managing UOS. The sector is defined here as the conglomeration of landowners (e.g. local governments, housing companies, cemeteries) and professionals dealing with UOS governance and management, including planners, designers, consultants and landscapers. As the UOS sector consists of many different landowners and many different interest groups, it is complex and an overview is appropriate. We provide an overview of the Swedish UOS sector as an example.

The importance of UOS for human life and well-being and the relationship between development of green and blue spaces and post-industrialisation urban planning was briefly mentioned in Chapter 1. The history of UOS and knowledge of this cultural heritage is important for management through social, environmental and economic perspectives. A historical outlook is also needed in order to better understand the changes that will inevitably occur in the future. UOS forms the background for social interactions and thus creates forms of place attachment (Aliyas & Nezhad, 2019; Romolini et al., 2019). Thus UOS contributes to the creation of a collective identity (Sia et al., 2020), which is based on the development, planning and design of the places in question. Information on when and how UOS was formed and, just as importantly, how it was managed, contributes to the collective knowledge of the current challenges. Therefore, this chapter provides a brief historical overview of UOS development, including recent economic-political developments in management organisation models in Western Europe.

The main responsibility for governance and management of UOS in, for example, Scandinavia and the UK lies at the local government level (Randrup & Persson, 2009; Dempsey & Smith, 2014). According to Knuth et al. (2008), this is also the case in countries in Western and Central Asia. Nalau et al. (2015) described local governments in the Australian context as being

the 'silent partner', not recognised in the constitution as having a legal mandate but rather being arms of state and territory governments. Therefore, the main focus in this chapter is on the development of the local government UOS management organisation. We place particular emphasis on the UK, Germany and Sweden, as these three Western countries have responded very differently in terms of local government development since industrialisation in the 1850s.

The development of UOS organisations

Little seems to be known about the very first garden. It is often referred to as being a plot within an enclosure or a type of barrier to keep animals and intruders out (e.g. Turner, 2005). This may date back as far as 10,000 BC, and indicates that the very first UOS managers were actually farmers or individuals focusing on breeding and nursing crops. However, the first civilisations were believed to create gardens primarily for aesthetic purposes, with tomb paintings in Egypt (from 1475 BC) showing ornamental gardens (Mader, 2006). Turner (2005) claims that ancient garden construction and design was a primary precursor to landscape architecture, beginning in West Asia and eventually spreading westward into Greece, Spain, Germany, France and Britain.

UOSs have been an important part of European cities since industrialisation, and their development accelerated throughout the 19th century. The roles and responsibilities for creating, developing and maintaining UOS have evolved over the years, but the development of UOS has been dominated by public organisations. Today, a complex mix of local management models and traditions can be found, with a variety of public, private and community actors, such as housing companies and cemetery organisations, having responsibility for UOS.

In the UK, the origins of the urban public space movement as defined by de Magalhães and Carmona (2009) mainly date back to the royal hunting grounds, private estates and commercial pleasure gardens of the 17th century. The restoration of the monarchy with King Charles II in the 1660s brought with it a sense of prosperity, permanence and peace, awaking a new interest in creating landscaped estates and lavish gardens for private and then increasingly public benefit. One of the most prominent examples of this transition is Greenwich Park (Figure 4.1), one of the Royal Parks of London. Its structure and form can be attributed to the influence of Charles II and his penchant for the formal baroque landscapes of André Le Nôtre. This iconic and incredibly popular park is still owned by the Crown but is now managed by the Royal Parks, an independent and increasingly self-funding charity created in 2017 from the former Royal Parks Agency, a UK government agency.

The creation of a large number of privately owned and managed parks and gardens in the UK paved the way for publicly accessible green spaces during the 18th century. These new publicly accessible parks were often funded by an entrance fee and offered a welcome escape from the squalor of their surroundings (Figure 4.2). Bloomsbury in central London is an example of this type of town planning, with numerous gardens and squares, including Russell Square, Tavistock Square Gardens and Brunswick Square Gardens. These were originally private gardens, with access restricted to keyholders (known as frontagers) who lived around these exclusive spaces and paid an annual fee or service charge that funded

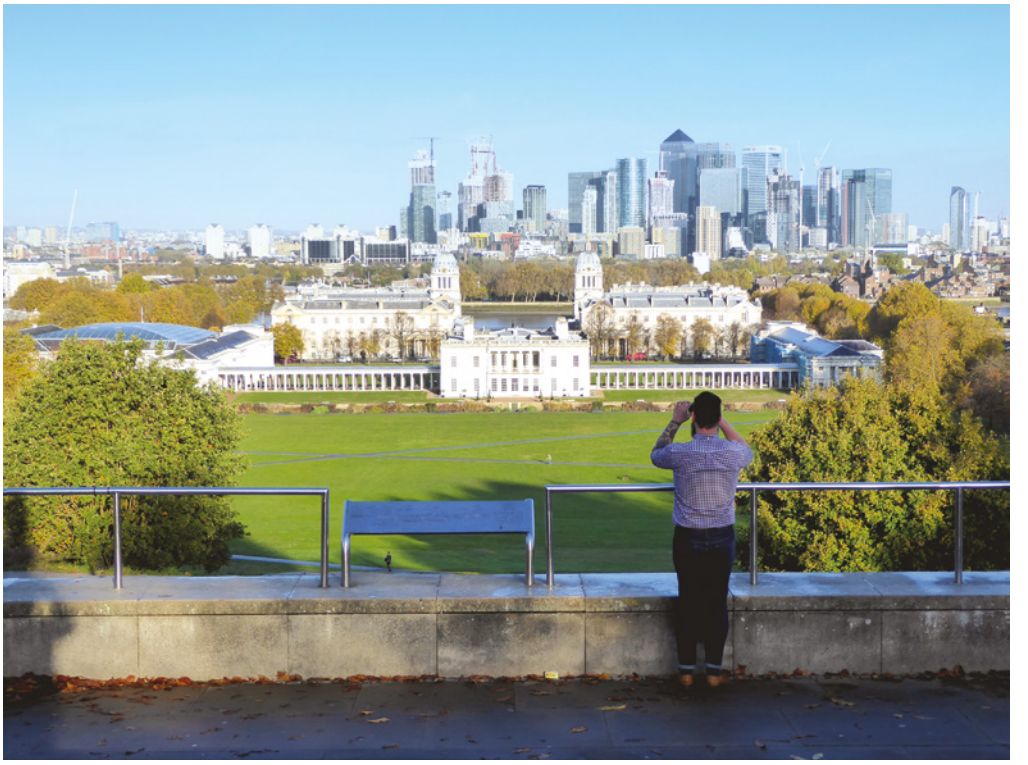


Figure 4.1 Greenwich Park, London. *Photo*: Peter Neal

Figure 4.2 Derby Arboretum, the first public park in the UK. *Photo*: Peter Neal

their upkeep. While most of Bloomsbury's garden squares now enjoy full public access and are maintained by the local government, some remain privately owned and managed (e.g. Mecklenburgh Square Gardens). These are still under private management by the surrounding property owners, charge-payers and keyholders.

The 19th century heralded the start of a municipal parks movement throughout Western Europe (1850s–early 1900). This was triggered by rapid industrialisation but was driven principally by a need to improve public health in cities and as a means to raise the value of land and cross-funded property development (Brandt, 2002). This 'capitalisation' of a park's value to adjacent homeowners has been described by Crompton (2004) as 'the proximate principle' and provided much of the economic rationale for public park building throughout the 1800s. This model was adopted by both private developers and public authorities as a means to justify and fund the initial development of UOS, in particular in wealthier industrial cities. Although many parks were gifted by philanthropists and industrial benefactors, a large number were created by public funding, providing public benefit and remaining publicly owned assets but also maintained in perpetuity by the public purse.

In Germany, the Englischer Garten in Munich (Figure 4.3) was the first park to be opened to the public. It was created in 1789 and owned and managed by the Bavarian royals. During the Napoleonic wars (1803–1815) in Germany, most walled towns were destroyed, opening up new free space that was used in many cities as UOS and primarily green spaces (Hennebo, 1970;

Figure 4.3 The Englischer Garten, Munich. *Photo*: Anna Steidle

Milchert, 1980). Publicly funded parks generally emerged in the early 19th century, for example Klosterbergepark in Magdeburg, which opened in 1824 (Mader, 2006). The emergence of publicly funded parks also led to the creation of the first independent parks departments within local governments (Richter, 1981). Modern planning and management of UOS in Germany is believed to be significantly influenced by these early organisations even today, as publicly owned land is viewed as equal to privately owned property. In general, there are no particular national or international laws governing UOS (Knuth et al., 2008), but local governments in Germany still have formal responsibility for managing public land, while the level and the quality of the management may vary across cities (Rothermund & Kraft, 2008).

Funding for UOS governance and management was not a problem throughout much of the 20th century, with local taxation providing the necessary resources and democratic structures to coordinate management and maintenance. However, the flaw in this financial model has become increasingly evident in recent decades as the demand for, and costs of, public services have grown significantly. With local governments having to meet particular legal and statutory responsibilities for education, health care and social care, made greater by the impact of an ageing population, the funding available for UOS has become increasingly restricted. This became particularly challenging in the 1980s with the introduction of New Public Management (NPM) as a public government doctrine, introducing new steering means for management and outsourcing and attempting to improve the commercial efficiency of local governments in many Western countries (e.g. Hood, 1995; Foss Hansen, 2011). The varying organisational forms and approaches to UOS maintenance in existence today are described in more detail in Chapter 9 and are to a large extent related to the influence of NPM. The fact that many public-sector maintenance contracts were sent out to tender led to many UOSs being managed by private contractors rather than local government-run grounds maintenance teams (Rau, 2007; Lindholst et al., 2018). However, there are differences between countries; for example, in Sweden, UOS maintenance is more or less always contracted out, while in Denmark, outsourcing is an exception among housing companies (Persson et al., 2017). Private contractors can be employed for a single green space or for the management of all parks and other UOSs under the responsibility of one or more local government departments. The outsourcing regime used is, not least, a matter of budgetary constraints.

Increasingly, UOS management and related maintenance have been focusing on price, delivering progressively lower standards of maintenance while many of the traditional horticultural skills, knowledge and expertise that have been at the heart of green space services for decades are disappearing (e.g. Clouston, 1984). Varying tax systems in different countries have also influenced the management of UOS. For example, in Germany, income tax is collected by the central government, which pays the local government for managing UOS. The budgetary situation is likely to affect the degree to which UOS management is long-sighted and visionary, or whether the focus is primarily on the required minimum maintenance.

The financial crash of 2008 sent shockwaves through many sectors, and its implications have been far-reaching. Over much of the subsequent decade, public finances in the UK have been severely squeezed as successive governments have adhered to demanding austerity programmes to reduce the burden of public debt.

> With social care and waste spending absorbing a rising proportion of the resources available to councils, funding for other council services drops by 35 per cent in cash terms by the end of the decade, from £26.6 billion in 2010/11 to £17.2 billion in 2019/20.
>
> (LGA, 2015, p. 4)

Thus a number of challenges still exist in managing public green spaces in the UK. The reformation of the Royal Parks into an independent charity represents a growing trend in UOS management in the UK. This is in contrast to the more traditional public-sector model in which the local government plays a central role in the governance and management of public parks, still seen in, for example, Scandinavia and the rest of Europe.

In general, the current state of urban parks and green spaces in the UK and Germany is dominated by local government maintenance budgets being reduced and less capital being available for improvements. While park usage is increasing and local communities are taking on a greater role in the management of green spaces, some parks in the UK may simply be sold or transferred to the care of others (Neal, 2014, 2016; see also Box 4.1). In Germany,

BOX 4.1: THE STATE OF UK PUBLIC PARKS

The UK Heritage Lottery Fund has published two 'State of UK Public Parks' surveys. These highlight an increasing trend in the use of public parks, with over half of the UK population (an increase from 54% in 2014 to 57% in 2016) visiting their local parks at least once a month or more, the equivalent of over 35 million monthly visits. At the same time, the majority of park managers (92% in 2016) saw their budgets cut over the previous three years and most expected this trend to continue in future years. Three-quarters of UK councils have significantly reduced their number of staff, particularly managerial staff, and there has been a substantial decline in frontline skills needed to deliver park-related services, including the loss of horticultural skills (41% in 2016).

Local governments in the UK are increasingly varying their approach to managing and maintaining their UOSs. Half have chosen to transfer some of their management responsibilities to others, in particular environmental and conservation organisations and community sports clubs and groups. Some are considering disposing of entire sites or parts of sites, with general amenity spaces and natural green spaces the most likely to be sold. Local governments are increasingly diversifying their income streams to fund the UOS service, with almost one-third of funding (29% in 2016) expected to come from external sources, including planning revenues, ticketed events and commercial sponsorship. Community groups are also having a growing impact by supporting their local parks and green spaces. There has been an increase in the number of friends groups, often non-profit groups or organisations that actively support their parks, help with daily programmes, special events, fundraising and public education, and they serve as important links to local communities and other UOS user groups. The level of volunteering and the amount of fundraising are also on the increase. It is estimated that the value of volunteering may be at least £70 million (2016) per year, alongside a cumulative estimate of £50 million (2016) raised annually by community groups.

one city tried to sell all of its public space, presumably to avoid the task of maintaining it, but without success (Bergmeister & Oberpriller, 2010). However, in Sweden local government green space managers regard the current quality of their green spaces to be adequate and budgets for upkeep sufficient, just as they look optimistically into the near future (Randrup et al., 2017). The Swedish trends contradict the UK and German situation and indicate that, even though the NPM doctrine was a global trend that has impacted local government steering throughout the world, the effect in relation to local government UOS management has varied.

The UOS sector, using Sweden as a case study

A sector can be defined as an area in which businesses share the same or a related product or service (Boyett, 1996; Dieter & Thoroe, 2003). It can also be defined as an industry or market that shares common characteristics, thus being a sociological, economic or political subdivision of society (Salamon & Anheier, 1992). To date, the UOS sector has primarily consisted of relevant landowners and associated interest groups or stakeholders dealing with UOS governance and management. However, there is growing engagement from non-government organisations, friends and community groups (see Chapters 5–7). This growing complexity of the UOS sector makes it appropriate to assess the current state of the art when it comes to size and primary actors in the sector. Such an attempt has been performed in Sweden during the past 10 years. The latest report on the state of the UOS sector in Sweden is summarised next.

Limitations in providing an overview of the UOS sector

The UOS sector is not unified, as there is no formal national influence or coordinated lobbying going on. This is due to the fact that the sector comprises a number of smaller or larger landowners who all manage UOS with more or less access for the public. Dividing a sector into different sub-sectors allows for a more in-depth analysis of the economy as a whole. Therefore, the following description of the UOS sector is divided into three main sub-sectors, local governments, housing companies and cemeteries, reflecting the main public landowner groups in a Swedish context.

The following is based on a national study that estimated the size and turnover of the Swedish UOS sector (Ekelund et al., 2017). In a number of other sectors, estimates of the total turnover are based on total sales and proceeds – for example, the horticulture sector produces plants, vegetables or trees. These have a primary production value, which is often regarded as the sector's total economic output. The UOS sector has no sales but provides public goods, sometimes expressed as ecosystem services (MEA, 2005). There are basically three ways of assessing the size of the UOS sector: (i) by estimating the number of organisations or even individuals working within the sector, (ii) by estimating the number of square metres of UOS within each of the sub-sectors or (iii) by estimating the costs related to purchasing or providing services. A combination of the three may provide the best estimate.

The UOS sector is typically characterised by a large number of organisations, many of which are relatively small, as many have management of UOS as only a small part of their overall responsibilities. Further, one

of the primary UOS organisations, local government, splits responsibility for UOS management between different departments within the organisation (see Chapter 9). Therefore, it is difficult to produce a comprehensive estimate of the sector. Figures from landscaping companies and consultants are estimates based on a series of sources, as these sub-sectors may have overall figures for turnover but do not differentiate between different consumer or project types. Individual family homeowners may also hire various landscaping and maintenance services, but these operations are not included in the estimates. Thus the figures available must be regarded as very conservative.

To assess the size or land area of the UOS sector, Persson et al. (2012) used costs from interest groups either purchasing or providing services to the sector. However, it proved difficult to obtain sufficient data to make a reliable estimate. Therefore, calculations were mostly based on the size of UOS and the costs for establishing and maintaining each square metre. Total costs were estimated using the following formula: area x cost per square metre = total cost (Persson et al., 2012). A key issue is, therefore, to find the area of different UOSs being managed by different UOS managers, often across multiple organisations within a local government (for example, parks, roads, cultural, social). Much area data can be found through publicly available statistical sources, and different sources may be used to verify data from key sources. For an overview of how different UOS typologies add up to an urban matrix, see Chapter 3.

The primary amount of expenditure (costs) is met through national, regional or local government taxes (publicly owned areas), rent or fees for residents (housing companies, semi-public areas) or burial tax in cemeteries. There is in general a lack of comparable data to make one estimate for the entire UOS sector.

In the Swedish study (Persson et al., 2012), planning, design (including consultancy services) and acquiring maintenance services were all included in 'management'. These costs are related to purchases (see Figure 4.6), while the remaining costs are generated by the management organisations themselves and regarded as in-house work. The sector often uses terms such as 'purchaser' and 'provider', based on the New Public Management terminology (see the aforementioned and Chapter 9), where the purchaser has the formal management responsibility (and owns the resources) and the provider does the operational work (undertakes the maintenance).

For housing estates and privately managed estates, the costs for maintenance of UOS are often calculated based on the rented area, most commonly floor space. Information on costs may be gathered from purchasers/managers' own estimates of expenditure per square metre and in some cases from providers. The costs of maintenance of different areas varies based on the extent to which they are maintained, how effective the operations are and differing maintenance standards depending on context and usage. Expenditure by area is, therefore, different for different UOSs.

It is important to note that conditions differ between various parts of the sector, which demands good sectoral knowledge and insights into the methods of presenting costs, managed area and operations employed by the different branches in order to obtain trustworthy and comparable information. It is currently difficult to produce information that is sufficiently unified in order to make national comparisons. For international comparisons, there is also a need to adjust for national differences in accounting.

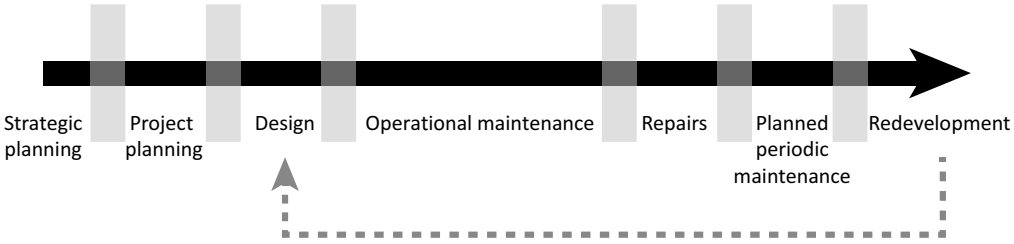


Figure 4.4 The different operations in management of the UOS sector, shown as a sequence of actions over time. The operational maintenance phase includes repairs (re-construction), planned periodic maintenance (e.g. tree pruning) and redevelopment (e.g. when a worn out playground is refurbished). See Chapter 3 for definitions of green, blue, brown and grey spaces.

Green spaces in local governments

In a Swedish context, green spaces, or more specifically parks, are designated as public spaces and protected as recreational areas in local plans. In the Swedish planning system, parks in local plans are usually owned and managed by the local government, as a service offered to their residents. However, the term 'park' in local plans often also includes roadside verges, brown spaces and unused strips in between developments.

There is general uncertainty in defining what actually characterises a 'park', not only in legislation but also in practice. During the late 1990s, the Swedish Association of Local Authorities (SALA) sent a questionnaire to all local government parks departments. The survey focused on the type of space regarded as a park, as well as the related management costs. According to an extrapolation by SALA based on the responses, there were 71,000 hectares of parkland in Sweden, of which 27,000 hectares (38%) landscaped park and the remaining 44,000 hectares (62%) preserved nature (Svenska kommunförbundet, 1997). Park maintenance was estimated to cost EUR 130 million, of which 93% was spent on managed parks and 7% on the natural land.

Park management by local governments in Sweden is funded through local government taxes. Statistics in Sweden's annual report on local government expenditure show that costs related to parks amount to EUR 435 million or an average of EUR 45 per citizen and year (SCB, 2017). The expenditure is not further subdivided.

Green spaces around housing estates

A large proportion of UOS is located within residential areas or is connected to other types of property, such as offices, hospitals and schools (Ekelund et al., 2017). Moreover, approximately 50% of what is often considered to be UOS is privately owned (Fuller & Gaston, 2009; Schmitt-Harsh et al., 2013), yet can still be accessible, physically or visually, and contribute much to the public in various ways through enhanced amenities, ecosystem services, etc. Green spaces belonging to housing estates are regarded as private land and are not (as such) publicly accessible. They are owned by companies, which can be semi-public or private. In Sweden, local governments provide affordable housing through publicly owned, but individually governed, public housing companies. Despite the private character of the space surrounding the

estates, they are always open for residents' use. Since the 1930s, it has been common practice for local governments to integrate these residential green spaces with other UOS in a cohesive green infrastructure planning network with a combined socio-ecological perspective. These spaces play an important role for residents and as a supplement to public UOS, for recreation that can be active or passive (e.g. when enjoying the view from a window [Lindgren, 2010]). On average, managing green spaces in Swedish multi-family housing areas costs EUR 650 million per year or EUR 155 per resident and year.

Cemeteries as green spaces

Significant green spaces in terms of cemeteries have existed in and around urban areas for centuries (Bennett & Davies, 2015) as part of church grounds (Figure 4.5). Urbanisation and urban expansion have caused cemeteries to grow in a similar way to other types of UOS during the 20th century. Differences in cemetery traditions across Europe, and even within countries, make these types of UOS more or less important as part of the urban matrix, providing social, ecological, heritage and cultural values.

The Church of Sweden runs all cemeteries in Sweden, except in two cities where they are managed by the local governments. In the past, local congregations have been responsible for managing their cemeteries, but today, cemeteries are managed at the parish level. There are approximately 600 parishes in Sweden, which may consist of one or several congregations. Parishes are decreasing in number and growing in area, following several reforms and mergers. The parish's most senior official, the vicar, is responsible for all operations, including cemetery administration. Larger parishes often employ professional management teams.

The Church of Sweden was the national church until the church was separated from the state in 2000 (Svenska Kyrkan, 2018). Cemetery management was financed through a church tax until it was replaced by a funeral fee, paid as a percentage of taxable income, also in 2000. The funeral fee originally differed between different funeral organisations and varied between 0.08% and 0.76% of taxable income in 2015. Since 2017, the fee has been the same across the country, 0.25% of taxable income. These fees cover the burial costs and maintenance of communal areas of the cemetery, as individual grave maintenance is covered by the families of the deceased. Thus cemetery management administrations hold a series of individual grave maintenance agreements with the related families.

Results from the Swedish study

Table 4.1 shows the number of UOS management organisations, contractors, consultants and individual homeowners in Sweden. In total, there are approximately 40,000 organisations responsible for UOS or providing UOS services in Sweden.

Table 4.2 shows the national turnover of UOS in Sweden in type, size and maintenance costs for green spaces defined as local government-managed parks, UOS around housing estates and UOS in cemeteries. These comprise the majority of managed UOS in Sweden.

According to Table 4.2, the Swedish UOS sector has annual maintenance costs of approximately EUR 1.8 billion. An additional EUR 0.7 billion is related to planning, design and construction (Ekelund et al., 2017). The combined value (EUR

(i)

(ii)

(iii)

Figure 4.5 Three examples showing the variety of green space provided by cemeteries: (i) West Norwood Cemetery, London, UK; (ii) Waldfriedhof Stadt Lampertheim in Hessen, close to Mannheim, Germany; and (iii) Skogskyrkogården, Stockholm, Sweden. *Photos*: Peter Neal (i and iii), Anna Steidle (ii)

Table 4.1 Number of organisations, companies and homeowners acting as managers of UOS in Sweden

Organisations and companies	
Local governments – Park organisations (usually environmental/technical departments) – Institutions (social, education, etc.) – Sports grounds (usually culture departments) – Greening alongside streets (usually roads departments)	290
Housing companies	25,600
Cooperatives	260
Publicly owned housing companies	12,300
Members of the Association of Property Owners	
Funeral managers (Parish or equivalent) for 3,200 cemeteries	616
County councils	20
The Swedish Transport Administration ('green streets' and traffic environments)	1
Individual homeowners	
Permanent dwellings	1,880,000
Recreational dwellings	577,000
Landscapers and consultants	
Landscaping companies	500
Consultants	200

Source: Adapted from Ekelund et al. (2017)

Table 4.2 Size and maintenance cost of UOS in Sweden

Type of urban open space	*Size of UOS, ha*	*Annual maintenance cost, million EUR*
Green spaces (parks)	80,000	435
Housing estates	26,000	650
Cemeteries	9,500	330
Sports grounds	3,150	95
Institutions, i.e. day care, schools, hospitals	–	145
Industrial and office estates (only office estates)	–	100
Green areas along streets and roads	–	15
Total	118 500	1 770

Source: Reproduced from Ekelund et al. (2017)

2.5 billion) is equivalent to the primary production value of Sweden's forestry sector (EUR 2.7 billion) (Skogsstyrelsen, 2018).

Looking into the future

Collectively, the Swedish UOS sector is a major and complex one, consisting of many independent organisations. There is reason to believe that the Swedish situation of complexity and lack of a unified organisation representing the entire sector also applies in other countries. The lack of one collective organisation representing the entire sector makes it difficult to gather data on its operations, while the lack of unification also makes the sector

somewhat invisible to the public and to governments and politicians on all levels. On a national scale, the formal organisation for UOS management is often the local government. Even if UOS management constitutes only a fragment of the total local government turnover, it often has a designated organisation – for example a parks department, skilled staff on the tactical level and growing attention from politicians and users (Arts et al., 2006; Jansson et al., 2019).

The conditions under which modern governance and management of UOS are performed varies between countries. In the UK, which has been hit hard by austerity measures, the late 20th century saw a marked change in fortunes with the launch of a national Urban Parks Programme funded by the National Lottery. This provided both capital and revenue for the restoration and regeneration of many of the most important historic public parks across the UK. This was followed by the parliamentary enquiry into town and country parks, the establishment of an Urban Parks Forum and the creation of an Urban Green Spaces Taskforce, which recommended the formation of a national agency for urban green spaces. Thus the lack of a unified UOS sector has a direct effect on the continuing threat to the very existence of parks and other UOS in the UK. As UOS management is generally not a statutory duty of local governments, it is subject to political prioritisation by both national and local governments regarding how money is spent. In Sweden, the lack of a unified sector may seem problematic in relation to the size and impact of UOS on the public – for example, in relation to providing ecosystem services (MEA, 2005) – and in the potential of UOS to modify some of the current environmental challenges, including climate change, as described in Chapter 1. In Germany, the majority of local governments are experiencing similar cuts in public budgets as seen in the UK, but the German statutory obligation to manage publicly owned green spaces keeps the focus of local governments on this task.

Current governance and management of UOS is driven in part by austerity and in part by increased interest and expectation from various stakeholders (see Chapters 5 and 6). As a result, UOS governance and management in the UK and in many other places now include a growing focus on collaboration, public engagement, entrepreneurism and strategic partnerships. Due perhaps to the perceived lack of economic threat experienced by Swedish managers, UOS governance and management in Sweden currently does not involve voluntary support and alliances with local stakeholders in relation to the actual maintenance of green spaces (Randrup et al., 2017).

There is a need for increased collaboration within and beyond the sector, increased interest from politicians, planners and users and creative ideas on development and financing of the sector. This seems to be relevant across international borders. There is also a clear need for greater innovation and strategic reform of the UOS sector. This is required not just to meet the considerable economic challenges that public services are facing but also to respond to wider drivers of change. These include socioeconomic trends, growing urban populations and increasing urban density, a continuing need to improve public health and promote more active lifestyles, increasing environmental resilience, greater efficiency in the use of natural resources and counteracting the impacts of, for example, a changing climate.

In the UK, CABE Space was launched in 2003 as a dedicated unit within the Commission for Architecture and the Built Environment (CABE). Established as a national champion for the urban parks and green spaces sector, the organisation developed a programme of national campaigns, research, best practice and enabling to improve the planning, design and management of UOS. It published a variety of evidence-based surveys on the benefits of high-quality UOS, highlighting examples of good practice, which provided a valuable resource for local governments and public-sector organisations. This helped to justify local government investment and resources for management and maintenance but also raised the profile of the sector as a valuable, if not essential, public service. More than a decade later, many CABE Space publications are still used as important points of reference. These include the following: '*Is the grass greener? Learning from international innovations in urban green space management*', which provides detailed and still relevant research on UOS management across world cities, including Tokyo, Minneapolis, Zürich, Wellington, Melbourne and Paris (CABE, 2019). CABE Space was disbanded by the UK government in 2011, but the reports are still available (CABE, 2019).

Of particular interest for the future governance and funding arrangements of UOS is an increasing role of independent park trusts and charities in UOS management. In the UK, there are already several long-established examples that have performed well throughout recent political and economic turbulence. A number of cities and local governments are now considering establishing independent trusts and transferring their UOS management activities and operations. This does not seem to be the case in all countries (e.g. in Sweden), but the need to include and engage with local users seems evident (see Chapters 5 and 7). The question remains whether politicians see and understand the need for well-managed UOS and whether UOS managers are skilled enough to both communicate and meet this need. London's Royal Parks have followed a route of transferring from a public agency to an independent charity in 2017. This change has provided greater autonomy in operation, wider opportunities for fundraising and charitable activities, more appeals for volunteering and an ability to draw on wider commercial and organisation skills and expertise through appointments to management teams and the executive board. Thus the diversity in the organisational set-up is wide and likely to be increasingly varied.

The UOS management sector shows variation but also similarities across nations. In the UK, the sector has seen major cuts in management budgets, and new schemes, cooperations and organisational and legal organisations have been developed. In Germany, there is a formal obligation to manage UOS, but the financial burden of meeting this requirement is increasing. In Sweden, local government managers have not faced similar economics-related challenges. However, as shown in this chapter, the Swedish UOS sector is divided, fragmented and lacking one voice, a situation that can be assumed to apply in similar sectors internationally. Therefore, there is a general need for national UOS sectors to formalise organisation of the UOS sector. This includes development of new forms of engagement and economic steering mechanisms in order to fulfil the requirements (formal or informal) set by modern society and to ensure that UOS remains as relevant and valued in the future as it was in the past.

References

Aliyas, Z. & Nezhad, S.M., (2019). The role of historical Persian gardens as urban green spaces: Psychological, physical, and social aspects. *Environmental Justice*. **12**(3), doi.org/10.1089/env.2018.0034

Arts, B., Leroy, P. & van Tatenhove, J., (2006). Political modernisation and policy arrangements: A framework for understanding environmental policy change. *Public Organization Review*. **6**(2), 93–106.

Bennett, G. & Davies, P.J., (2015). Urban cemetery planning and the conflicting role of local and regional interests. *Land Use Policy*. **42**(1), 450–459.

Bergmeister, P. & Oberpriller, M., (2010). Weniger Grün zum Verkauf. *RP Online*. [September 2019] https://rp-online.de/nrw/staedte/solingen/weniger-gruen-zum-verkauf_aid-12591187

Boyett, I., (1996). The public sector entrepreneur – A definition. *International Journal of Public Sector Management*. **9**(2), 36–51.

Brandt, H., (2002). *Europa 1815–1850: Reaktion, Konstitution, Revolution*. Stuttgart: Kohlhammer.

CABE, (2019). *CABE Space Archives*. https://webarchive.nationalarchives.gov.uk/20110118095359/www.cabe.org.uk/

Clouston, B., (1984). Urban parks in crisis. *Landscape Design*. **149**, 12–14.

Crompton, J., (2004). *The Proximate Principle: The Impact of Parks, Open Space and Water Features on Residential Property Values and the Property Tax Base*. 2nd ed. Ashburn, VA: National Recreation and Park Association.

de Magalhães, C. & Carmona, M., (2009). Dimensions and models of contemporary public space management in England. *Journal of Environmental Planning and Management*. **52**(1), 11–129.

Dempsey, N. & Smith, H., (2014). Understanding place-keeping of open space. In: N. Dempsey, H. Smith & M. Burton (eds.) *Place-keeping: Open Space Management in Practice*. London: Routledge. 13–29.

Dieter, M. & Thoroe, C., (2003). Forst- und Holzwirtschaft in der Bundesrepublik Deutschland nach neuer europäischer Sektorenabgrenzung. *Forstwissenschaftliches Centralblatt*. **122**(2), 138–151.

Ekelund, L., Hansson, T., Johnson, L., Kristoffersson, A., Lundqvist, S. et al., (2017). *Branschbeskrivning Trädgård*. Enheten för samverkan och utveckling: SLU, LTV-fakulteten.

Foss Hansen, H., (2011). NPM in scandinavia. In: T. Christensen & P. Lægreid (eds.) *New Public Management*. Burlington: Ashgate. 113–129.

Fuller, R.A. & Gaston, K.J., (2009). The scaling of green space coverage in European cities. *Biology Letters*. **5**(3), 352–355.

Hennebo, D., (1970). *Geschichte des Stadtgrüns: Entwicklung des Stadtgrüns in England von den frühen Volkswiesen bis zu den öffentlichen Parks im 19. Jahrhundert*. Hannover, Berlin, Sarstedt: Patzer.

Hood, C., (1995). The "New Public Management" in the 1980s: Variations on a theme. *Accounting, Organizations and Society*. **20**(2/3), 93–109.

Jansson, M., Vogel, N., Fors, H. & Randrup, T.B., (2019). The governance of landscape management: New approaches to urban space development. *Landscape Research*. **44**(8), 952–965.

Knuth, L., Randrup, T.B. & Gauthier, M., (2008). Legal, policy and institutional aspects of urban and peri-urban forestry and greening: The case of West and Central Asia. *CAB Reviews: Perspectives in Agriculture, Veterinary Science, Nutrition and Natural Resources*. **3**(94), 1–13.

LGA, (2015). *Funding Outlook for Councils to 2019/20*. Local Government Association, 4 July.

Lindgren, T., (2010). *Green Space Management and Residents' Benefits – A Study of Swedish Rental Multi-Family Housing Areas* (Ph.D. Thesis). Swedish University of Agricultural Sciences, Alnarp.

Lindholst, A.C., (2017). A review of the outcomes from contracting out urban green space maintenance: What we know, don't know and should know. *Urban Forestry & Urban Greening*. **27**, 50–58.

Lindholst, A.C., Randrup, T.B., Kristoffersson, A., Hansen, M.B. & Persson, B., (2018). The many outcomes from contracting out: The voice of public managers. *Environment and Planning C: Politics and Space*. **36**(6), 1046–1067.

Mader, G., (2006). *Geschichte der Gartenkunst: Streifzüge durch vier Jahrtausende*. Stuttgart (Hohenheim): Ulmer.

MEA, (2005). *Millennium Ecosystem Assessment Report. Ecosystems and Human Well-being: Synthesis*. Millennium Ecosystem Assessment. Washington, DC: Island Press.

Milchert, J., (1980). 200 Jahre städtische Grünpolitik. Ein Überblick. In: *Garten und Landschaft*. München: Callwey-Verlag.

Nalau, J., Preston, B.L. & Maloney, M.C., (2015). Is adaptation a local responsibility? *Environmental Science & Policy*. **48**, 89–98.

Neal, P., (2014). *State of UK Public Parks*. Research Report to the Heritage Lottery Fund. London: Heritage Lottery Fund.

Neal, P., (2016). *State of UK Public Parks*. Research Report to the Heritage Lottery Fund. London: Heritage Lottery Fund.

Persson, B., Lindholst, C.A., Sunding, A., Kristoffersson, A., Delshammar, T., Fälth, E. & Randrup, T.B., (2017). *Kvalitetsaspekter vid upphandling av utemiljöförvaltning – en jämförelse mellan offentliga och privata förvaltare i Sverige och Danmark*. Fakulteten för landskapsarkitektur, trädgårds- och växtproduktionsvetenskap. Rapport 2017:2. Alnarp: Sveriges lantbruksuniversitet.

Persson, B., Sunding, A. & Johnson, L., (2012). Branschbeskrivning utemiljö. In: I. Christensen, G. Larsson, L. Ekelund et al., (eds.) *Branschbeskrivning trädgård*. Fakulteten för landskapsarkitektur, trädgårds- och växtproduktionsvetenskap. Alnarp: Sveriges lantbruksuniversitet.

Randrup, T.B., Östberg, J. & Wiström, B., (2017). Swedish green space management – The managers perspective. *Urban Forestry & Urban Greening*. **28**, 103–109.

Randrup, T.B. & Persson, B., (2009). Public green spaces in the Nordic countries: Development of a new strategic management regime. *Urban Forestry & Urban Greening*. **8**(1), 31–40.

Rau, T., (2007). *Betriebswirtschaftslehre für Städte und Gemeinden: Strategie, Personal, Organisation*. 2nd ed. Vahlen: München.

Richter, G., (1981). *Handbuch Stadtgrün. Landschaftsarchitektur im städtischen Freiraum*. München, Wien, Zürich: BLV-Verlagsgesellschaft.

Romolini, M., Ryan, R.L., Simso, E.R. & Strauss, E.G., (2019). Visitors' attachment to urban parks in Los Angeles, CA. *Urban Forestry & Urban Greening*. **41**, 118–126.

Rothermund, C. & Kraft, G., (2008). *Die Haftung der Kommunen für die Verletzung der Verkehrssicherungspflicht*. Berlin: Erich Schmidt Verlag.

Salamon, L.M. & Anheier, H.K., (1992). In search of the non-profit sector. I: The question of definitions. *Voluntas*. **3**(2), 125–151.

SCB, (2017). *Statistikdatabasen*. [October 2019] www.statistikdatabasen.scb.se/

Schmitt-Harsh, M., Mincey, S.K., Patterson, M., Fischer, B.C. & Evans, T.P., (2013). Private residential urban forest structure and carbon storage in a moderate-sized urban area in the Midwest, United States. *Urban Forestry & Urban Greening*. **12**(4), 454–463.

Shimoni, B., (2019). *Organization Development and Society*. New York: Routledge.

Sia, A., Kua, E.H. & Ho, R., (2020). Building social resilience through parks and common recreational spaces. In: C.H. Leong & L.C. Malone-Lee (eds.) *Building Resilient Neighbourhoods in Singapore. Advances in 21st Century Human Settlements*. Singapore: Springer. 51–62.

Skogsstyrelsen, (2018). *Statistical Database*. [October 2019] Pxweb.skogstyrelsen.se

Svenska kommunförbundet, (1997). *Kommunernas Parker 1997*. Stockholm: Svenska kommunförbundet.

Svenska kyrkan, (2018). *Historik*. [October 2019] www.svenskakyrkan.se/

Turner, T., (2005). *Garden History: Philosophy and Design 2000 BC–2000 AD*. London – New York: Spon Press.

van der Jagt, A.P.N. & Lawrence, A., (2019). Local government and urban forest governance: Insights from Scotland. *Scandinavian Journal of Forest Research*. **34**(1), 53–66.

All figures are used with permission.

Part II

Understanding relations and values

5 User-oriented urban open space governance and management

Märit Jansson, Hanna Fors, Elin Pritzel Sundevall, Anna Bengtsson, Inger Lerstrup, Patrick Hurley, Mattias Qviström and Thomas B. Randrup

Introduction

Governance and management of urban open space (UOS) affect the qualities and properties of UOS in relation to its use potential, which is determined by its content, quality, access and context. UOSs are visited or perceived by people, or users, for various activities, or uses (Jansson & Lindgren, 2012; Dempsey & Smith, 2014). Thus UOS governance and management can adapt to, support or encourage use and thereby provide ecosystem services that lead to various user benefits.

There are generally no binding or legal responsibilities for organisations to provide people with high-quality UOS; rather, this is an implicit demand (de Magalhães & Carmona, 2009). Yet UOSs and their management – in public but also semi-public and sometimes private UOS settings – can provide well-being and equity (Jennings et al., 2016) and are important in supporting various user groups.

In this chapter, we describe how user-oriented governance and management approaches to UOS can adapt to, support or encourage various uses, focusing on user groups with specific needs, such as children, young people, the elderly, people with disabilities and ethnic minorities.

Preferences for UOSs and their management

Research has identified several relationships between the perception of environments and human well-being that are relevant for UOS governance and management. Grahn and Stigsdotter (2010) describe eight perceived sensory dimensions of green spaces that are generally preferred and their variety. These are, in order from most to least preferred: serene (silent and calm), space (spacious, a coherent whole), nature (wild), rich in species (various plants and animals), refuge (safe, secluded, seating), culture

(historical and cultural elements), prospect (open surfaces, vistas) and social (meeting places, pleasure) (Grahn & Stigsdotter, 2010). These dimensions are connected to activities on a scale from passive to active use. Similarly, Carr et al. (1992) describe people as attracted to public spaces that allow them to meet five needs: comfort, relaxation, passive engagement, active engagement and discovery. Another relevant theory is the so-called preference matrix, with coherence and complexity (to make sense) and legibility and mystery (to get involved or interested in) described as four essential qualities in green spaces (Kaplan & Kaplan, 1989).

The concept of affordances is also relevant. According to Heft (1988, p. 32), affordances are 'perceived qualities that emerge from person-environment relations'. They are the perceived meaningful action possibilities in an environment. A tree can afford walking in shade, picking fruits or climbing, while a pond can afford water play, bird watching or meditation. These individual perceptions of possible uses are affected by various norms and change over lifespans, with season, weather, time of the day, etc., but depend strongly on properties and qualities of UOS, such as maintenance level, design and content.

People who seek out UOS look for specific qualities and properties in order to find environments and affordances matching their needs, so-called person-environment fit, which depends on environmental, social, demographic and individual factors (Kahana et al., 2003). For example, people experiencing much stress tend to prefer the dimensions refuge, nature and rich in species more than others (Grahn & Stigsdotter, 2010). By contrast, people engaged in foraging may value particular species, based on, for example, edibility, that may be seen as serving other functions (e.g. wildlife habitat) or not seen as valuable (e.g. invasive species). Such variation in users and uses is a challenge for UOS managers.

User-oriented UOS governance and management

A UOS open space governance and management approach that is user oriented (Jansson & Lindgren, 2012) requires interest and knowledge of both users and uses. In general, it is important to provide variation, adapt to a multitude of local uses and users and continuously re-develop spaces. Examples include mowing grass more often to facilitate ball sports, placing benches along a path favoured by the elderly or reviewing rules on allowing plant harvesting.

User-oriented UOS governance and management often require collection of user information to analyse the local situation. Managers may gain inspiration based on observations of use, data on demographics, surveys, e-tools or theoretical knowledge on different user groups, behaviours or preferences. Critical analysis of such information is important, as it is not always the most common or noticed users who need the most support, and some users and uses may be invisible or problematic. It can also be of value for managers to inform users in various ways, increasing the knowledge and understanding of UOS and its management. This can be done through signage, media, social media, etc. (Figure 5.1).

In order to manage in a user-oriented manner and to build partnerships, it is important to initiate two-way communication with users through, for example, workshops, focus group interviews or e-tools (see Chapters 7 and 10). Today, most management organisations, particularly local governments, have ways for users to comment

Figure 5.1 Signage in Edinburgh, UK, where the local government is informing users about its management approach. *Photo*: Märit Jansson

or submit requests. Some also have close contact with interest groups concerning, for example, access for the disabled; organising walks focusing on, for example, perceived safety; or educating and learning from local users through various projects or guided tours. One step further is to invite users into decision making or other forms of active participation through various levels of co-governance, as further described in Chapter 7.

Providing accessibility and quality

In UOS, quality and accessibility are two aspects that are both highly intertwined and of critical importance for use. Although quality in relation to UOS is dependent on various, often individual, factors, there are some general quality aspects – for example, accessibility, maintenance, nature and facilities (Fors et al., 2018). Bell et al. (2003) identified the social, experimental, ecological and functional as important dimensions of woodlands, which can be interpreted as four main aspects of user quality, related also to accessibility. Good accessibility is a quality of great societal importance, often a precondition for use (Van Herzele & Wiedemann, 2003). Achieving accessibility in UOS across abilities can give very positive experiences, as found among people with learning disabilities (Mathers, 2008). Exclusion of users, on the other hand, is experienced as highly negative, such as when playgrounds are ill fitted for children with disabilities and their parents (Prellwitz & Skär, 2017).

Proximity is a highly relevant aspect of accessibility, as people mainly experience

UOS close to where they spend time, live, work or commute and rarely compensate for lack of nearby green spaces by visiting more remote UOS. People living close to ample green spaces with suitable facilities are more physically active than others across ages and ethnicities (Kaczynski et al., 2014). In general, people with access to many urban green spaces are healthier, but this effect can depend on the type and character of the spaces (Weeler et al., 2015). Growing up in an area with many green spaces is associated with good mental health (Engemann et al., 2019). Distances of a few hundred metres often determine the frequency of visits, which affects reported stress, health and quality of life (Stigsdotter et al., 2010). In order to provide benefits for people, it is, therefore, valuable to consider accessibility through proximity. However, true accessibility is also affected by factors such as barriers, usability and social inclusion.

Accessibility and quality interplay at various urban scales and through several factors, from individual gardens to entire neighbourhoods. These factors can include high residential density and mixed land uses (offering services and facilities close by), accessibility (easily reached green spaces), connectedness and permeability, legibility (quality and number of nodes and landmarks), attractiveness (user perceived, amount of greenery), inclusiveness (pedestrian friendly, welcoming to all), maintenance (level, amount of litter), safety and character (Dempsey, 2008). Most urban residents prefer signs of human care in UOS (Nassauer, 1995), particularly in their immediate residential environment, for a local place identity (Jorgensen et al., 2007). Many also have an equally pressing need for accessible wilderness-like areas (such as woodlands) close to home for restorative experiences. Jorgensen et al. (2007), therefore, suggest providing access to a wide range of UOS types close to residential settings so that residents can choose the way in which they use and interact with UOS.

Supporting perceived safety

A common issue among users is the perceived fear in UOS, particularly within some groups, due to perceived vulnerability or past experiences of crime, even though they are often not likely to be victims of crime (Sreetheran & van den Bosch, 2014). This includes the elderly, who are dependent on perceived safety for their residential satisfaction (Kahana et al., 2003), immigrants who might be anxious due to low language proficiency (Wu & Wareham, 2017) and women (Koskela, 1999). Perceived unsafety outdoors limits many people in their social lives and physical activities, with negative consequences for well-being. The reasons are complex, often based on both social and individual aspects (Sreetheran & van den Bosch, 2014). Physical properties, which are much affected by the way a UOS is managed, have a large impact on the experience, particularly after dark and where vegetation is free-growing or unmanaged (Jansson et al., 2013).

Aspects affecting perceived safety include a readable and unified landscape design with a low degree of closure (e.g. vegetation only on one side of a path) and good possibilities for overview and control, including the possibility to escape or see other people approaching and evaluate whether they pose a potential threat. This can be achieved through strategic lighting and vegetation designs allowing visual access and ease of movement – for example low vegetation density between knee and eye level. Vegetation character and maintenance are also important – i.e. preventing poorly maintained, vandalised and littered

UOS (Jansson et al., 2013). A challenge when managing for increased perceived safety is to retain an attractive vegetation character and its benefits, as very simple, safety-promoting concepts might result in less attractive UOS. As there is also a need for more wild and varied UOS characters, providing choices between routes and areas with various types of management approaches might be valuable also in this respect (Jorgensen, 2007).

Providing multifunction and flexibility

In order to provide all functions needed in UOS and to adapt to changes in uses and users, multifunction and flexibility are needed. New approaches might balance between different types of multifunction. UOS management often needs to enable social and ecological functions to co-exist (Shams & Barker, 2019). This can include biodiversity, protection of vulnerable ecosystems and species, cultural heritage and stormwater management. Legislation might protect some areas and guide governance and management. Managing UOS for a multitude of ecosystem services and values can, therefore, mean regulating its use. When considering mainly social multifunctions, there are different approaches, such as providing places to support specific uses (boule courts, skate parks, playgrounds) or striving for total multifunction, to fit several users (see Box 5.1).

Social activities in UOS are much appreciated among many user groups, including different ethnicities (Ordóñez-Barona, 2017). UOSs often act as meeting places and, with deliberate design and management, can facilitate social cohesion and integration of immigrants (Van der Jagt et al., 2016), encouraging active use by diverse users, avoiding over-regulation and leaving room for self-organisation (Peters et al., 2010). There is a need for different 'social environments' that are inclusive for all users (Haase et al., 2017). Complex and diverse UOS can provide various affordances for multifunction and is often preferred over monotonous areas. Lawns can be developed by adding sensory experiences – for example

BOX 5.1: APPROACHES TO MULTIFUNCTION IN URBAN OPEN SPACE

Multifunction in UOS can mean different things and be of various types. Rode (2016) defines three types of spatial multifunction:

- **Tessellated** (mosaic) multifunction (separated functions within an area)
- **Partial** multifunction (combination of functions within an area, with one or two dominating)
- **Total** multifunction (a balance between different functions within an area).

Multifunction can also be based on time (Ahern, 2011):

- **Time-based** multifunction (several functions within an area but at different times).

variations between cut grass and meadow – and providing more affordances (Ignatieva et al., 2017). If thoughtfully managed and designed, some UOSs can provide multiple and better functions and values. For example, social inclusion can be supported where UOSs are shared between preschools and homes for the elderly (partial or time-based multifunction) or between children in playgrounds and elderly people doing community gardening (tessellated multifunction) (see Box 5.2). However, not all functions can be successfully combined and aiming for too much 'multifunction' within a

BOX 5.2: MULTIFUNCTION IN EAST VILLAGE, CALGARY, CANADA

The UOS Crossroads in East Village in Calgary, Canada (Figure 5.2), was developed in 2016 through a closed co-governance approach, supported by local politicians and managers. It provides social functions across the generations and ecological functions. In response to requests from nearby homes for the elderly, facilities for community gardening are provided. A playground, a small square with chairs and tables and parcels of meadow are located close by. This is an example of mainly tessellated multifunction, with various functions mostly separated but located together.

Figure 5.2 Playground, community garden and square in tessellated multifunction at Crossroads, Calgary, Canada. *Photo*: Märit Jansson

limited space can instead decrease both values and uses – for example, by heavy wear and tear or users disturbing each other.

Places and elements can be both programmed (benches, gym and play equipment) and non-programmed (rocks, hills, vegetation, sculptures, walls, etc.) for use. Programmed elements can be inviting to specific users or signal what is allowed but have the possible disadvantage that the use is steered or excluding. Therefore, non-programmed places and elements that bring

BOX 5.3: TAMING THE INFORMAL IN HIGH LINE PARK, NEW YORK CITY, US

One UOS that has been developed based on an informal character is High Line Park in New York City, US (see Figure 5.3), the subject of much fascination and criticism for being 'over-managed' and gentrified. In 2009, an abandoned and overgrown elevated railroad track in Manhattan's West Side was re-designed into a public park, but critics claim that too much of the informal character has been lost and thereby also many of the possibilities for creative uses (Millington, 2015).

Figure 5.3 The High Line, New York City, US, where the informal character has been tamed. *Photo*: Johan Östberg

a multitude of affordances and flexibility of use are valuable, including many informal, in between or abandoned UOSs. Such places are appreciated because they impose little restriction and can provide biodiversity, nature contact (Rupprecht, 2017) and a feeling of wilderness or escape for children, for example (Jansson et al., 2016). Many researchers, including Qviström (2011), stress the importance of keeping informal areas as attractive features and warn that recreational values risk disappearing if they are 'over-managed' (see Box 5.3). However, not everybody appreciates informal aesthetics, and it can be important to deal with, for example, litter, weeds, pests or animals since 'even a minimal level of management [maintenance] could improve both perception and recreational value of informal green spaces' (Rupprecht, 2017, p. 19).

Multifunction, particularly time based, is also connected to flexibility. Flexibility over time can be necessary for long-term UOS quality, as the qualities sought change with societal changes but also for short-term or seasonal changes. Such flexibility can support community initiatives (Brinkhuijsen & Steenhuis, 2015) and allow well-functioning temporary uses, such as festivals. Some seasonal happenings connected to UOS and culture require active management, like ice skating or the traditional hanami, when springtime cherry blossoms are viewed and celebrated with picnics in specific UOSs in Japan.

Adapting to various uses

Various uses and potential conflicts

Uses of UOS shift over time and contexts, as related to various users and roles, and can be categorised in several ways. Fongar et al. (2019) describe uses as extrinsic (dog walking, foraging, play), social (meeting friends, picnics, festivities), active (running, ball games, skateboarding, qi gong), intrinsic (nature experience, mental recreation, sunbathing) and non-use (passing through, not using). Some uses can also be of several types, including walking and recreational running, and the possibilities for different activities depend strongly on local affordances.

In some of the multiple and changing uses of UOSs, users might disturb each other. Governance and management activities must, therefore, address or avoid conflicts in use (de Magalhães & Carmona, 2009). A wish among many, often young, users to affect, explore and co-create the environment has challenged UOS management increasingly over recent decades and has sometimes led to conflicts. Expressions from graffiti and skateboarding to a variety of bottom-up so-called do-it yourself urbanism taking various forms, including urban knitting (yarn bombing) and guerrilla gardening, may have historical roots (Talen, 2015) but have changed and challenged the way people use, perceive and interact in UOSs. It is often possible for landscape professionals to learn from and support these initiatives (Fabian & Samson, 2015) – for example by encouraging stewardship by users over time – rather than quick actions that might counteract UOS management goals.

Besides the challenges associated with the co-existence of several uses, crowding through the mere presence of many people can be an issue. There is a need for sufficient space, as, for example, heavy wear and tear in the use of UOSs by schools and preschools that lack their own or sufficient outdoor environments can pose challenges for managers in dealing with conflicts and maintaining the quality for other users. By

providing variety in facilities, the management can support those users who desire low densities of people (Arnberger et al., 2010).

Walking and mental recreation

A very common and multifaceted use is walking in, or just passing through or by, UOSs. Walking is facilitated in neighbourhoods with connected greenways, good accessibility to green spaces and public UOS facilities, such as gyms and gardens, a wide choice of paths and consideration of perceived personal safety and (traffic) security (Wang et al., 2016).

Walking in UOSs has lately been affected by GIS and mobile technology, with location-based games, most notably the highly used Pokémon GO (launched in 2016), encouraging various types of treasure hunts in the physical environment. These games increase the overall use of UOSs, mainly public parks and places close to water, and enable engagement from landscape professionals (Potts et al., 2017). For example, it is important to provide variation and landmarks in order to make UOSs more interesting to explore with GIS technology.

Many users seek UOS, and particularly green areas, for intrinsic motives, such as mental recreation, often to reduce and recover from stress. UOSs can be managed for mental recreation in several ways, including more free-growing, nature-like environments (Hartig et al., 2003; Grahn & Stigsdotter, 2010). Restorativeness is mainly found in biodiversity and the dimensions refuge and nature (Grahn & Stigsdotter, 2010) or where grass, shrubs and trees form a varied nature-like environment, which is more often the case in large parks (Figure 5.4) but sometimes also provided in limited spaces (Nordh et al., 2009). Although

Figure 5.4 Restorative environments with grass, trees and shrubs are more often provided in large parks than in smaller UOSs. *Photo*: Anna Bengtsson

moving in supportive environments is preferable, viewing trees, water or similar natural elements from a window can also reduce stress and blood pressure (Hartig et al., 2003).

Recreational running

Active physical activities, such as recreational running, Nordic walking and power walking, are common in UOS. Recreational running is estimated to be the second largest recreational outdoor activity in Sweden, after walking (Qviström, 2017). The increase in recreational running over time has affected UOS management in various ways (see Box 5.4). In some countries, it has had a major impact, with the development of outdoor fitness centres and trails with outdoor gyms and organisation of various sports activities related to running (Figure 5.5). Today, recreational running is a malleable and diversified practice occupying a wide range of places. The main challenge in UOS management is to accommodate all runners.

Figure 5.5 The many forms of recreational running developed lately include fun runs, here for children in a suburban park in Alnarp, Sweden. *Photo*: Märit Jansson

BOX 5.4: DEVELOPMENT OF RECREATIONAL RUNNING IN SWEDEN

Societal changes can lead to new activities in UOS, affecting management, as shown in the example of recreational running. Before the general understanding of the importance of recreational exercise for all ages triggered by the dramatic increase in lifestyle diseases in the 1950s and 1960s (Latham, 2015; Qviström, 2017), it would have been deemed out of place and physically harmful for a middle-aged woman to jog. From its early experimental phase, recreational running developed into a large movement in the 1960s and 1970s. Sweden became a forerunner in providing for recreational running, with ideas of exercise related to outdoor recreation rather than to sport (Qviström, 2016). There were at least 5,000 fitness trails for running by 1987, of which almost 2,000 were illuminated (Qviström, 2017) (see Figure 5.6). From the late 1970s onwards, the development of city marathons and fun runs has contributed to the popularity of the exercise. Large mass events can block entire city centres, sometimes combining elite sport activities with carnival-like activities (Edensor & Larsen, 2017). The ingredients of sport, everyday exercise, nature and commercial interest continue to mix and blend in new constellations, adding new forms rather than replacing old forms. More recent international trends include commuting by running, organised tourist runs, informal fun runs or 'park runs' (Stevinson et al., 2015) and bottom-up trends, such as the Swedish initiative 'plogging' – i.e. picking up litter while jogging.

Figure 5.6 The popularity of recreational running is evident in urban and peri-urban locations, like in the many trails provided in Skrylle, an area for outdoor recreation outside the city of Lund, Sweden. *Photo*: Mattias Qviström

Foraging

There is growing recognition of UOS functions for the extrinsic use of foraging (Shackleton et al., 2017). As a distinctive community of practice, foragers harvest diverse species of plants, mosses, lichens and other allied organisms, including associated materials (e.g. fruits, leaves, blossoms) for foods, medicines or raw materials for culturally or economically important items (e.g. jams, teas, baskets) (Poe et al., 2013; Hurley et al., 2015). Some foraged materials may represent an important contribution to a user's diet (Synk et al., 2017) or, in some cities, culturally appropriate wild foods and medicines for indigenous peoples (Poe et al., 2013). Foraging also supports personal connections to nature (Poe et al., 2014) and stewardship of some species, habitats and areas (McLain et al., 2017).

Foraging poses a number of challenges for UOS governance and management. A variety of UOS types (Figure 5.7), ranging from parks to cemeteries, backyards and street trees, support the activities of foragers, but harvesting of plants may be illegal in some spaces (Shackleton et al., 2017). Likewise, the extent to which existing UOS development, such as species selection, enables or constrains foraging remains understudied. Analyses of foraging supply are still rather novel – for example the recent evaluation of New York City's street trees as potential resources for foragers (Hurley & Emery, 2018). Foraging is increasingly understood as a community of practice transcending social and economic distinctions. However, research suggests that foraging practices, including the species that support these and the conditions under which they are accessed in UOS may be culturally differentiated and characterised by unequal access and involvement in the decision-making processes (Watson et al., 2018).

Adapting to various user groups

Within specific user groups, with similar though not totally homogeneous uses, perceived qualities and accessibility of UOS may differ from those in other groups. For example, the importance of social, physical and management aspects of UOS may change with user age (Laatkainen et al., 2017). Some user groups can be of specific importance in user-oriented UOS management. This is highlighted by Target 11.7 in the UN Sustainable Development Goals, which emphasises the provision of universal access to safe, inclusive and accessible green and public spaces, in particular for women, children, the elderly and people with disabilities (United Nations, 2015).

Young children and their families

Children of preschool and primary school age are among the most active users, both in terms of time spent and in the intensity of the use, but they need to be close to UOS. The use is in general different for children compared with adults, making it of specific relevance for UOS managers to take an interest in children's perspectives. Children tend to look for affordances for play and interaction in their environments. Specific facilities such as school grounds, playgrounds, skate parks and multi-sport facilities can facilitate outdoor play, but a mix with other UOSs provides richness and variety in affordances. When children of school age go about on their own, they may use, for example, playgrounds and grey

Figure 5.7 Foraging can take place in various types of UOS. (i) Foraging in vegetation in an UOS in Philadelphia, Pennsylvania, US, and (ii) by a playground in Landskrona, Sweden. *Photos*: (i) Patrick Hurley, (ii) Elin Pritzel Sundevall

spaces, such as roads and sidewalks, but also appreciate 'wild' areas, such as abandoned lots or nature for the many affordances found there (Jansson et al., 2016). Jones (2000) describes the value of *otherable space* for children since UOS that is disordered, polymorphic (allows multifunction), variable and manipulable also has permeable boundaries through which children can move between various spaces. In such otherable space, children find meaningful uses and exploit environments without being hindered.

Nature in its large variation often has a richness in affordances exceeding that in fully designed spaces. Variation in UOSs in terms of management levels, qualities and content is, therefore, interesting to children (Jansson et al., 2016). Hills and ditches, multi-stemmed and other climbing-friendly trees, shrubs, rocks and other hideouts, as well as anything that is loose or can be picked, manipulated or modified, such as mud and water, are popular elements for young children (Lerstrup, 2016) (Figure 5.8). In particular, mixing prefabricated play equipment with natural elements in large UOSs has been found to lead to versatile play (Mårtensson, 2013).

Children creating their own places (dens, bike trails, etc.) might be considered problematic from a management perspective, but it is often possible to find ways to support such initiatives. Children have an interest in construction and maintenance of UOS and sometimes also in the professionals performing these activities, which is a promising starting point for involving children in operational management activities (Jansson, 2015). Children's constructive play can also be encouraged, for example, by leaving branches to allow den

(i)

(ii)

Figure 5.8 (i) and (ii): Manipulable and mouldable elements like water provide many affordances for children and can be made accessible for play in several types of UOS, whether formal or informal, programmed or unprogrammed. *Photos*: Märit Jansson

construction (see the example in Box 5.5 and Figure 5.9)

Managers often have to deal with different ideals and thoughts concerning environments for children, as adults may find children's play disturbing, messy or dangerous. Risk often becomes a major aspect of managing UOSs for children, affected by a focus on safety standards and adults' fears. These aspects must be balanced with play values and the importance of children having access to varied, challenging and inspiring UOSs where they can learn how to handle risks (Brussoni et al., 2015). Ditches, trees, rocks, climbing structures, loose elements and water are features that children can use to develop strength, risk awareness and self-regulation. UOS managers can make UOSs accessible, enabling and interesting for children and provide knowledge and common sense in contacts with users and others.

Playgrounds are commonly provided in UOSs. Much visited playgrounds often have place-specific qualities, such as surrounding play-friendly and shading green areas, while play equipment that is perceived as new, challenging or unique generates much interest (Jansson, 2010). Adaptation to local needs and preferences is important in order to make playgrounds useful parts of a varied local landscape. In particular, fathers prefer challenging features for playing with their children and mothers prefer places to socialise (Refshauge et al., 2012). Among the aspects preferred by children on playgrounds

BOX 5.5: THE 'FOREST OF DENS' IN BRUNNSHÖG, LUND, SWEDEN

One example of managing UOS for active construction and manipulation by children is '*kojskogen*' (the forest of dens) in the area Brunnshög in Lund, Sweden. There, a forest of deciduous trees (mainly *Acer pseudoplatanus*) planted in the 1990s was converted into a place that actively invited children and others to play and build dens, supported by the local government. It was initiated in 2015 by the Swedish branch of Architecture Sans Frontières International, together with the local government and university students. The first constructions were made in willow by the artist Steen Madsen. By providing piles of willow branches, continuous construction was encouraged, both freely and as part of temporal educational activities.

Figure 5.9 The entrance area to the 'forest of dens', Brunnshög, Lund, Sweden. *Photo*: Björn Wiström

are physical challenges (climbing high, moving fast), placemaking (finding or constructing dens) and manipulation (physically affecting, using loose parts), all supported by vegetation in or close to playgrounds (Jansson, 2015). UOS managers can learn from children's perspectives to provide richness in affordances in playgrounds (Jansson, 2015). In so-called adventure playgrounds, where children construct their own play spaces supported by play workers, children's perspectives are often very well met (Figure 5.10).

Children in schools and preschools

Outdoor areas at institutions such as schools and preschools can allow children everyday outdoor experiences and related benefits.

Figure 5.10 An adventure playground in Chiba, Japan. The adventure playground movement started in the Nordic countries but has become particularly successful in Japan and provides inspiration globally. *Photo*: Märit Jansson

Many children spend little time outdoors in their free time compared with previous generations, increasing the importance of institutional areas, where approaches from both school staff and UOS managers can have large influence (Jansson et al., 2018a). Overall school ground quality can be assessed through Outdoor Environment Play Categories (OPEC) (Mårtensson, 2013), based on research findings on the need for space, shade and play possibilities. The OPEC describe three main qualities: large surface area (preferably above 6,000 square metres), varied and green content (at least half of the surface area covered by trees, shrubs or broken ground) and design (integration of areas that are open, vegetated and with play equipment) (Boldemann et al., 2011; Söderström et al., 2013). Another overarching approach is the 'seven Cs' by Herrington & Lesmeister (2007): character, context, connectivity, change, chance, clarity and challenge.

School grounds can be improved through, for example, gardening or participatory greening projects. Participation by pupils in planning and design is important to develop spaces that suit children, while participation in UOS management – for example through education-based approaches – is positive for everyday appreciation of school grounds and their development (Jansson et al., 2018a). It is highly relevant to include school grounds in the curriculum and develop them through dialogue and active participation.

Schools and preschools also use UOS outside their own grounds, such as nearby playgrounds, parks or forests, where management may have a strong influence on the play value and learning possibilities. For preschools, proximity and safe routes are of the utmost importance for visits, often to green playgrounds (Jansson & Persson, 2010) or to gathering sites sheltered from traffic and with variety, abundance, changes over the year and possibilities to manipulate objects and materials. Forest preschools prefer glades or sites by forest edges, often with slopes and access to open water (Lerstrup & Møller, 2016).

Adolescents

Adolescents are a marginalised and sometimes invisible user group, and there are difficulties in finding places that suit them and where their use is accepted (Bell et al., 2003). There are different views of adolescents as either abusive users or not, but they can use UOSs with sound relations to an understanding adult world, including UOS managers.

Adolescents often favour UOSs with social qualities for retreat, alone or in smaller groups, and for interaction, relating to others and being seen (Lieberg, 1995). Providing a number of such multifunctional settings, also allowing solitude, helps adolescents more easily find uses in UOSs. These can be organised settings, such as playgrounds if these allow sitting together (Owens, 2002) – for example, on multiple or large swings or unprogrammed structures that allow social interaction. Sport facilities, outdoor gyms and large slides can also attract adolescents, particularly in well-maintained and aesthetically pleasing settings (Mertens et al., 2019). Many also appreciate green spaces that are informal or even 'invisible', including small clearings and wooded areas (Bell et al., 2003). Owens and McKinnon (2009) found that adolescents often prefer environments supporting recreation, restoration and socialising, with nature and vegetation being of varying, often large, importance.

In school grounds, the uses of adolescents tend to be neglected, and the spaces and their management are rarely well adapted to them, often leading to limited use and sedentary behaviour, in particular among girls, with negative effects on their health. By developing several multifunctional and not too programmed places on school grounds, adolescents can find affordances, allowing multifunction, such as socialising and ball games, in well-maintained green settings (Jansson et al., 2018b).

The elderly and people in need of care

Many fragile users rarely go outdoors and if so mainly in good weather conditions (Bengtsson & Carlsson, 2013). UOS management can use strategically located windows to enhance indoor views of outdoor attractions, such as daylight, nature, plantings or places for activities and meetings. Sheltered indoor-outdoor spaces, such as winter gardens, balconies and patios, provide the possibility to connect with the outside environment (Chalfont & Rodiek, 2005), and strategic use of plants, for example, preferably developed in dialogue between users and managers, can screen and prevent access to private rooms from outside.

UOS management to suit fragile users also involves facilitating the use of parks or gardens, preferably in the immediate

surroundings of buildings and with connections to the wider neighbourhood (Bengtsson, 2015). Bengtsson and Grahn (2014) point out two overall important aspects to consider when developing and managing UOS to support fragile users – namely, managing to make people comfortable in the outdoors and supporting access to nature and surrounding life (Figure 5.11).

Providing qualities that allow people to be comfortable outdoors requires UOS managers to consider perceived safety, recognition, variation and enclosure and to listen to users concerning their comfort in the entire UOS. Perceived safety can be achieved when users feel safely enclosed but not confined, avoiding physical or psychological unpleasantness, such as risks of falling, sliding or being exposed to disturbing features or extreme content and shapes that might cause stressful reactions. The management can strive for UOSs to appear as united and natural parts of settings, with familiar features and plants that are functional year-round and support recognition, interpretation and orientation, avoiding too many impressions, with variation and options in terms of sun, shade and protection from wind and rain.

Qualities that support access to nature and surrounding life can be achieved through a *gradient of challenge*, from passive impressions in calm and secluded areas to interaction with people and natural elements in active areas. Environmental qualities can support contact with the surrounding life (views of events involving people, traffic, pets, etc.), social interaction (accessible and attractive seating for various group sizes) and impressions of human culture (e.g. elements stimulating memory). UOS management can support the

Figure 5.11 Example of how a comfortable UOS for elderly people can be safely enclosed but not confined. *Photo*: Anna Bengtsson

possibility to experience nature's various expressions with all senses and access to secluded, peaceful UOSs enclosed by greenery and preferably including water features. In relation to the continuum of the gradient of challenge, it is important for UOS management to consider users' choices on whether to confront qualities perceived as challenging or avoiding overstimulation (Bengtsson & Carlsson, 2013).

People with disabilities

Disabled people can have physical disabilities, including sensorial disabilities (such as vision and hearing) and/or mental disabilities (such as anxiety and stress-related disorders). These people may have very different needs but often encounter the common problem of being excluded from social life in, for example, UOSs (Seeland & Nicolè, 2006; Baris & Uslu, 2009).

As a basis for inclusion, the UN Convention on the Rights of Persons with Disabilities emphasises access in a broad sense and requires state parties to 'ensure to persons with disabilities access, on an equal basis with others, to the physical environment' (United Nations, 2006). Processes forming and developing UOSs, including management, can consider and involve all users rather than making additions to existing UOSs that might even increase stigmatisation (Seeland & Nicolè, 2006). One way of considering people with disabilities in a larger context is though the concept of universal design, which aims to provide environments that function for everyone. The seven principles of universal design are equitable use, flexibility in use, simple and intuitive use, perceptible information, tolerance for error, low physical effort and size and space for approach and use (Story, 2001). Universal design can be employed in many contexts, including in UOS governance and management.

People with physical disabilities face many obstacles in UOSs, limiting their independence and inclusion, but UOSs with appropriate qualities can promote their use (Botticello et al., 2014). There are a number of physical obstacles to consider, mainly in relation to people with physical disabilities. Kerb ramps can be too few, in bad condition, too steep, slippery or even blocked. Stairs need handrails or complementary elevators or ramps. The presence and width of sidewalks are important, as are placement and availability of street crossings. Nearby parking spaces specifically for the disabled may be needed. Walking paths should be clear, level and wide enough to pass and meet others (with wheelchairs). Providing the possibility to rest, especially on sloping ground, is important, preferably with shelter from the rain (Baris & Uslu, 2009; Rosenberg et al., 2013). Presence of light and pleasing aesthetics in local environments can encourage going outdoors. Providing more greenery, secluded areas and community gardens can promote social interaction, beautiful views and a variety of things to look at, including animals, children playing, water and artworks, which are appreciated among midlife and older adults with mobility-related disabilities (Rosenberg et al., 2013).

Many people with mental disabilities spend their daily life at home, with restricted experience of leisure pursuits. Visiting public UOSs requires much energy and preparation for this group and for those caring for them (Mathers, 2008). For example, people with learning disabilities prefer environments that are easily understood (Mathers, 2008). Having staff at sites, simple maps, obvious routes, smooth footpaths, cleanliness and flexible seating are adaptations that can encourage visits, as can ready

information about toilets, places to sit and other facilities (Mathers, 2008).

Ethnic minorities and immigrants

Uses and preferences for UOSs generally have many similarities across cultural and ethnic backgrounds. Good UOS management can offer affordances for social interaction and integration, which Ordóñez-Barona (2017) identified as one of the most important values for immigrants. Several studies have pointed out that high maintenance levels make UOS function well for a multicultural user clientele and support social benefits such as integration (Gobster, 2002; Kazmierczak, 2013). This could be due to many immigrants and ethnic minorities being socio-economically marginalised and having limited access to high-quality and functional outdoor environments (Ordóñez-Barona, 2017). However, some studies show that while immigrants (Jay & Schraml, 2014) and people with various ethnic backgrounds (Byrne, 2012) enjoy natural settings, they may rarely visit these because they feel unwelcome when users are predominantly non-immigrants (Byrne, 2012).

Social interaction and a sense of connection with UOSs can lead to multicultural, inclusive environments. Feelings of connectedness can be achieved by familiar plants, landscapes or activities that link homelands to the new country (Rishbeth & Finney, 2006). Other inclusive adaptations are to provide diversity of engaging activities, such as local festivals, sports or beautiful flowers (Rishbeth & Finney, 2006), functional infrastructures that allow passive social activities in large groups (Ordóñez-Barona, 2017), accessibility through openness and free access with easy wayfinding (Rishbeth & Finney, 2006; Byrne, 2012). Providing information about parks and their use to newly arrived immigrants – for example, through employing park personnel – is also valuable (Rishbeth & Finney, 2006).

Developing the role of managers for user-oriented approaches

User-oriented governance and management of UOSs require professional training for UOS managers in various positions (Fors et al., 2018). The role of managers involves facilitating services for a large variation of uses and users. Adaptation to, and communication with, multiple user groups can be a way of making UOSs useful, relevant and inclusive for more people. Participatory approaches are important, but UOS managers and their competences are also needed to balance the influence of various users and ensure that the least powerful groups, such as children, young people, the elderly, the disabled and immigrants, are given access and influence. In this respect, the role of the manager is to communicate, negotiate and explain management approaches leading to diverse qualities and functions, including, for example, cultural history and biodiversity. Managers also have an important role in finding ways to allow active involvement – for example foraging, den play, urban gardening and participation – with awareness of the ever-changing uses and user perspectives, encouraging (long-term) stewardship among users. There is a particular need to be aware of views and demands that tend to diminish the quality of UOSs or limit the value and use of UOSs for others, particularly for more vulnerable groups.

Since governance and management actions have large impacts on the content and

quality of UOSs and on people's relations to these spaces, they greatly affect the associated benefits for people. The individuality of users underlines the importance of working strategically and being user-oriented, providing for a multitude of present and future users and uses. There is a need for flexibility in UOS governance and management, as uses change over time. Beyond the physical results of UOS governance and management, activities, presence and contact with users by individual UOS managers might be beneficial to users. The role of the manager of UOS uses and users is thereby truly multifaceted.

References

Ahern, J., (2011). From fail-safe to safe-fail: Sustainability and resilience in the new urban world. *Landscape and Urban Planning*. **100**(4), 341–343.

Arnberger, A., Aikoh, T., Eder, R, Shoji, Y. & Mieno, T., (2010). How many people should be in the urban forest? A comparison of trail preferences of Vienna and Sapporo forest visitor segments. *Urban Forestry & Urban Greening*. **9**, 215–225.

Baris, M.E. & Uslu, A., (2009). Accessibility for the disabled people to the built environment in Ankara, Turkey. *African Journal of Agricultural Research*. **4**(9), 801–814.

Bell, S., Ward Thompson, C. & Travlou, P., (2003). Contested views of freedom and control: Children, teenagers and urban fringe woodlands in central Scotland. *Urban Forestry & Urban Greening*. **3**, 87–100.

Bengtsson, A., (2015). *From Experiences of the Outdoors to the Design of Healthcare Environments A Phenomenological Case Study at Nursing Homes* (Ph.D. Thesis). Swedish University of Agricultural Sciences, Alnarp.

Bengtsson, A. & Carlsson, G., (2013). Outdoor environments at three nursing homes – qualitative interviews with residents and next of kin. *Urban Forestry & Urban Greening*. **12**(3), 393–400.

Bengtsson, A. & Grahn, P., (2014). Outdoor environments in healthcare settings: A quality evaluation tool for use in designing healthcare gardens. *Urban Forestry & Urban Greening*. **13**(4), 878–891.

Boldemann, C., Dal, H., Mårtensson, F., Cosco, N., Moore, R., Bieber, B., et al., (2011). Preschool outdoor play environments may combine promotion of children's physical activity and sun protection. Further evidence from Southern Sweden and North Carolina. *Science & Sports*. **26**(2), 72–82.

Botticello, A.L., Rohrbach, T. & Cobbold, N., (2014). Disability and the built environment: An investigation of community and neighborhood land uses and participation for physically impaired adults. *Annals of Epidemiology*. **24**(7), 545–550.

Brinkhuijsen, M. & Steenhuis, M., (2015). Park design between community and professionals: The Wollefoppenpark in Rotterdam. *Journal of Landscape Architecture*. **3**, 28–37.

Brussoni, M., Gibbons, R., Gray, C., Ishikawa, T., Sandseter, E.B., et al., (2015). What is the relationship between risky outdoor play and health in children? A systematic review. *International Journal of Environmental Research and Public Health*. **12**(6), 6423–6454.

Byrne, J., (2012). When green is white: The cultural politics of race, nature and social exclusion in a Los Angeles urban national park. *Geoforum*. **43**, 595–611.

Carr, S.M., Francis, M.A., Rivlin, L. & Stone, A., (1992). *Public Space*. New York: Cambridge University Press.

Chalfont, G.E. & Rodiek, S., (2005). Building edge: An ecological approach to research and design of environments for people with dementia. *Alzheimer's Care Quarterly*. **6**(4), 341–348.

de Magalhães, C. & Carmona, M., (2009). Dimensions and models of contemporary public space management in England. *Journal of Environmental Planning and Management*. **52**(1), 111–129.

Dempsey, N., (2008). Quality of the built environment in urban neighbourhoods. *Planning Practice & Research*. **23**(2), 249–264.

Dempsey, N. & Smith, H., (2014). Understanding place-keeping of open space. In: N. Dempsey, H. Smith & M. Burton (eds.) *Place-Keeping – Open Space Management in Practice*. New York: Routledge. 13–29.

Edensor, T. & Larsen, J., (2017). Rhythmanalysing marathon running: 'A drama of rhythms'. *Environment and Planning A*. **50**(3), 730–746.

Engemann, K., Pedesen, C.B., Arge, L., Tsirogiannis, C., Mortensen, P.B. & Svenning, J-C., (2019). Residential green space in childhood is associated with lower risk of psychiatric disorders from adolescence into adulthood. *PNAS*. **116**(11), 5188–5193.

Fabian, L. & Samson, K., (2015). Claiming participation – A comparative analysis of DIY urbanism in Denmark. *Journal of Urbanism: International Research on Placemaking and Urban Sustainability*. **9**(2), 166–184.

Fongar, C., Aamodt, G., Randrup, T.B. & Solfjeld, I., (2019). Does perceived green space quality matter? Linking Norwegian adult perspectives on perceived quality to motivation and frequency of visits. *International Journal of Environmental Research and Public Health*. **16**, 2327.

Fors, H., Jansson, M. & Busse Nielsen, A., (2018). The impact of residential participation on urban woodland quality – A case study of Sletten, Denmark. *Forests*. **9**, 670.

Fors, H., Nielsen, A.B., van den Bosch, C.C.K. & Jansson, M., (2018). From borders to ecotones – Private-public co-management of urban woodland edges bordering private housing. *Urban Forestry & Urban Greening*. **30**, 46–55.

Gobster, P.H., (2002). Managing urban parks for a racially and ethnically diverse clientele. *Leisure Sciences*. **24**(2), 143–159.

Grahn, P. & Stigsdotter, U.K., (2010). The relation between perceived sensory dimensions of urban green space and stress restoration. *Landscape and Urban Planning*. **94**, 264–275.

Haase, D., Kabish, S., Haase, A., Andersson, E., Banzhaf, E., et al., (2017). Greening cities to be socially inclusive? About the alleged paradox of society and ecology in cities. *Habitat International*. **64**, 41–48.

Hartig, T., Evans, G.W., Jamner, L.D., Davis, D.S. & Gärling, T., (2003). Tracking restoration in natural and urban field settings. *Journal of Environmental Psychology*. **23**, 109–123.

Heft, H., (1988). Affordances of children's environments: A functional approach to environmental description. *Children's Environments Quarterly*. **5**(3), 29–37.

Herrington, S. & Lesmeister, C., (2007). The design of landscapes at child-care centres: Seven Cs. *Landscape Research*. **31**(1), 63–82.

Hurley, P.T. & Emery, M.R., (2018). Locating provisioning ecosystem services in urban forests: Forageable woody species in New York City, USA. *Landscape and Urban Planning*. **170** (February 2018), 266–275.

Hurley, P.T., Emery, M.R., McLain, R., Poe, M., Grabbatin, B. & Goetcheus, C.L., (2015). Whose urban forest? The political ecology of foraging urban nontimber forest products. In: C. Isenhour, G. McDonagh & M. Checker (eds.) *Sustainability in the Global City: Myth and Practice*. New York: Cambridge University Press. 187–212.

Ignatieva, M., Eriksson, F., Eriksson, T., Berg, P. & Hedblom, M., (2017). The lawn as a social and cultural phenomenon in Sweden. *Urban Forestry & Urban Greening*. **21**, 213–223.

Jansson, M., (2010). Attractive playgrounds: Some factors affecting user interest and visiting patterns. *Landscape Research*. **35**(1), 63–81.

Jansson, M., (2015). Children's perspectives on playground use as basis for children's participation in local play space management. *Local Environment*. **20**(2), 165–179.

Jansson, M., Abdulah, M. & Eriksson, A., (2018b). Secondary school students' perspectives and use of three school grounds of varying size, content and design. *Urban Forestry & Urban Greening*. **30**, 115–123.

Jansson, M., Fors, H., Lindgren, T. & Wiström, B., (2013). Perceived safety in relation to urban woodland vegetation – A review. *Urban Forestry & Urban Greening*. **12**(2), 127–133.

Jansson, M. & Lindgren, T., (2012). A review of the concept 'management' in relation to urban landscapes and green spaces: Toward a holistic understanding. *Urban Forestry & Urban Greening*. **11**(2), 139–145.

Jansson, M., Mårtensson, F. & Gunnarsson, A., (2018a). The meaning of participation in school ground greening: A study from project to everyday setting. *Landscape Research*. **43**(1), 163–179.

Jansson, M. & Persson, B., (2010). Playground planning and management: An evaluation of standard-influenced provision through user needs. *Urban Forestry & Urban Greening*. **9**(1), 33–42.

Jansson, M., Sundevall, E. & Wales, M., (2016). The role of green spaces and their management in a child-friendly urban village. *Urban Forestry & Urban Greening*. **18**, 228–236.

Jay, M. & Schraml, U., (2014). Diversity in mind: Towards a differentiated understanding of migrants' recreational practices in urban

forests. *Urban Forestry & Urban Greening*. **13**(1), 38–47.

Jennings, V., Larson, L. & Yun, J., (2016). Advancing sustainability through urban green space: Cultural ecosystem services, equity, and social determinants of health. *International Journal of Environmental Research and Public Health*. **13**, 196.

Jones, O., (2000). Melting geography. Purity, disorder, childhood and space. In: S. Holloway & G. Valentine (eds.) *Children's Geographies: Playing, Living, Learning*. London: Routledge. 28–47.

Jorgensen, A., Hitchmough, J. & Dunnett, N., (2007). Woodland as a setting for housing-appreciation and fear and the contribution to residential satisfaction and place identity in Warrington New Town, UK. *Landscape and Urban Planning*. **79**, 273–287.

Kaczynski, A.T., Besenyi, G.M., Wilhelm Stanis, S.A., Koohsar, M.J., Oestman, K.B., Bergstrom, R., Potwarka, L.R. & Reis, R.S., (2014). Are park proximity and park features related to park use and park-based physical activity among adults? Variations by multiple socio-demographic characteristics. *International Journal of Behavioral Nutrition and Physical Activity*. **11**, 146.

Kahana, E., Lovegreen, L., Kahana, B. & Kahana, M., (2003). Person, environment, and person-environment fit as influences on residential satisfaction of elders. *Environment and Behavior*. **35**(3), 434–453.

Kaplan, R. & Kaplan, S., (1989). *The Experience of Nature: A Psychological Perspective*. Cambridge, UK: Cambridge University Press.

Kazmierczak, A., (2013). The contribution of local parks to neighbourhood social ties. *Landscape and Urban Planning*. **109**(1), 31–44.

Koskela, H., (1999). 'Gendered exclusions': Women's fear of violence and changing relations to space. *Geografiska Annaler, Series B: Human Geography*. **81**(2), 111–124.

Laatkainen, T.E., Broberg, A. & Kyttä, M., (2017). The physical environment of positive places: Exploring differences between age groups. *Preventive Medicine*. **95**, 85–91.

Latham, A., (2015). The history of a habit: Jogging as a palliative to sedentariness in 1960s America. *Cultural Geographies*. **22**, 103–126.

Lerstrup, I., (2016). *Green Settings for Children in Preschools: Affordance-Based Considerations for Design and Management* (Ph.D Thesis). Department of Geosciences and Natural Resource Management: University of Copenhagen.

Lerstrup, I. & Møller, M.S., (2016). Affordances of ditches for children in preschool. *Children, Youth and Environments*. **26**(2), 43–60.

Lieberg, M., (1995). Teenagers and public space. *Communication Research*. **22**(6), 720–744.

Mårtensson, F., (2013). Guiding environmental dimensions for outdoor play. *Socialmedicinsk Tidskrift*. **4**, 658–665.

Mathers, A.R., (2008). Hidden voices: The participation of people with learning disabilities in the experience of public open space. *Local Environment*. **13**(6), 515–529.

McLain, R.J., Poe, M.R., Urgenson, L.S., Blahna, D.J. & Buttolph, L.P., (2017). Urban non-timber forest products stewardship practices among foragers in Seattle, Washington (USA). *Urban Forestry & Urban Greening*. **28**, 36–42.

Mertens, L., Van Cauwenberg, J., Veicht, J., Deforche, B. & Van Dyck, D., (2019). Differences in park characteristic preferences for visitation and physical activity among adolescents: A latent class analysis. *PLoS One*. **14**(3), e0212920.

Millington, N., (2015). From urban scar to 'park in the sky': Terrain vague, urban design, and the remaking of New York City's High Line Park. *Environment and Planning A*. **47**, 2324–2338.

Nassauer, J.I., (1995). Messy ecosystems, orderly frames. *Landscape Journal*. **14**, 161–170.

Nordh, H., Hartig, T., Hägerhäll, C.M. & Fry, G., (2009). Components of small urban parks that predict the possibility for restoration. *Urban Forestry & Urban Greening*. **8**(4), 225–235.

Ordóñez-Barona, C., (2017). How different ethnocultural groups value urban forests and its implications for managing urban nature in a multicultural landscape: A systematic review of the literature. *Urban Forestry and Urban Greening*. **26**, 65–77.

Owens, P.E., (2002). No teens allowed: The exclusion of adolescents from public spaces. *Landscape Journal*. **21**(1), 156–163.

Owens, P.E. & McKinnon, I., (2009). In pursuit of nature: The role of nature in adolescents' lives. *The Journal of Developmental Processes*. **4**(1), 43–58.

Peters, K., Elands, B. & Buijs, A., (2010). Social interactions in urban parks: Stimulating social cohesion? *Urban Forestry & Urban Greening*. **9**(2), 93–100.

Poe, M.R., LeCompte, J., McLain, R. & Hurley, P., (2014). Urban foraging and the relational ecologies of belonging. *Social & Cultural Geography*. **15**(8), 901–919.

Poe, M.R., McLain, R.J., Emery, M. & Hurley, P.T., (2013). Urban forest justice and the rights to wild foods, medicines, and materials in the city. *Human Ecology*. **41**(3), 409–422.

Potts, R., Jacka, L. & Herley Yee, L., (2017). Can we 'Catch 'em All?' An exploration of the nexus between augmented reality games, urban planning and urban design. *Journal of Urban Design*. **22**(6), 866–880.

Prellwitz, M. & Skär, L., (2017). Are playgrounds a case of occupational injustice? Experiences of parents of children with disabilities. *Children, Youth and Environments*. **26**(2), 28–42.

Qviström, M., (2011). Taming the wild: Gyllin's Garden and the urbanization of a wildscape. In: A. Jorgensen & R. Keenan (eds.) *Urban Wildscapes*. New York: Routledge. 187–200.

Qviström, M., (2016). The nature of running: On embedded landscape ideals in leisure planning. *Urban Forestry & Urban Greening*. **17**, 202–210.

Qviström, M., (2017). Competing geographies of recreational running: The case of the "jogging wave" in Sweden in the late 1970s. *Health & Place*. **46**, 351–357.

Refshauge, A.D., Stigsdotter, U.K. & Cosco, N.G., (2012). Adults' motivation for bringing their children to park playgrounds. *Urban Forestry & Urban Greening*. **11**(4), 396–405.

Rishbeth, C. & Finney, N., (2006). Novelty and nostalgia in urban greenspace: Refugee perspectives. *Journal of Economic and Social Geography*. **97**(3), 281–295.

Rode, M.W., (2016). Nature conservation as part of a multifunctional use of suburban landscapes In: F. Wang & M. Prominski (eds.) *Urbanization and Locality. Strengthening Identity and Sustainability by Site-specific Planning and Design*. Heidelberg: Springer. 323–343.

Rosenberg, D., Huang, D., Simonovich, S. & Belza, B., (2013). Outdoor built environment barriers and facilitators to activity among midlife and older adults with mobility disabilities. *Gerontologist*. **53**(2), 268–279.

Rupprecht, C., (2017). Informal urban green space: Residents' perception, use, and management preferences across four major Japanese shrinking cities. *Land*. **6**(3), 59.

Seeland, K. & Nicolè, S., (2006). Public green space and disabled users. *Urban Forestry & Urban Greening*. **5**(1), 29–34.

Shackleton, C., Hurley, P., Dahlberg, A., Emery, M. & Nagendra, H., (2017). Urban foraging: A ubiquitous human practice overlooked by urban planners, policy, and research. *Sustainability*. **9**(10), 1884.

Shams, I. & Barker, A., (2019). Barriers and opportunities of combining social and ecological functions of urban greenspaces – Users' and landscape professionals' perspectives. *Urban Forestry & Urban Greening*. **39**, 67–78.

Söderström, M., Boldemann, C., Sahlin, U., Mårtensson, F., Raustorp, A. & Blennow, M., (2013). The quality of the outdoor environment influences childrens health – A cross-sectional study of preschools. *Acta Paediatrica*. **102**(1), 83.

Sreetheran, M. & van den Bosch, C.C.K., (2014). A socio-ecological exploration of fear of crime in urban green spaces – A systematic review. *Urban Forestry & Urban Greening*. **13**(1), 1–18.

Stevinson, C., Wiltshire, G. & Hickson, M., (2015). Facilitating participation in health-enhancing physical activity: A qualitative study of parkrun. *International Journal of Behavioural Medicine*. **22**, 170–177.

Stigsdotter, U.K., Ekholm, O., Schipperijn, J., Toftager, M., Kamper-Jørgensen, F. & Randrup, T.B., (2010). Health promoting outdoor environments – Associations between green space, and health, health-related quality of life and stress based on a Danish national representative survey. *Scandinavian Journal of Public Health*. **38**(4), 411–417.

Story, M.F., (2001). The seven principles of universal design. In: W.F.E. Preiser & E. Ostroff (eds.) *Universal Design Handbook*. New York: McGraw-Hill.

Synk, C.M., Kim, B.F., Davis, C.A., Harding, J., Rogers, V., Hurley, P.T., et al., (2017). Gathering Baltimore's bounty: Characterizing behaviors, motivations, and barriers of foragers in an urban ecosystem. *Urban Forestry & Urban Greening*. **28**, 97–102.

Talen, E., (2015). Do it yourself urbanism: A history. *Journal of Planning History*. **14**(2), 135–148.

UN, (2006). *Convention on the Rights of Persons with Disabilities*. United Nations.

UN, (2015). *Sustainable Development Goals*. United Nations.

Van der Jagt, A.P.N., Elands, B.H.M., Ambrose-Oji, B., Gerőházi, E. & Steen Møller, M., (2016). Participatory governance of urban green space: Trends and practices in the EU. *Nordic Journal of Architectural Research*. **28**(3), 11–39.

Van Herzele, A. & Wiedemann, T., (2003). A monitoring tool for the provision of accessible and attractive urban green spaces. *Landscape and Urban Planning*. **63**(2), 109–126.

Wang, Y., Chau, C.K., Ng, W.Y. & Leung, T.M., (2016). A review on the effects of physical built environment attributes on enhancing walking and cycling activity levels within residential neighborhoods. *Cities*. **50**, 1–15.

Watson, K., Christian, C.S., Emery, M.R., Hurley, P., McLain, R. & Wilmsen, C., (2018). Social dimensions of nontimber forest products. In: J.L. Chamberlain, M. Emery, R. Marla & T. Patel-Weynand (eds.) *Assessment of Nontimber Forest Products in the United States Under Changing Conditions*. General Technical Reports SRS–232. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station.

Weeler, B.W., Lovell, R., Higgins, S.L., White, M.P., Alock, I., Osborne, N.J., Husk, K., Sabel, C.E. & Depledge, M.H., (2015). Beyond greenspace: An ecological study of population general health and indicators of natural environment type and quality. *International Journal of Health Geographics*. **14**, 17.

Wu, Y. & Wareham, J., (2017). Perceived risk of crime: A tale of two immigrant groups in Metro Detroit. *Journal of Ethnicity in Criminal Justice*. **15**(2), 117–137.

All figures are used with permission.

6 Ethical dimensions in urban open space governance and management

Nina Vogel, Finn Arler, Natalie Gulsrud and Märit Jansson

Why do ethics matter?

Although it might not always be obvious to the beholder, landscapes are not neutral or natural but are the result of many different values and ideas, which have shaped them through the many human activities that occur there. According to Jorgensen (2016, p. 2), it is 'inevitable that political, economic, social and cultural inequalities become enshrined in landscape itself, creating unequal access not only to natural goods and resources, but also to the embedded processes that determine how landscape is shaped and represented'. Considering this, ethics are, or should be, a basic component when landscapes and urban open spaces (UOSs) are being shaped. Ethical considerations lead decision makers and managers beyond immediate and private needs and encourage responsibility for the common good, as well as concern for future generations and other species – for example animals and plant life. In UOS governance and management practices, an ethical approach will typically promote values, such as democracy, social inclusion, justice and equal opportunities. A particular focus in this chapter is, therefore, on vulnerable societal groups that are disadvantaged and need particular recognition and support.

There is reason to believe that an urban environment that ignores ethical concerns is also less resilient (Barrett et al., 2016). Discounting vulnerable groups may foster distrust, crime, weak community bonds, narcissistic tendencies and populistic politics. Barrett et al. (2016) present the ethical city as a meta-concept covering existing models of resilient, sustainable and just urban development to which management approaches and governance arrangement can contribute.

Urban developments and lifestyles have impacts far beyond local geographical boundaries and time frames, as they can influence people far away, future generations and other species (Vogel, 2015). The ways in which people eat, build, arrange transport and manage UOSs have an impact on climate, biodiversity, etc., and may have far-reaching consequences. Consequences

of decisions and actions, therefore, need to be scrupulously recorded and critically assessed from an ethical perspective, particularly if they create path dependencies with a more permanent impact on the quality of environments for humans and other species. Therefore, UOS management can be perceived as spatial expressions of ethical configurations.

The role of ethical considerations is often underestimated due to the fact that it permeates all sectors of society, including law, politics, economics and planning to such a degree that people tend to overlook its presence and determining influence. Ethical concerns often work as a kind of tacit knowledge in the societal fabric, where past struggles over rights and limits have disappeared and self-evident concerns have taken over. Explicit disputes around ethics mainly appear in situations of conflict. Current debates on urban development occur in multiple domains, from local questions of affordable housing, common rights to the city, resource allocation, social justice, etc. (Barrett et al., 2016), to wider concerns, such as climate justice or biodiversity losses. These challenges are often described as wicked problems, as they have complex interdependencies and are often difficult to fully recognise.

Core challenges concerning UOS governance and management include social questions of inequality in access, quality and use and the need to embrace the diversity of local stakeholders but also the distant victims of more wide-ranging impacts in time or space. Ambitions of CO_2 neutrality, reducing distant impacts of urban living, etc., are new, more ecological issues on the ethical agenda for cities. Fainstein's (2011) three core criteria of a just city (equity, democracy and respect for diversity) are, therefore, relevant but must be complemented with long-term sustainability and concern for other species.

Today, local government environmental policies and guiding principles are often based on international conventions, such as the New urban agenda connected to Habitat III (UN, 2017) and the Sustainable Development Goals (SDGs) (UN, 2015). These serve as frameworks that attempt to safeguard ecological and social values in urban development. They can also serve as a basis for understanding, discussing and implementing shared values at a global scale. However, implementation at a local scale is still needed and may lead to new challenges and disputes when the overarching goals are concretised locally.

Building an ethical argument

Ethics and their purpose can be understood from various perspectives and on several levels (Box 6.1). In general, ethical concerns are of two kinds (Arler, 2002):

1 Concerns relating to questions of values and 'the common good'. In the case of UOS governance and management, values may be related to, for example, preservation of biodiversity, protection of features of historical significance, access to landscape resources or concern for distinctive elements that determine specific characteristics of the landscape. Values are also related to human ambitions of furthering the common good in the landscape, whether this is primarily conceived as economic growth, environmentally friendly development or rewilding.
2 Concerns relating to considerations for others. The demand for impartiality and universalisation means that all relevant parties ought to be taken equally into consideration. This is

BOX 6.1: ETHICS AND THEIR PURPOSE

Ethics are moral considerations that govern a person's behaviour or an institution's actions. The overall purpose is to identify actions, projects, rules, plans, institutions, etc., that can be justified with reasons that ought to be universally acceptable in a given set of circumstances. One's actions, projects, etc., must be justifiable impartially to oneself as well as to others without using special standards for oneself or for one's close relations.

Often a distinction is made between meta-ethics, dealing with the nature of ethical properties, statements, attitudes and judgements; normative ethics, focusing on general standards and arguments that are relevant for assessing right and wrong behaviour; and applied ethics, referring to the practical application of moral considerations. The three levels can be difficult to separate, however.

particularly the case with individuals who are exposed and vulnerable to negative impacts of a proposed change of action, but it is also a general concern that appears in various shapes. In Western law, for instance, protection of individual human rights is a growing concern. Democracy and user participation are other ways of taking all relevant parties into consideration. Public impact assessments can be seen as a way of showing ethical considerations, as they explicitly strive to include substantial impacts on all people and have the explicit goal of furthering human welfare and freedom.

The palette of ethical concerns in the landscape profession is broad. For example, ethical concerns arise regarding the complexity of an agricultural system that involves farming vast amounts of cheap animal products for food, often at the expense of animal welfare, human health, biodiversity, environmental concerns, landscape accessibility and climate change. Ethical concerns relating to equity and justice in the distribution, benefits and decision making around UOSs are also increasing (Rutt & Gulsrud, 2016). Managers need to be aware of those parameters in their work from policymaking to more daily operational decisions. This may require spatial re-designs for more inclusive settings or intensified dialogue with relevant actors to genuinely understand (missing) user values within UOS. More generally, the field of environmental justice deals with how environmental and social differences are intertwined and with processes through which environmental inequalities arise and are maintained (Walker, 2012; Perez et al., 2015). For example, a 'fair' distribution, and thus equal access to high-quality UOSs and associated health benefits, is an ethical concern.

Environmental ethics

Explicitly stated ethical considerations will inevitably change. Some concerns disappear from the public realm and become tacit knowledge that is no longer disputed, whereas others emerge along with new conflict areas. The form and content of the disputes are influenced by discourses in

different cultural contexts and historical periods, as established ways of thinking are continually challenged by new emerging ideas. This is the case with environmental ethics, which has emerged as a new focus area with explicit influence on landscape professions and on governance and management practices in UOS.

Environmental ethics are concerned with humans' relations with their environment and the conflicts and considerations relating to treatment of organisms and other features there. This includes a variety of issues from global challenges, such as climate change and biodiversity losses to more local or regional questions concerning, for example, acidification and concern for wildlife but also issues such as preservation of significant landscape features, access and influence.

The development of environmental ethics is often presented as a ladder, where an increasing amount of concerns are included (Table 6.1). The first move is from the egocentric actors, who exploit everybody else if possible, to the moral actors, who respect and care for fellow humans and may be aware of the long-term usefulness of treating the environment kindly. This is what Arne Næss (1973) calls 'shallow ecology'. The next move, to a nonanthropocentric realm, is to include other species, initially only animals with an advanced sensory system but later other organisms in the circle of moral standing in a kind of biospheric egalitarianism, where equal respect and care are obligatory. In the final move to deep ecology, ecosystems as integrated wholes are included among the objects deserving respect.

The ladder model is attractive due to its simplicity, but it has a number of problems related to it. First, the interpretations remain anthropocentric all the way through, in the sense that it is always human beings who interpret, not other species. Second, biospheric egalitarianism can quickly develop into a moral nightmare, as pointed out by one of its defenders, Albert Schweitzer (1969). Theorists like Paul Taylor (1986) and Robin Attfield (1991) have tried to avoid this by making rules about which concerns should come first but not without encountering major problems (Arler, 2009). The idea that ecosystems have goals of their own that must be respected can also be problematic as humans are part of them.

The discussion on environmental ethics has influenced landscape professionals

Table 6.1 The ladder of environmental ethics

• Anthropocentric = interpreting the world in terms of human interests, values and experiences	Egocentric – dominated by self-interest, both fellow humans and other species are considered resources to be exploited, mutual advantage of common laws Homocentric – includes mutual respect among humans, welfare and social justice values, recognition of dependencies between human and non-human nature, stewardship of the natural world
• Non-anthropocentric = interpreting the world by also granting moral standing to natural objects, such as animals, plants, ecosystems or landscapes	Biocentric – includes moral significance to animals (and sometimes plants) as part of the biotic community, humans as equal parts of nature with equal rights to all Ecocentric – focused on ecosystems more than individual life forms, assumes that ecosystems have goals of their own that are worthy of respect

Source: Based on a table in Thompson, 1998, pp. 177–179

very differently over time (Thompson, 1998). The period from the late 19th century, when nature protection organisations emerged, until the 1960s was dominated by aesthetic values and concern for rare species and unique landscape features. Environmental damage was primarily seen as an aesthetic problem and ecological balance mainly appreciated due to its 'beautification' of landscapes (Colvin, 1970).

The North American tradition is somewhat different from that in Europe for several reasons, including a history of colonisation where landscapes and peoples were 'tamed' (Gasteyer & Flora, 2000) and a long religiously inspired concern for remaining wilderness areas and wildlife regarded as remnants of divine creation (Nash, 1982; Oelschlaeger, 1991). Such landscapes are preserved and protected in national parks (Muir, 1991). This concern has later been supported by ecological justifications with ecocentric undertones. Aldo Leopold's *Sand County Almanac* (1949) is famous for the claim that 'the land' is the centre of concern. Later, in the 1970s, American watercourse protection was established with pristinity as an ultimate goal. This has later been adopted by the European Union (EU) in the Water Framework Directive, where the highest score is given to water areas that appear as though they have never been touched by humans (EC, 2000). Another related, still very active, approach is 'rewilding', a concept with various meanings but which basically involves diminishing the influence of humans in substantial areas into which large animals are reintroduced (Vera & Buissenk, 2007; Nogués-Bravo et al., 2016).

The period from the 1960s to the 1980s was characterised by a more pronounced awareness of environmental concerns, starting with Rachel Carson's *Silent Spring* (1962) and later taken to a new level through – for example Paul and Anne Ehrlich's books about human overpopulation, resource problems and environmental degradation (Ehrlich & Ehrlich, 1970). This was reflected in landscape-related works, such as *Design with Nature* (McHarg, 1969) and *Landscape Planning: An Introduction to Theory and Practice* (Hacket, 1971). In this tradition, the stronger attention to the ecological values of landscapes and nature did not lead beyond the anthropocentric realm.

In the concept of sustainable development, which emerged in the International Union for Conservation of Nature strategy from 1980 (IUCN, 1980), awareness of planetary boundaries and environmental pollution consequences was combined with global societal awareness. This was later elaborated upon and popularised in the so-called Brundtland Report (WCED, 1987). The main message was that economic growth and environmental concerns could both be met by making gentler and more efficient technologies. This was later codified in the 'ecological modernisation' movement in the 1990s, promising economic success and environmental protection at the same time (e.g. Hawken et al., 1999).

Ecological humanism or 'eco-humanism' (Brennan, 1988) is a pragmatic approach related to environmental ethics, according to which ecosystems provide human life not only with necessary resources but also with spiritual and emotional values. This approach was predominant in the concern for biodiversity that emerged during the 1980s and culminated in the adoption of the Biodiversity Convention in Rio in 1992 (UN, 1992) and the EU Habitat Directive in the same year (EC, 1992). Since then, it has been common to talk about ecosystem services (see Chapter 8) in a broad way, covering not only 'provisioning' services, such as deliveries of food and energy, together with necessary 'supporting'

and 'regulating' services, but also a variety of 'cultural' services (MEA, 2005).

Even though the homocentric approach has been strong, voices that value the protection of *all* species continue to be present (McNeely et al., 1990). If all arguments for the preservation of biodiversity were related to servicing human survival, we might manage with a smaller number of species than now, but other arguments are also made (Arler, 2009). These include German philosopher Immanuel Kant's concept of 'disinterested' interests (Kant, 1974) – i.e. interests that do not reduce other species to servicing means for human welfare and satisfaction but emanate from a purer fascination with organisms and their beauty, intricate lives and evolutionary narratives (Arler, 2009).

Environmental ethics applied in landscape professions

Environmental ethics and its development can serve landscape professions, such as UOS managers who play a crucial role in offering a form of development that incorporates ecological responsibilities, and represents a diversity of life support services. Ethical concerns are represented, for example, in the codes of ethics and conduct established by the overarching organisations of the landscape professions in order to help members adhere to commonly agreed upon standards and appropriate professional behaviour (see Box 6.2).

BOX 6.2: CODES OF ETHICS IN LANDSCAPE ARCHITECTURE

There are codes of ethics developed by associations for landscape professionals such as the European Region of the International Federation of Landscape Architects (IFLA Europe) and the American Society of Landscape Architects (ASLA), serving professionals as ethical guidelines and common sense indicators for good practice. ASLA has developed a professional code of ethics and an environmental code of ethics to guide standards in this professional discipline. Violation of these codes of ethics can result in the loss of the licence to practice in the landscape professions.

The following are the main statements of the ASLA Code of Environmental Ethics (ASLA, 2000):

- The health and well-being of biological systems and their integrity are essential to sustain human well-being.
- Future generations have a right to the same environmental assets and ecological aesthetics.
- Long-term economic survival has a dependence on the natural environment.
- Environmental stewardship is essential to maintain a healthy environment and a quality of life for the earth.

Landscape justice

Setten et al. (2013) call for increased engagement in questions concerning environmental justice and specifically the emerging term landscape justice to arrive at a better understanding and identification of ways to cope with challenges concerning, for example, power distribution in decision-making processes or deprivation of rights. Main inequalities faced may concern access, ownership and connection at various scales. Landscape justice deals with challenges concerning equality, justice and distribution of power and raises critical ethical considerations, as ecosystems and their elements (trees, water bodies, parks, etc.) are considered environmental goods. Therefore, it is important to consider how equitably these goods are distributed and to what degree diverse actors are engaged in decision making and management. Nesbitt et al. (2018) raise two dominant concerns regarding landscape justice: the spatial distribution of UOS and the recognition of diverse actors and their values in related decision making. Spatial distribution determines who has access to UOS and the quality of that space. Procedural recognition touches on who defines the rules of UOS decision-making processes and how diverse voices are included and acknowledged in both formal and informal decision-making processes. Both aspects touch on the ethical considerations of inclusion and exclusion in UOS governance and management.

Distribution of UOS is a key environmental justice concern (Walker, 2012) related to the distribution of environmental goods, such as spacious high-quality parks and environmental bads, including toxic industrial land and polluted water bodies. Despite this, numerous examples illustrate that the distribution of UOS and, specifically, vegetation is often inequitable globally (Heynen, 2003; Buijs et al., 2016; Nesbitt et al., 2019). High-quality UOSs are more frequently located in wealthier neighbourhoods (Poudyal et al., 2009), while lower-income and ethnically diverse neighbourhoods are more often associated with lower levels of tree canopy cover (Schwarz et al., 2015; Nesbitt et al., 2018). Ethnically and socioeconomically diverse users are sometimes excluded from UOS governance and management processes (Buijs et al., 2016) and feel a lack of control over UOS resources (Heynen, 2003). Studies show that ethno-cultural preferences and a lack of 'sense of belonging' impact the distribution of cultural goods in UOS development, raising the question of which services are provided through ecological networks and for whom (Byrne, 2012; Gulsrud et al., 2018).

The management of UOS could be strengthened by more examinations of differentiated distribution of various UOSs and the implications over time, alongside explorations into pluralistic notions of quality (Rutt & Gulsrud, 2016, p. 124). Examples of this include resident-driven indicators of quality of diverse UOSs. Such actions could assist in analysing what physical and economic changes related to UOS governance and management mean for diverse social groups over time (see also Chapter 8 for a discussion on valuing UOS). Another key aspect of landscape justice for UOS governance and management is the way in which actors are included, and feel included, in decision-making processes. Some have called for procedural justice to include explicitly democratic processes, but these can be interpreted in many ways. In procedural environmental justice, 'fairness' is thought to be dependent on more than concrete outcomes but equally on how persons are treated or expect to be treated (Low,

2013; Rutt & Gulsrud, 2016). This relates to how power is considered in the governance processes of UOS. Some considerations include how personal, cultural and emotional access in physical UOS differ between diverse users and how decisions around such spaces are negotiated, accepted and contested over time (Rutt & Gulsrud, 2016).

Sustainable development targets from a global to local scale

Many policy domains are incorporating global to local directives on how to govern urban spatial development. Some are binding, others more guiding or visionary. However, any policy needs to be implementable in a local context to have an impact. Sustainability goals have been criticised for lacking measures (Vogel, 2015), guiding function and connection to everyday life, which can explain the disempowering effect of disconnected sustainability goals (Hajer & Versteeg, 2005). Contemporary societies can critically assess and renew agreed upon conventions to safeguard human rights, equal treatment and well-being for all societal members. This includes the UN Convention on the Rights of the Child from 1989 and the UN Convention on the Rights of Persons with Disabilities from 2006 (UN, 2006), as well as the European Landscape Convention (CE, 2000) and the SDGs agreed upon in 2015 (UN, 2015).

The 17 SDGs – and the related 165 sub-themes – reflect the main challenges considered by the current group of global leaders. These range from no poverty (SDG 1) and quality education (SDG4) to responsible consumption and production (SDG 12) and climate action (SDG 13), to name a few. Particularly interesting for UOSs are goals concerned with sustainable cities and communities (SDG 11), gender equality (SDG 5) and good health and well-being (SDG 3). However, all goals are interrelated and represent a comprehensive set of targets and ambitions. It is quite remarkable that there is global consensus on a broad spectrum of ethical concerns, some of which may even have become trivial and self-evident in some parts of the world, although it is obvious that explicit implementation of the agenda will continue to be the subject of political controversy and conflict.

These and other conventions need to be translated to particular development contexts in order to act as meaningful measures for local governments. Thus researchers and administrations are increasingly engaging in, and assessing the possibilities for, a meaningful process to integrate these goals in actual governance and management (Valencia et al., 2019). For example, the SDGs can potentially have transformative capacity but need coherent governance, political will and new collaborations (Valencia et al., 2019). They may also represent an 'ethical turn' related to sustainable development, going from the three pillars to a new normative model of human needs, social equity and environmental pillars (Holden et al., 2016, p. 214).

The European Landscape Convention (CE, 2000) interprets landscapes as affected by people's actions and can thereby provide a starting point for a holistic discussion on landscape justice with connections to human rights. This is valuable as the pluralistic landscape, particularly in the urban context, will comprise conflicting and competing targets that need to be debated in each particular setting. Here an ethical lens can guide the assessment of synergies and trade-offs as part of continuous monitoring of consequences of global targets for local practices, possibly prompting reorientation and amendments.

Approaches to applied ethics

There are certainly different rationales and value systems, as well as personal preferences and behaviours, underlying professional action and decision making concerning UOS governance and management. For critical practitioners and/or theorists, it is of interest, if not a necessity, to be aware of those value-laden systems of thought. The question then arises as to which of these could be applied to support decision making, reflection on decisions and their possible impact. Different conceptual approaches can incorporate ethical considerations in the development of UOS, building on the main strands of environmental ethics and landscape justice and their link to UOS governance and management. The parameters worthy of moral consideration cannot be predefined as such, but a 'fair' dispute on what to consider may result in more just decisions.

A model on ethical obligations

Ethical considerations are not only relevant in relation to local contexts and people. As illustrated clearly with the current concern about climate change, actions and decisions have impacts far beyond the local area, both in space and time. Figure 6.1 illustrates three dimensions relevant to include (Arler, 2004). The axis representing the dimension of time differentiates between past generations, current generations, near generations and distant generations. The circumstances of past generations cannot be changed, but past decisions may continue to influence current decisions, just as creations of the past (buildings, UOS structures, practices, etc.) are often highly relevant for current choices. The main concerns relate to current and nearest future generations (children and grandchildren), but they should not overshadow concern for people further away in time. Sustainability is basically another word for impartiality across generations, so even though concern for people close to us in time is intense and comprehensive, the weaker concern for people further away still dominates. Efforts to support the nearest generations should not be accomplished at the expense of future people, as stated in the Brundtland Report (WCED, 1987).

Similar points can be made in relation to the axis representing space and culture. Obviously, our major concerns are related to people close to us (family and friends), and we participate in political communities, for example nations, that take a special interest in members of the community. Again, this special concern should not be performed at the expense of people further away. General concerns trump special concerns. It is fair to be partial to family and fellow members of one's community, but this partiality should not overrule the impartial claim to let everybody else have the chance to do likewise.

The third and final axis represents species (and other natural phenomena) that are either close to or far from us in origin. Often, we mainly care about humans but tend to make restrictions on how to treat members of other species, for instance in relation to food production. We distinguish between species and make stricter regulations in relation to those with qualities such as an advanced nervous system. This does not mean that we can remain indifferent to other species, but our concern is of a different kind. Therefore, it can be fascinating to ponder what impartiality across species (or biospheric egalitarianism) might imply (Arler, 2009).

Figure 6.1 can be used as a checklist for mapping relevant ethical considerations in a variety of situations where decisions about UOS are made. When a road is built, a new building is erected or a playground is re-constructed (from imported hardwood), the consequences may be significant far beyond the local area due to climate change and biodiversity decline. First of all, however, the diagram is a reminder that all decisions may affect individuals beyond our narrow circles and that we are constantly forced to assess whether our comprehensive concerns for people close to us can be justified and are compatible with other people's equally legitimate concerns for friends and community.

Norm-critical/creative approaches

'Having a norm-critical perspective means to explore and visualize norms that affect our actions, values, and beliefs' (Jonsson & Lundmark, 2014, p. 3). Norm-critical approaches deal with social norms and their implicit or explicit power relations. Studies engage with revealing and understanding possible inequalities as regards sexuality, gender, class, race, ethnicity or religion; how to offer alternatives to given norm structures; and how to transform them (Jonsson & Lundmark, 2014). As such, norm-criticism is a means towards more just societies, offering important insights to reassess and reflect on value systems underlying ethical, and thus normative and moral, principles.

This is relevant when dealing with the quality of functions (see also Chapter 3) and particular values (see also Chapter 8) of UOS. Professionals in the development of UOS need to be sensitive to the different user groups benefiting from the space. This includes those who may not be present or even excluded and why. Questions

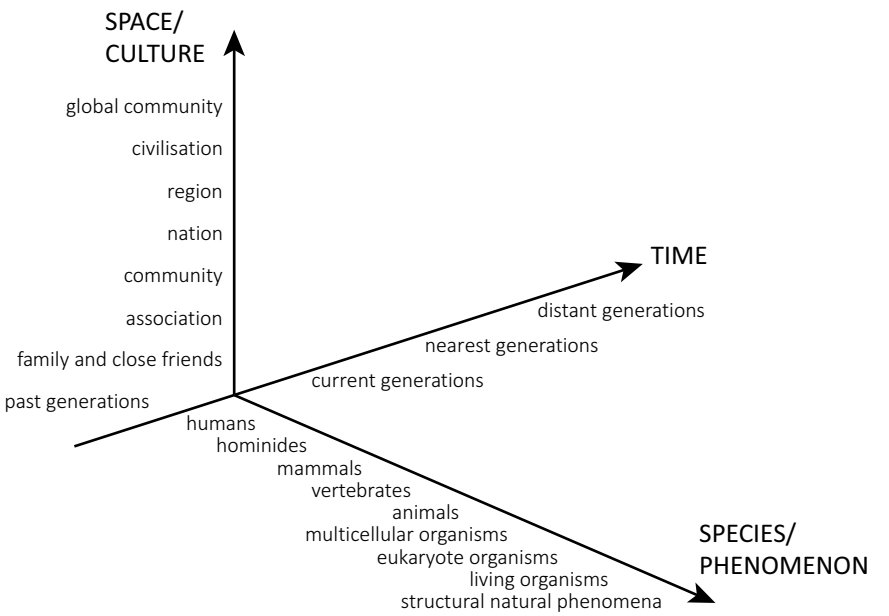


Figure 6.1 Three dimensions of ethical considerations: time, space/culture, and species. *Source*: Reproduced from Arler (2004), with permission from *UNESCO–Encyclopedia of Life Support Systems*

arise that concern accessibility to an UOS, user groups' needs and values, as well as acceptance of different societal groups there. UOS managers may initiate or facilitate user involvement. Participatory approaches can explore new processes for UOS development driven by users' needs and ideas or even involve them as co- or self-managers of explicit spaces. These often temporary project interventions can be curated by professional organisations other than the local government (see Box 6.3 and Figure 6.2), as processes may stretch beyond the typical time frame and use of resources generally employed (see also Chapter 7).

BOX 6.3: DISORDER

Disorder installs democratic architecture – Disorder, an experimental and research-based collective by landscape architects Karin Andersson and Johanna Bratel, claims that 'we are not playing with kids – we are developing Sweden's democracy'.

The case

Rosengård Centrum, in the disadvantaged neighbourhood of Rosengård in Malmö, Sweden, has the city's second most, well-visited library. People go there to read newspapers, use computers, play chess or draw with their children. Just outside the library is a mini-square that only received a name, Biblioteksplatsen (Library Square), in 2017. Despite being centrally located along the main path for pedestrians and cyclists, the site used to be rundown, mismanaged and neglected, described as scary and dark, perceived as only used by men and avoided by teenage girls.

Core actors

Disorder – a landscape architecture team as the project lead, local residents (in particular children and teenagers), local social institutions, owners and the local government.

The process

In spring of 2016, Disorder started a commission for the urban redevelopment process with the focus on developing public space through dialogue and co-creation. Biblioteksplatsen had great potential for being a meeting place for local residents due partly to its central location and defined area and partly to the multiple social institutions adjacent to it. The local library and the youth club Tegelhuset were very keen to collaborate to improve the site. Disorder proposed a temporary architectural installation in one summer as a test of how to alter the use of the site in a collective design process with local children and teenagers, which ended in a grand opening. User empowerment has been the foundation for this process. Disorder's aim has been to provide the participants with all the knowledge they need to be able to engage to their full extent. Thus they worked from the motto 'knowledge is power' and that the knowledge people

gained will be useful to them in the future. In that sense, Disorder regards this method as a way to strengthen democracy.

Lessons learnt

- Being on-site and engaging with people, playing, talking and eating are of the utmost importance in building genuine involvement and truly exploring the site.
- Avoid project fatigue: People need to see and experience that their input is valued, valuable and leads to actual change.
- The diverse roles of landscape architects became obvious during this process – for example as facilitators between local government, property owners, residents and other local stakeholders.

Outlook

The end of the process can be questioned and considered an ethical problem, as it would have been valuable to continue to activate and appropriate the site in collaboration with more user groups, as a social management strategy to keep local stakeholders caring about the space. It is important that participatory processes include all relevant ethical aspects, including the dimension of time.

Figure 6.2 Child participating in the on-site collective design process at Biblioteksplatsen. *Photo:* Karin Andersson

Trends of co- and self-governance and forms of stewardship

New trends of collective action are entering the practice of urban development, reclaiming community values, managing shared resources and hence appropriating urban commons (Vogel, 2017). These include co- and self-governance and management practices that include a multiplicity of actors and flexibility concerning time frames and scales for action (Vogel, 2017). Some reasons for these new approaches are frustrations with given policies and conditions in the built environment that, for example, reflect unequal access to UOSs and increased privatisation of public goods. New forms of spatial appropriation and collective governance and management practices provide a basis for negotiations about the use and function of UOSs and collaborative forms concerning resource management and use (Oswald et al., 2013; Diedrich, 2013; Vogel, 2017; Parker et al., 2018).

Often, these new uses are of a temporary character and represent high adaptability and flexibility to counter uncertainty and sudden shifts in urban development. They allow new collective decision making and empower actors who might otherwise not take part to explore and test UOS functions and form (see Figure 6.3). Increasingly, local

Figure 6.3 Prinzessinnengärten (Princess Gardens), Moritzplats, Berlin, Germany, was a wasteland for over 50 years. Now, transportable containers are used for growing organic fruit and vegetables on the site. The organisation Nomadisch Grün (Nomadic Green) created this community garden to increase biological, social and cultural diversity in the neighbourhood and pioneer a way of living together in the city (see also prinzessinnengarten.net). *Photo*: Nina Vogel

governments are involved and see temporary uses as an urban redevelopment opportunity that stimulates and creates new uses, values and identities (Parker et al., 2018) (see Figure 6.4). However, there are certainly both potential and pitfalls with temporary uses. Democracy can be supported by deeper and more varied participation in UOSs, realising alternative urban developments, but conditions of precarity for those developing and using UOSs can be reproduced and people's capacity in building meaningful spaces abused (Parker et al., 2018).

The recognition and inclusion of socially marginalised and frequently ignored groups is critical to a just outcome of UOS governance and management. Social identities are closely bound to, and largely shaped by, societal norms and dominant sociopolitical narratives, including the portrayal of multi-cultural groups in the media. According to Rutt and Gulsrud (2016), recognition-based justice calls for the acknowledgement of typically excluded social groups (e.g. migrants, women, people with disabilities and the elderly) and their meaningful inclusion in political spaces (Fraser, 2010). Recognition has an enormous influence on how distribution and procedures occur in UOS management. Moving forward, it is critical to consider how groups are identified in UOS governance processes and how this impacts participation. It is also critical to consider how different experiences and understandings of UOS purpose, use and management reflect or contest dominant sociopolitical narratives (Rutt & Gulsrud, 2016).

Figure 6.4 Covered meeting space and community garden within #Pixlapiren (the Pixel Pier), an urban commons project on a disused ferry terminal in Helsingborg, Sweden, initiated by the local government. *Photo*: Nina Vogel

New trends of collective governance and stewardship show promising potential in accounting for distributive and representative aspects of justice and equity in UOS governance and management. The case of #Pixlapiren can also be seen as an example of novel governance approaches in the making (see chapter 2). In Copenhagen, Denmark, the social cooperative ByBi (Urban Bee) provides a rich case study of how collective and stewardship-based forms of UOS governance are enabling new, ethically desirable procedures and voices (see Box 6.4).

BOX 6.4: BYBI

The social cooperative ByBi (Urban Bee) aims to enrich the environment through urban beekeeping, based in the belief that everyone has something to contribute, whatever their background (see also http://bybi.dk/om_bybi/).

The case and process

ByBi is a social cooperative that rents beehives to public, private and social organisations in the city of Copenhagen, Denmark. The beehives are housed around the city, often on rooftops (Figure 6.5), and ByBi is responsible for more than 250 bee colonies all over Copenhagen and for processing and selling the honey produced.. In addition, ByBi facilitates events and tours, organises courses for schools and non-profit housing associations and sells the products, mostly directly to employees in the collaborating businesses.

Figure 6.5 ByBi Beekeepers checking their hives on a rooftop in Copenhagen. *Source*: ByBi – www.bugsfeed.com/bybi_urban_beekeepers_of_copenhagen – creative commons licence

Core actors

The social cooperative ByBi works in collaboration with public, private and social organisations in the city of Copenhagen and a broad range of people within civil society, from the homeless and refugees, to schoolchildren, migrants, women, people with disabilities and the elderly.

Lessons learnt

- This circular model of production directly relates to UOS governance by actively collaborating with many actors, contributing to the general distribution of quality UOS for people and highlighting the importance of insects.
- New voices and perspectives are added to the governance of UOS through ByBi's collaborative model of networking, generating social and natural values.
- Actors are simultaneously collaborators, stewards and producers and thereby acknowledged as meaningful participants in the governance of UOS.
- Impacting the UOS governance can support local policies to create more and higher quality UOS with users.

Outlook

UOS stewardship in this case moves beyond the human, as co-production is understood in a broad sense, encompassing both human and non-human interaction and technology. This is a radical shift in power allocation from the human to the more than human, supported by theory from environmental ethics and environmental justice in terms of how equity can and should play out in UOS.

Conclusions – changing roles and capacities

This chapter introduced ethics as an integral part of human life and described its decisive influence on the existence and quality of desirable environments for human and non-human species. An ethical lens on UOS governance and management practices allows managers to reflect on decisions made and to assess their wide-ranging consequences. This not only concerns the local impact of development projects and practices but also wider issues of inclusion/exclusion of affected people, species and themes. An ethical perspective challenges the short-term and narrowly defined character of decision making and requires longer-term strategies, even though they may be more complex and costly in the short run. By critically assessing the consequences of actions, for vulnerable societal groups in particular, differing needs are recognised that may explain user behaviour and possible conflicts. More ethical reflection in UOS development will benefit more societal members and likely be more cost-effective. Further, ethics can challenge the conception of 'human needs' as always superior to those of other species, a conception that often leads to self-destructive exploitations of natural environments and resources and damages biodiversity and ecosystems. This broadens the horizon of the impact assessment

of UOS governance and management and points in the direction of increased interdisciplinary and transdisciplinary work modes in all landscape professions.

Local governments may strengthen and legitimise new forms of development and decision making by offering clear mandates and policy support and develop interdisciplinary and transdisciplinary capacity with high awareness of ethical considerations to facilitate applied ethics in a local context. This will be needed to cope better with today's and tomorrow's wicked problems.

References

Arler, F., (2002). Miljøetik – en introduktion. In: F. Arler (ed.) *Humanøkologi. Miljø, teknologi og samfund*. Aalborg: Aalborg University Press.

Arler, F., (2004). Distributive justice and sustainable development. In: G. Barbiroli (ed.) *Principles of Sustainable Development. Encyclopedia of Life Support Systems*. Oxford: Eolss Publishers.

Arler, F., (2009). *Biodiversitet. Videnskab Kultur Etik. Vol. I-II*. Aalborg: Aalborg University Press.

ASLA (2000). ASLA Code of Environmental Ethics. [October 2019] www.asla.org/ContentDetail.aspx?id=4308

Attfield, R., (1991). *The Ethics of Environmental Concern*. Athens and London: University of Georgia Press.

Barrett, B.F.D, Horne, R. & Fien, J., (2016). The ethical city: A rationale for an urgent new urban agenda. *Sustainability*. **8**(1197), 1–14.

Brennan, A., (1988). *Thinking about Nature: An Investigation of Nature, Value and Ecology*. London: Routledge.

Buijs, A.E., Mattijssen, T.J.M., van der Jagt, A.P.N., Ambrose-Oji, B., Andersson, E., Elands, B.H.M. & Møller, M.S., (2016). Active citizenship for urban green infrastructure: Fostering the diversity and dynamics of citizen contributions through mosaic governance. *Current Opinion in Environmental Sustainability*. **22**, 1–6.

Byrne, J., (2012). When green is white: The cultural politics of race, nature and social exclusion in a Los Angeles urban national park. *Geoforum*. **43**, 595–611.

Carson, R., (1962). *Silent Spring*. Boston: Houghton Mifflin.

CE, (2000). *European Landscape Convention*. Council of Europe.

Colvin, B., (1970). *Land and Landscape: Evolution, Design and Control*. London: John Murray Publishers.

Diedrich, L., (2013). *Translating Harbourscapes. Site-specific Design Approaches in Contemporary Harbour Transformation* (Ph.D. Thesis). Copenhagen: University of Copenhagen.

EC, (1992). Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. *European Council*. [October 2019] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:31992L0043&from=EN

EC, (2000). Council Directive 2000/60/EC of 23 October 2000 establishing a framework for Community action in the field of water policy. *European Council*. [October 2019] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02000L0060-20140101

Ehrlich, P. & Ehrlich, A., (1970). *Population, Resources, Environments: Issues in Human Ecology*. San Francisco: Freeman.

Fainstein, S., (2011). *The Just City*. Ithaca, NY: Cornell University Press.

Fraser, N., (2010). *Scales of Justice: Reimagining Political Space in a Globalizing World*. New York: Columbia University Press.

Gasteyer, S.P. & Flora, C.B., (2000). Modernizing the savage: Colonization and perceptions of landscape and lifescape. *Journal of the European Society for Rural Sociology*. **40**(1), 128–149.

Gulsrud, N.M., Hertzog, K. & Shears, I., (2018). Innovative urban forestry governance in Melbourne? Investigating "green placemaking" as a nature-based solution. *Environmental Research*. **161**, 158–167.

Hacket, B., (1971). *Landscape Planning: An Introduction to Theory and Practice*. Newcastle upon Tyne: Oriel Press.

Hajer, M.A. & Versteeg, W., (2005). A decade of discourse analysis of environmental politics: Achievements, challenges, perspectives. *Journal of Environmental Policy & Planning*. **7**(3), 175–184.

Hawken, P., Lovins, A. & Hunter Lovins, L., (1999). *Natural Capitalism. Creating the next Industrial Revolution*. Boston, New York and London: Little, Brown and Company.

Heynen, N.C., (2003). The scalar production of injustice within the urban forest. *Antipode*. **35**, 980–998.

Holden, E., Linnerud, K. & Banister, D., (2016). The imperatives of sustainable development. *Sustainable Development*. Wiley Online Library.

IUCN, (1980). *World Conservation Strategy. Living Resource Conservation for Sustainable Development*. International Union for Conservation of Nature and Natural Resources. IUCN.

Jonsson, F. & Lundmark, F., (2014). *Norm-Critical Design Analysis: A Framework*. SIRG Research reports SIRR, 2014:1. Stockholm Internet Research Group, Stockholm University.

Jorgensen, A., (2016). Editorial: 2016: Landscape justice in an anniversary year. *Landscape Research*. **41**(1), 1–6.

Kant, I., (1974). *Kritik der Urteilskraft*. Hamburg: Felix Meiner.

Leopold, A., (1949). *A Sand County Almanac: And Sketches Here and There*. New York: Oxford University Press.

Low, S., (2013). Public space and diversity: Distributive, procedural and interactional justice for parks. In: G. Young & D. Stevenson (eds.) *The Ashgate Research Companion to Planning and Culture*. Surrey: Ashgate Publishing. 295–310.

McHarg, I.L., (1969). *Design with Nature*. American Museum of Natural History. Garden City, New York: Natural History Press.

McNeely, J.A., Miller, K.R., Reid, W.V., Mittermeier, R.A. & Werner, T.B., (1990). *Conserving the World's Biological Diversity*. Washington, DC: International Union for Conservation of Nature and Natural Resources, IUCN.

MEA, (2005). *Millennium Ecosystem Assessment Report. Ecosystems and Human Well-being: Synthesis*. Millennium Ecosystem Assessment. Washington, DC: Island Press.

Muir, J., (1991). *Our National Parks*. San Francisco: Sierra Club Books.

Næss, A., (1973). The shallow and the deep, long-range ecology movement. A summary. *Inquiry*. **16**, 95–100.

Nash, R., (1982). *Wilderness and the American Mind*. New Haven and London: Yale University Press.

Nesbitt, L., Meitner, M.J., Girling, C., Sheppard, S.R.J. & Lu, V., (2019). Who has access to urban vegetation? A spatial analysis of distributional green equity in 10 US cities. *Landscape and Urban Planning*. **181**, 51–79.

Nesbitt, L., Meitner, M.J., Sheppard, S.R.J. & Girling, C., (2018). The dimensions of urban green equity: A framework for analysis. *Urban Forestry & Urban Greening*. **34**, 240–248.

Nogués-Bravo, D., Simberloff, D., Rahbek, C. & Sanders, N.J., (2016). Rewilding is the new Pandora's box in conservation. *Current Biology*. **26**(3), R87–R91.

Oelschlaeger, M., (1991). *The Idea of Wilderness*. New Haven and London: Yale University Press.

Oswald, P., Overmeyer, K. & Misselwitz, P., (2013). *Urban Catalyst: The Power of Temporary Use*. Berlin: DOM Publisher.

Parker, P., Vogel, N. & Diedrich, L., (2018). Investigating the democratic potential of temporary uses in urban redevlopment projects. In: J.K. Fsiker, L. Chiappini, L. Pugalis & A. Bruzzese (eds.) *Enabling Urban Alternatives: Croses, Contestattion, and Cooperation*. London: Palgrave Macmillan. 85–107.

Perez, A.C., Grafton, B., Mohai, P., Hardin, R., Hintzen, K. & Orvis, S., (2015). Evolution of the environmental justice movement: Activism, formalization and differentiation. *Environmental Research Letters*. **10**, 105002.

Poudyal, N.C., Hodgesa, D.G. & Merrett, C.D., (2009). A hedonic analysis of the demand for and benefits of urban recreation parks. *Land Use Policy*. **26**(4), 975–983.

Rutt, R.L. & Gulsrud, N.M., (2016). Green justice in the city: A new agenda for urban green space research in Europe. *Urban Forestry & Urban Greening*. **19**, 123–127.

Schwarz, K., Fragkias, M., Boone, C.G., Zhou, W., McHale, M., et al., (2015). Trees grow on money: Urban tree canopy cover and environmental justice. *PLoS One*. **10**, 1–17.

Schweitzer, A., (1969). *Reverence for Life*. New York: Harper & Row.

Setten, G., Brown, K.M. & Rørtveit, H.N., (2013). Landscape and social justice. In: P. Howard, I. Thompson & E. Waterton (eds.) *The Routledge Companion to Landscape Studies*. Abingdon, England: Routledge. 243–252.

Taylor, P.W, (1986). *Respect for Nature: A Theory of Environmental Ethics – 25th Anniversary Edition*. Princeton, NJ: Princeton University Press.

Thompson, I.H., (1998). Environmental ethics and the development of landscape architectural theory. *Landscape Research*. **23**(2), 175–194.

UN, (1989). *Convention on the Rights of the Child*. UNICEF.

UN, (1992). *Convention on Biological Diversity*. United Nations.

UN, (2006). *Convention on the Rights of Persons with Disabilities*. United Nations.

UN, (2015). *Sustainable Development Goals*. United Nations.

UN, (2017). *New Urban Agenda*. United Nations.

Valencia, S.C., Simon, D., Croese, S., Nordqvist, J., Oloko, M., et al., (2019). Adapting the sustainable development goals and the new urban agenda to the city level: Initial reflections from a comparative research project. *International Journal of Urban Sustainable Development*. **11**(1), 4–23.

Vera, F. & Buissenk, F., (2007). *Wilderness in Europe*. Baarn, The Netherlands: Tirion Publishers.

Vogel, N., (2015). *Transitions in the Making: A Critical Dispute on Urban Transition Processes Toward Sustainable Mobility* (Ph.D. Thesis). Aalborg University, Aalborg.

Vogel, N., (2017). Synergies through entanglement: Commoning entering the urban governance realm. *The Public Sector*. **43**(1), 7–18.

Walker, G., (2012). *Environmental Justice: Concepts, Evidence and Politics*. London: Routledge.

WCED, (1987). *Our Common Future*. Report on the World Commission on Environment and Development. Oxford: Oxford University Press.

All figures are used with permission.

7 Participation in urban open space governance and management

Hanna Fors, Bianca Ambrose-Oji, Cecil Konijnendijk van den Bosch, Helena Mellqvist and Märit Jansson

Why participation in urban open space?

In the past, local governments have been responsible for the management of public urban open space (UOS). However, recent years have seen an emerging trend for user involvement in UOS management (Mattijssen et al., 2017; Sheppard et al., 2017). User participation in urban planning and management issues dates back to the 1960s, when local governments – for example in the US and UK – started involving users in urban and regional planning as a response to contemporary criticisms of professionally based rational comprehensive planning (Smith et al., 2014). The work of Patsy Healey (1997) contributed to establishing and developing more collaborative approaches to planning. In the specific case of green spaces, such as parks and other UOSs, user participation is currently promoted not only in terms of contributions to planning and design but also most recently in terms of ongoing management. International policies and initiatives, such as the Local Agenda 21 Action Plan (UN, 1992), the European Landscape Convention (CE, 2000) and the Aarhus Convention (UN, 1998), all of which advocate involving users more closely in decisions regarding UOSs, have contributed to this widening remit. The underlying idea regarding user participation is that UOS can only be planned and managed in an appropriate, democratic, robust and sustainable way if its users are directly involved and their needs, perspectives and capabilities are effectively integrated (Van Herzele et al., 2005; Sheppard et al., 2017).

Various benefits of participation in UOS management have been highlighted. User participation in UOS management has the potential to benefit local governments, participating and non-participating users and UOSs. Users have been found to benefit from participation in UOS management through an increased sense of satisfaction with their neighbourhoods (Nannini et al., 1998), with greater recreational and social use (Jones, 2002; Glover et al., 2005) and an increased sense of attachment to green

spaces (Van Herzele et al., 2005). When a user (sometimes denoted 'connoisseur') is invited to participate in actual planning, a new expert is introduced and an exchange of knowledge emerges that strengthens trust between participating stakeholders (Mellqvist, 2017). Participation can also address environmental justice issues (e.g. Rutt & Gulsrud, 2016) and lead to UOS quality being perceived as higher among participating users (Fors et al., 2018a). However, a review of the scientific literature on user participation in UOS planning and management found that, while many potential benefits of participation were discussed, few were empirically tested (Fors et al., 2015). This implies that many benefits of participation seem to be taken for granted, especially whether participation actually improves the quality of physical UOS.

User participation in UOS governance and management has gained increased attention with the introduction of the various international policies, research studies and development of new trends, such as urbanisation and individualisation. User participation is becoming a more emphasised aspect of UOS management and a main pillar for UOS governance (Jansson et al., 2019). This chapter addresses the need for theories and appropriate methods to support participatory approaches within these practices.

Current trends and approaches to participation in UOS development

As a result of the increased interest in user participation, different ways of including users have been tested. A variety of participatory approaches are actively promoted by managers on the strategic level (top-down), facilitated by various organisations and initiated by users (bottom-up). Some of the trends affecting green space governance and management in Europe, but also relevant for North America and worldwide, are described in Box 7.1. Associated examples of participatory projects and actions in UOS management are shown in Figure 7.1.

Involved – but to what degree?

The concept of participation may be defined in various ways, but the important signifier here is *user* – implying that the target group is mostly relatively local to the UOS. Users are a specific part of the public – namely, the people or groups that regularly or potentially inhabit and interact with a space. Users can also be described as either 'communities of location', i.e. a group of people living in the same geographical location, such as a neighbourhood close to an UOS, or 'communities of interest', i.e. a group of people brought together due to their common interest in using the same UOS (e.g. Seyfang & Smith, 2007). When these users participate in the management of, and decision making about, a publicly accessible UOS, the term 'public participation' is also relevant. 'Public participation' and 'public involvement' are often used interchangeably, but their meanings can entail different nuances. The term public involvement includes the public in decision making without necessarily guaranteeing that they actually have any impact on the end result (World Bank, 1993). In contrast, in her seminal work on public participation, Sherry Arnstein (1969) stressed that participation should give access to process and a degree of power to affect outcomes. The use of these terms as synonyms shows that participation

BOX 7.1: TRENDS IN USER PARTICIPATION IN UOS

Several societal trends currently affect participatory governance practices for UOS in Europe (Van der Jagt et al., 2016). Four of these trends are described next.

1. Linking up with sociocultural objectives

Public involvement in green space management is often linked up with sociocultural objectives, finding mechanisms to improve social cohesion, supporting users with less power or facilitating integration of immigrants. However, there is little attention in current research on how to involve different groups in modes of participation that move beyond consultation towards empowerment and self-organisation.

2. Promoting e-governance

E-governance facilitates participatory green space governance. It is becoming increasingly common to include the use of electronic Internet-based communication tools in governance activities, such as online consultation platforms, participatory GIS and mapping of green space issues. Another example of this is participatory budgeting, when local governments invite users to submit their ideas on how to develop local green spaces. Winning proposals are implemented for a dedicated part of the municipal budget, and in this way, users influence what is done with their city.

3. Fostering of public-private partnerships

Cuts in maintenance budgets have forced local governments to find alternative solutions in order to maintain public UOS quality. This has increased outsourcing of public green space maintenance to private actors and led to a third trend: fostering of public-private partnerships where, for example, private businesses sponsor maintenance of a local public green space.

4. Engaging in urban agriculture and local food production

Many local governments across the globe promote and engage in community-supported urban agriculture and local food production. Urban residents in many parts of the world are showing increasing interest in knowing more about the origins of food, understanding the health benefits of gardening and wanting to encounter biodiversity. This has led to the initiation of many urban gardening initiatives. Urban gardening initiatives create unique UOSs, such as allotment gardens, community food gardens, orchards or vineyards. A rather new urban gardening practice in Europe, North America and elsewhere is to make use of former industrial or infrastructural areas (i.e. brown space) through temporary and 'pop-up' gardening projects, often linked with objectives to foster social cohesion.

Figure 7.1 Examples of four current trends in user participation. (i) School ground greening in Malmö, Sweden. (ii) E-governance using children's maps in GIS. (iii) Public-private collaboration in Mexico City where some businesses have taken responsibility for maintenance of public planting areas outside their premises. (iv) Davie Village community garden in Vancouver, Canada. *Photos*: (i) Jansson et al. (2014), (ii) Ulla Berglund, (iii) Elizabeth Shelley and (iv) Märit Jansson

notions can range from consultation without influence on decisions to integrated cooperation (World Bank, 1993), a range that raises questions regarding what ideals of participation processes and outcomes to strive for.

Involvement of users in UOS planning and management is generally seen as good and desirable, but it is not always clear what it means in practice in terms of the degree of actual involvement and how much power is transferred from, for example, local governments to participating users. Figure 7.2 presents different ways of describing the level of user participation. Apart from the 'spectrum of public participation in forest and woodland planning', none of the ladders and spectra described next is specifically developed for participation in UOS management, but all may,

Ladder of citizen participation (Arnstein, 1969)

Manipulation	Therapy		Informing	Consultation	Placation		Partnership	Delegated power	Citizen control
Non-participation			*Tokenism*				*Citizen power*		

Ladder of children's participation (Hart, 1992)

Manipulation	Decoration	Tokenism	Assigned but informed	Consulted and informed		Adult-initiated, shared decisions with children	Child initiated and directed	Child initiated, shared decisions with adults	
Non-participation			*Degrees of participation*						

Spectrum of public participation in forest and woodland planning (Ambrose-Oji et al., 2011)

Form of participation	Inform	Consult		Involve			Partnership (or collaborate)		Empower (or control)	
Non-government actor role	Provide information and views about plans for decision making processes			In care and maintenance	in planning decisions	In management	Collaborative management		Lease of public land	Purchase of public land

The hierarchical, closed and open co-governance and self-governance continuum (Arnouts et al., 2012)

Hierarchical governance		Closed co-governance	Open co-governance		Self-governance

Figure 7.2 Levels of user participation as described in different studies. *Source*: Reproduced from Fors (2018)

nonetheless, be applied to the field. An early description of involvement levels can be found in Arnstein's (1969) ladder of citizen participation, which was a response to how citizen participation was treated in the 1960s in the US, often without redistribution of power. This created an 'empty' participation process for the users involved, while the authorities could still claim that they had permitted user participation. Arnstein (1969) pointed out that there are gradations of user participation with varying degrees of power and depicted the different levels of user (citizen) participation in decision making and planning as a ladder with eight progressive rungs: (i) manipulation, (ii) therapy, (iii) informing, (iv) consultation, (v) placation, (vi) partnership, (vii) delegated power and (viii) citizen control. Rungs i and ii represent non-participation and rungs iii–v represent tokenism, so only the three highest levels of participation can be described as 'citizen power' (Arnstein, 1969). This work is still influential and frequently cited, although its suggested view and the metaphor of a ladder, with the highest degree of participation always at the top (the best), has been criticised because the full spectrum of user participation may play an important part in different social and political contexts and at different stages in the development of UOS (Hayward et al., 2004).

Tritter and McCallum (2006) criticised Arnstein's ladder of participation for being a hierarchical, linear and, therefore, unrealistic model of user involvement that only emphasises the transfer of power between authorities and the public. Their focus was on user participation in health-care policy and practice, but their remarks are valid for other contexts. Gaining power through a public participation process is not the goal for all users or in all circumstances, and some do not even wish to become involved. Transferred power from, for example, local governments to users does not automatically result in high-quality participation processes or outcomes. Rather, Tritter and McCallum (2006) call for a model that shows the full potential of participation, dynamic and evolving with time, including a diversity of valuable knowledge and experience of the professionals and users involved – i.e. instead of a ladder, they propose a mosaic model.

It is not enough to consider only *how* people are involved; it is also important to be clear about *which* users are involved. Some societal groups tend to have less possibilities to influence decision making and the development of UOS, and it is important to include these groups in participatory approaches. Examples are ethnic and cultural minorities, people with disabilities, the elderly and children. Children and young people are a societal group that is particularly important to involve, as they provide a valuable perspective that is different from adults and are often interested in becoming involved and having their points of view included as important users of UOS. Participation can be a way to foster their democratic learning too, providing an opportunity for young people to learn about users' rights and duties and how decisions are made in a democracy. Article 12 in the United Nations (UN) Convention on the Rights of the Child (UN, 1989) supports children's participation, stating the right of each child to express views, be listened to and taken seriously. Despite these compelling reasons, adults often fail to involve children or even consider doing so (Lansdown, 2001).

Children's participation in the development of UOS has often been restricted to planning and design, but children might be particularly interested in participating within

management, including on the operational level through possibilities for physical manipulation of the environment (Jansson, 2015). Management has the potential to facilitate children's participation on a level that is daily, informal, local and hands-on (Clark & Percy-Smith, 2006), while also allowing for a dialogue-based approach (Graham & Fitzgerald, 2010). Increased participation and dialogue can help counteract the common lack of understanding and large distance between managers on various organisational levels, on the one hand, and children and youth as users of UOS on the other hand (Roe, 2006; Jansson, 2015).

Hart (1992) recognised the need to promote children's participation in particular and adapted Arnstein's ladder to include children's participation in the UN Children's Fund publication *Children's Participation: From Tokenism to Citizenship*. The purpose of this re-conceptualisation of Arnstein's ladder was to stimulate dialogue on children's participation rather than provide a comprehensive tool for assessment of work where children are involved (Hart, 2008). According to Hart (1992), a project involving children can be considered truly participatory when the children (i) understand the intentions of the project, (ii) know who made the decisions concerning their involvement and why, (iii) have a meaningful (rather than 'decorative') role and (iv) volunteer for the project after it is made clear to them.

There has been some criticism and misinterpretations of Hart's use of the ladder metaphor for children's participation, as discussed by Hart (2008). This is partly due to the important difference that, in many if not all circumstances, children are not fully empowered and in control of processes and decision making because of the (necessary) involvement of adults. Hart (2008) acknowledges that his approach provides a rather narrow range of ways for children to participate – i.e. formal programmes and projects rather than the much-needed every day informal participation of children and creation of a culture of play in their communities. That said, the most important thing when children are involved is that they are provided with the opportunity to choose to participate in any way they can to the best of their ability and in the fullest way possible (Hart, 1992).

Francis and Lorenzo (2002) reviewed 30 years of children's participation in planning and design and identified seven partly overlapping realms or approaches. They concluded that involving children in the romantic realm meant regarding children as competent planners who made better environments for themselves than adults could. Other realms were advocacy, needs, learning, rights and institutionalisation, as well as the increasingly common proactive realm, which regards participation as a communicative and visionary process that empowers both children and adults to create good environments for children through their genuine participation (Francis & Lorenzo, 2002). More recently, critical discussions have concluded that there are sometimes too many expectations on children's participation in UOS development and that adults need to take more responsibility for ensuring children's access to UOSs of both sufficient quantity and quality as a basic requirement for children's participation to be meaningful and ethical.

There are also more recent descriptions of user participation levels. The spectrum of public participation, developed by the International Association for Public Participation, was adapted by Ambrose-Oji et al. (2011) to specifically describe public participation in forest and woodland planning and management. A difference between the spectrum and the ladder of citizen participation is that the former does not take account of non-participation and the use of a spectrum, rather than a ladder, that attempts to move past the normative

association that the upper rungs of the (Arnstein) ladder are 'best' or the ultimate objective of any participation process. According to Van der Jagt et al. (2016), the value of the spectrum also lies in clarification of various roles of non-government actors along different parts of the spectrum (see the bottom row in Figure 7.2). Thus 'involve' is included between the rungs 'placation' and 'partnership' on the Arnstein ladder (Figure 7.2). Partnership is about 'partnering with the public in each aspect of the decision including the development of alternatives and the identification of the preferred solution', while to empower is to 'place final decision-making in the hands of the public' (Ambrose-Oji et al., 2011, p. 3).

There is a real distinction between involvement, partnership and empowerment in terms of where the power to make decisions and move forward with use and management of a UOS actually rests. Involvement and partnership imply different degrees of collaborative decision making but with a significant controlling interest remaining with the government agency or local government. Empowerment implies that the local community or other participatory groups – i.e. communities of interest – can act autonomously and have the power to move ahead with their own ideas about the development and management of UOS. In some cases, for example in Scotland through the National Forest Land Scheme, this might mean community groups actually purchasing land in public ownership (Ambrose-Oji et al., 2014; Lawrence & Ambrose-Oji, 2015). However, empowerment is commonly achieved through negotiation of a lease or similar agreement, where ownership of the land remains with the local government but the community or 'user group' has the agreed and often legal right to make its own decisions about land use.

The level of participation achieved may be affected by whether participation is initiated top-down by authorities or bottom-up by users. A participation process could be placed along the levels described earlier but could also be described according to the role of users in different modes of governance, ranging from hierarchical to closed co-governance, open co-governance or self-governance, depending on the level of public involvement and power sharing between different actors (Arnouts et al., 2012).

More than power – matching participation

The message conveyed by all spectra and ladders described earlier is that local governments should aim for genuine and real participation by a range of users while considering the benefits of their involvement. The most important issues for local governments to consider are what type of participation is appropriate, when and which users or groups of users to include. Once the decision to involve people has been made, the process needs to be handled with care, commitment and awareness. Users may lose interest in participation processes and become disappointed if their efforts and inputs are (or seem to be) disregarded by authorities seeking a more consultative type of involvement or if participation processes take too long, making it difficult to maintain enthusiasm and involvement and to effect the changes users want.

A key challenge is to match the type of participation to the objectives and users' desire to be involved, avoiding unconscious symbolic box-ticking on participation or imposition of the highest (empowering) level of involvement if participants do not want this. As Burton and Mathers (2014) emphasise, participants' capacity and interests concerning the scale and type of participation need to be matched with corresponding management activities. If an activity requires insurance, for

example, or if participants lack the needed skills to carry it out, it is better to offer participants other tasks. Many stakeholders in European cities continue to regard UOS management as the responsibility of local government, making them reluctant to participate in initiatives or very selective in how they become involved. Participants who feel that they are 'taking jobs' from professional staff may choose to be involved in arranging events rather than in operational maintenance. Participants may also find the initial place-making part more exciting than the place-keeping (management) of an UOS and lose interest over time (Burton & Mathers, 2014).

Building on a more critical perspective of earlier categorisations, spectra and ladders of participation, Buijs et al. (2016) propose so-called mosaic governance as a way to maximise environmental outcomes of user participation in UOS development. Mosaic governance is about applying an enabling and stimulating governance style in order to exploit the full potential of user participation while avoiding undesired outcomes. The cultural diversity of urban residents and their UOS use, the institutional diversity of how they self-organise and the diversity of physical UOSs demand context-sensitive rather than generic governance approaches from the authorities. In practice, this means embracing a wide range of partnerships with users, from bottom-up initiatives to cross-sector partnerships, creating different kinds of arrangements depending on UOS type and character and that of the users involved and adapted to changing social and ecological circumstances (Buijs et al., 2016).

Mosaic governance is closely connected with spatially explicit UOS and the spatial dimension of strategic urban planning, recognising that its components are not totally independent of one another. The variety of governance arrangements that exist and the different governance models employed in them reflect the urban landscape scale mosaic of interrelated urban green infrastructure ecologies, ecosystem functions and benefits. However, while landscape governance takes, primarily, characteristics of non-urban landscapes into account, mosaic governance explicitly focuses on grassroots and bottom-up processes in the urban context, as well as the unique feature of sociocultural diversity of residents and communities (Buijs et al., 2018).

MOSAIC GOVERNANCE IN PRACTICE While it is important to be aware of problems associated with the different types of non-participation described in Figure 7.2, the higher levels of participation are more interesting when discussing what participation at different levels might consist of in practice. The choice of method depends on the type of place where participation takes place and the type of participation process – for example involving residents in their local UOS close to their homes – calls for a different approach than, for example, involving them in planning for a more distant park. Based on conclusions reached by Tritter and McCallum (2006) and Buijs et al. (2016) on mosaic governance in UOS in practice, the following aspects need to be included:

- Acknowledge that participants may seek different types of involvement in relation to different issues and at different times in the development and implementation processes.
- Use a variety of methods for participation to tap into complementary communities of users. Thus provide context-sensitive methods for participation varying in set-up, ranging from, for example, one-off events to continuous participation, from hierarchical to self-governance, from bottom-up to

cross-sector partnerships or from individual to collective organisation and concerning a diversity of UOS types and scales – i.e. individual street trees, small street gardens, community gardens and nature conservation areas. These can target a diverse range of users – for example individuals, groups or organisations – as well as user diversity in culture, age, UOS use, knowledge, experience, resources, etc., and ensure UOS meets local requirements.

- Employ a dynamic structure and participation process negotiated by users themselves, along with changing social and ecological circumstances.

The mosaic envisioned by Tritter and McCallum (2006) shows a complex and dynamic relationship between individual tiles and groups of tiles, where tiles of different colours and shapes are essential parts of the complete picture, but only when systematically integrated. In the context of UOS, the tiles would represent different governance arrangements associated with different spatial locations varying in size, UOS type, community and participant type and integration within different institutional and organisational arrangements which might be top-down or bottom-up initiated, long-term or short-term and so forth. The completed mosaic could then be considered to represent the entire UOS governance approach and enable user participation to be mapped and monitored (Figure 7.3).

The mosaic governance concept (Buijs et al., 2016) resembles the policy arrangement

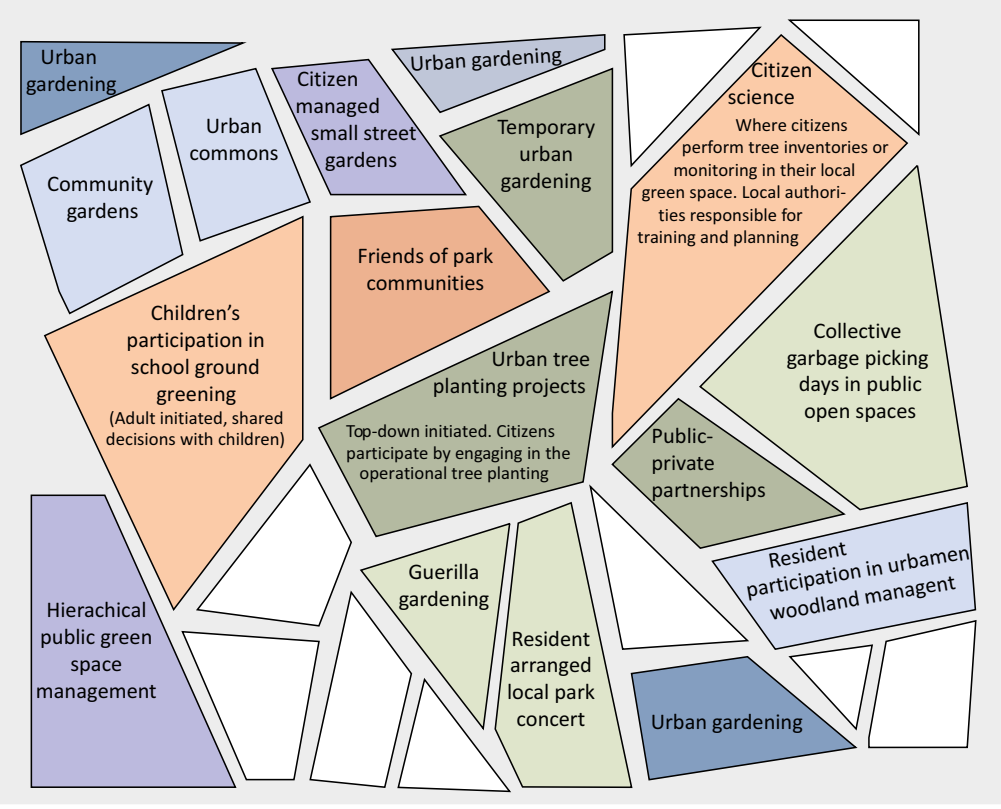


Figure 7.3 Illustration of mosaic governance in UOS and examples of possible content. *Illustration*: Hanna Fors

approach developed within the field of environmental policy and governance (Arts et al., 2006). This approach looks at the components important to decision making and places equal focus on the different types of users involved (e.g. individual users, local governments, communities). However, it makes the point that the power and resources (e.g. knowledge, time, financial), the discourses (main 'storylines' that provide context and background) and the rules of the game (formal and informal, guiding interaction and decision making) are harnessed and used by the different kinds of users in ways which produce different power relationships and outcomes (Arts et al., 2006).

Facilitating long-term participation

A crucial question for user participation in UOS management is how local governments can facilitate long-term user participation. Long-term initiatives often rely on individual 'champions' or 'key drivers', and if they leave, succession is often a problem. The concept of environmental stewardship can be described as responsible, sustainable engagement in natural resources, which can include individuals or groups of stakeholders in relation to UOS. In the US, environmental stewardship has been recognised as a way to foster longer-term involvement of, for example, community groups in the management of UOSs and other areas. Efforts are underway to identify and connect environmental stewardship organisations in networks. An example is the US Forest Service's Stewardship Mapping network, which currently includes cities such as New York City, Seattle and San Juan (Puerto Rico) (e.g. Romolini et al., 2016).

In some cases, local government can be the limiting factor over the long term. The well-established nature association De Ruige Hof (the Wild Court), which has managed 13 ha of nature in the Netherlands since 1986, has experienced both close and distant contacts with the local government over the years. Similarly, the Boscoincittà (Forest in the City) in Italy, a 120 ha public park managed by a non-government organisation for 40 years, reports both good and bad relations with different administrations during this time. These two European examples illustrate that changes in public administrations over time can make it difficult for users to create long-term relationships with authorities. Ambiguous communication structures and bureaucratic procedures may also hinder users' activities (Mattijssen et al., 2018). The set-up of formal arrangements and official policies that influence UOS substantially affect whether it is possible to secure long-term participation in UOS management. Annually renewed management contracts between local governments and an association, or an area not being officially designated as UOS or protected area, are examples of aspects that hinder users from feeling convinced that their work will be long-term and not destroyed by urban development (Mattijssen et al., 2018).

Three factors that support long-term user participation in public UOS management were identified by Mattijssen et al. (2018). First, *formalisation* supports continuity, so it is important to establish rules, procedures and power structures for stability within the group of users involved. However, a balance is needed between enough institutionalisation, matching existing laws and regulations to safeguard continuity and managing the UOS in a preferred way without losing too much independence. Second, users need to have strong *adaptive capacity* to cope with external political, socioeconomic and cultural development over time caused by

continual contextual changes. This capacity may include resources such as social capital, sufficient funding and a strong network. Third, the *supporting role of authorities* is very important for long-term user involvement, including providing security via stable (UOS) policies, formally protecting spaces, allowing long-term management contracts and contributing resources. Today, local governments retain a key role in UOS governance arrangements as landowners and policy makers, making users dependent on their cooperation and support in order to carry out activities but possibly also play a facilitating and enabling role in the background (Mattijssen et al., 2018).

The residential area Sletten in Holstebro, Denmark, is an example of resident participation in UOS management that has persisted over a long time (Fors et al., 2018b). Sletten residents participate in maintenance and management of the urban public woodland edge zone bordering their private gardens (Figure 7.4). This transition area between private and public land has been named the 'co-management zone'. Early on, some Sletten residents started to weed around the small tree seedlings or to grow flowers and vegetables at the woodland edge. As the tree canopy started to close, residents engaged in activities such as pruning and thinning among the trees, planting their own plants, providing nesting and feeding boxes for birds, setting up hammocks, putting out garden furniture, creating paths or building huts as part of children's play. Their participation in the woodland was tolerated and even encouraged by the local government. Some years later, resident participation became formalised with written guidelines for the co-management zone.

The case of Sletten both confirms and contradicts the importance of the three factors identified by Mattijssen et al. (2018b) in sustaining local residents' engagement in the long run. Formalisation of participation in Sletten, when guidelines for the

Figure 7.4 (i) and (ii): Two locations in the co-management zone between private garden and public woodland edge and the results of residents participation in Sletten, Holstebro, Denmark. *Photos*: Anders Busse Nielsen

co-management zone were written down and sent to all residents, increased the level of resident participation. The participation of Sletten residents was probably not greatly affected by societal changes over time, but they still needed strong adaptive capacity since the continuously growing woodland changed the circumstances. A young and an old woodland allowed for different actions and expressions of participation, where, for example, some residents initially grew vegetables but later put up a hammock in the shade of the trees. Sletten residents have appreciated the supporting role of authorities when given professional guidance, inspiration and control, clear guidelines for the co-management zone and continuous communication between residents and the local government. Earlier periods when this communication did not function well and guidelines were unclear made some residents refrain from participation, while others were satisfied with participating independently. It is important for local governments to find a good balance between encouraging and controlling the participation process since too strong control or too strict guidelines too early in the process seem to discourage participation. The Sletten residents appreciate their freedom to participate individually or in collaboration with neighbours without always having to ask for permission before they act.

In order to facilitate long-term participation in planning and management of UOS, the connoisseur method has been developed and tested in southern Sweden. The method aims to achieve a complete mosaic (see Figure 7.3) where the local users are considered experts or connoisseurs of their everyday landscape. Another aim is to support the role of local government. This is done by introducing university researchers as a third party in a model for planning, governance and management of UOS (see Figure 7.5). Studies

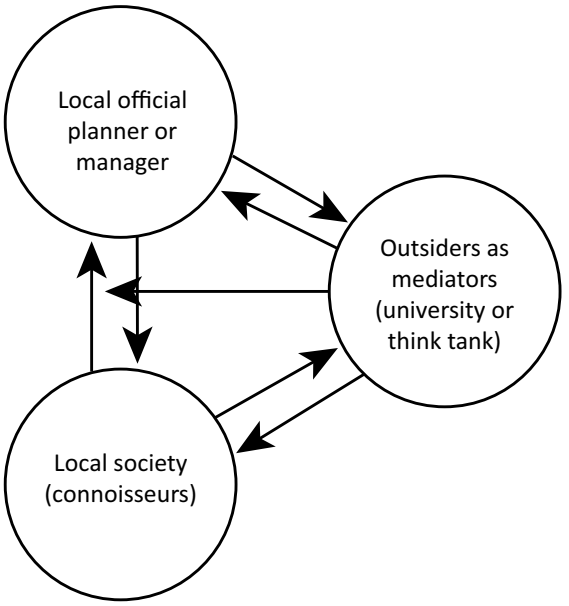


Figure 7.5 A university or other body that can contribute knowledge and facilitate communication can help achieve a circular flow of information between established decision makers and the local society or connoisseurs. *Source*: Adapted from Mellqvist (2017)

have shown that university researchers can contribute knowledge but also act as mediators, focusing the dialogue between local governments and local connoisseurs. University researchers could be replaced by think tank members or similar as a third party involved in the process with an interest in mutual learning and communication (Mellqvist, 2017).

The value of short-term and temporary participation

As discussed earlier, power transfer from local governments to users is not always the ultimate goal of participation in UOS governance and management. Similarly, long-term participation is not the only participation type to strive for, as short-term and temporary participation can also be valuable by allowing participation in cases where the long-term perspective is particularly challenging or not the goal for other reasons. Short-term/temporary participation can also be a way of broadening the possibilities for participation, involving those who are less interested in longer commitments and perhaps even reaching out to non-users. As an example, when children and their parents participate in playground development, the long-term perspective can be a challenge because the users quickly change as the children grow older, but short-term participatory projects can still be useful and create mutual learning (Jansson & Ramberg, 2012). Short-term involvement can also have value in school ground greening, developing more vegetation or growing vegetables, with children, teachers and managers involved in creating the change. Being able to extend children's participation to ongoing maintenance has also been shown to be valuable for children's engagement (Jansson et al., 2018). With a mosaic governance approach, long- and short-term participatory approaches can co-exist.

Changing roles and approaches within governance and management

Developing the enabling and stimulating governance style embodied by mosaic governance and using the full potential of user participation places the role of UOS managers under scrutiny. To fully mobilise the diversity of urban residents and the values and knowledge they hold regarding physical UOS types and ways of organising user participation, UOS managers need to be skilled communicators, sensitive and flexible to user initiatives when they arise, as well as to new trends in UOS management and participation. It helps to have a palette of reliable participation methods at hand, facilitating top-down integration of participation processes in the daily work and responses to urban residents' initiatives bottom-up. This also makes it easier to decide which method to use when jointly creating a functional UOS mosaic governance form built up from interdependent tiles.

While user participation processes demand new skills, the more conventional core competencies of UOS managers related to, for example, vegetation and technique are still needed. The changed role can take different forms. Some managers perceive the transformation from hierarchical governance to increased co-governance as challenging (Molin & Konijnendijk van den Bosch, 2014), while others simply deal with the changed circumstances (Fors et al., 2018b). The important inclusion of many different types of users in participatory

approaches, including groups such as children or people with disabilities, can be challenging and time-consuming but could be facilitated through collaboration with, for example, schools or interest organisations. Managers' reactions to this new role could depend on the type of governance arrangement, as dealing with participation through empowerment in a limited zone close to participants' homes might be perceived as less challenging than partnerships between local governments and users in an UOS farther from home. Location and participation types affect how much participants care about a specific place and how much work is demanded from managers.

There are increased opportunities for user participation in UOS management in general, but success will depend on a wide range of actors and opportunities as related to the parts of various governance arrangements (Arts et al., 2006). In Sweden, for example, few UOS managers involve users in management or intend to do so in the near future in contrast to the trend among managers in the UK (Randrup et al., 2017). There are neglected UOSs and under-prioritised areas farther away from city centres in residential areas in many parts of the world. Participation in management is an untapped resource that could increase UOS quality in such areas as long as participants are given clear guidelines and managers are sufficiently engaged, present and follow up on individual participation arrangements.

References

Ambrose-Oji, B., Lawrence, A. & Stewart, A., (2014). Community based forest enterprises in Britain: Two organising typologies. *Forest Policy and Economics*. **58**, 65–74.

Ambrose-Oji, B., Tabbush, P., Frost, B., Carter, C. & Fielding, K., (2011). *Public Engagement in Forestry: A Toolbox for Public Engagement in Forest and Woodland Planning*. Edinburgh: Forestry Commission, GB.

Arnouts, R., van der Zouwen, M. & Arts, B., (2012). Analysing governance modes and shifts – Governance arrangements in Dutch nature policy. *Forest Policy and Economics*. **16**, 43–50.

Arnstein, S.R., (1969). A ladder of citizen participation. *Journal of American Institute of Planners*. **35**(4), 216–224.

Arts, B., Leroy, P. & van Tatenhove, J., (2006). Political modernisation and policy arrangements: A framework for understanding environmental policy change. *Public Organization Review*. **6**(2), 93–106.

Buijs, A.E., Hansen, R., Van der Jagt, S., Ambrose-Oji, B., Elands, B., Lorance Rall, E., . . . Steen Møller, M., (2018). Mosaic governance for urban green infrastructure : Upscaling active citizenship from a local government perspective. *Urban Forestry & Urban Greening*. **40**, 53–62.

Buijs, A.E., Mattijssen, T.J.M., van der Jagt, A.P.N., Ambrose-Oji, B., Andersson, E., Elands, B.H.M. & Møller, M.S., (2016). Active citizenship for urban green infrastructure: Fostering the diversity and dynamics of citizen contributions through mosaic governance. *Current Opinion in Environmental Sustainability*. **22**, 1–6.

Burton, M. & Mathers, A., (2014). Collective responsibility for place-keeping: Are partnerships the solution for open space management? In: N. Dempsey, H. Smith & M. Burton (eds.) *Place-Keeping: Open Space Management in Practice*. New York: Routledge. 76–99.

CE, (2000). *European Landscape Convention*. Council of Europe.

Clark, A. & Percy-Smith, B., (2006). Beyond consultation: Participatory practices in everyday spaces. *Children, Youth and Environments*. **16**(2), 1–9.

Fors, H., (2018). *User Participation in Public Urban Woodland Management: Drivers and Impact on Green Space Quality*. Department of Landscape architecture, Planning and Management (Ph.D. Thesis). Swedish University of Agricultural Sciences, Alnarp.

Fors, H., Molin, J.F., Murphy, M.A. & Konijnendijk van den Bosch, C., (2015). User participation in urban green spaces – For the people or the parks? *Urban Forestry & Urban Greening*. **14**, 722–734.

Fors, H., Jansson, M., Nielsen, A.B., (2018a). The impact of resident participation on urban woodland quality – A case study of Sletten, Denmark. *Forests* 9.

Fors, H., Nielsen, A.B., van den Bosch, C.C.K. & Jansson, M., (2018b). From borders to ecotones – Private-public co-management of urban woodland edges bordering private housing. *Urban Forestry & Urban Greening*. **30**, 46–55.

Francis, M. & Lorenzo, R., (2002). Seven realms of children's participation. *Journal of Environmental Psychology*. **22**(1–2), 157–169.

Glover, T.D., Shinew, K.J. & Parry, D.C., (2005). Association, sociability, and civic culture: The democratic effect of community gardening. *Leisure Sciences*. **27**(1), 75–92.

Graham, A. & Fitzgerald, R., (2010). Progressing children's participation: Exploring the potential of a dialogical turn. *Childhood*. **17**(3), 343–359.

Hart, R.A., (1992). *Children's Participation: From Tokenism to Citizenship*. Innocenti Essay No. 4. United Nations Children's Fund: UNICEF.

Hart, R.A., (2008). Stepping back from 'The Ladder': Reflections on a model of participatory work with children. In: A. Reid, B.B. Jensen, J. Nikel & V. Simovska (eds.) *Participation and Learning: Perspectives on Education and the Environment, Health and Sustainability*. Dordrecht: Springer. 19–31.

Hayward, C., Simpson, L. & Wood, L., (2004). Still left out in the cold: Problematising participatory research and development. *Sociologica Ruralis*. **44**(1), 95–108.

Healey, P., (1997). *Collaborative Planning: Shaping Places in Fragmented Societies*. Vancouver: UBC Press.

Jansson, M., (2015). Children's perspectives on playground use as basis for children's participation in local play space management. *Local Environment*. **20**(2), 165–179.

Jansson, M., Gunnarsson, A., Mårtensson, F. & Andersson, S., (2014). Children's perspectives on vegetation establishment: Implications for school ground greening. *Urban Forestry & Urban Greening*. **13**(1), 166–174.

Jansson, M., Mårtensson, F. & Gunnarsson, A., (2018). The meaning of participation in school ground greening: A study from project to everyday setting. *Landscape Research*. **43**(1), 163–179.

Jansson, M. & Ramberg, U., (2012). Implementation and effects of user participation in playground management: A comparative study of two Swedish municipalities. *Managing Leisure*. **17**(1), 1–13.

Jansson, M., Vogel, N., Fors, H. & Randrup, T.B., (2019). The governance of landscape management: New approaches to urban open space development. *Landscape Research*. **44**(8), 952–965.

Jones, R., (2002). Enticement: The role of community involvement in the management of urban parks. *Managing Leisure*. **7**(1), 18–32.

Lansdown, G., (2001). *Promoting Children's Participation in Democratic Decision-Making*. Innocenti 01/9, Innocenti Insights. United Nations Children's Fund: UNICEF.

Lawrence, A. & Ambrose-Oji, B., (2015). Beauty, friends, power, money: Navigating the impacts of community woodlands. *Geographical Journal*. **181**, 268–279.

Mattijssen, T.J.M., Buijs, A., Elands, B. & Arts, B., (2018). The 'green' and 'self' in green self-governance – A study of 264 green space initiatives by citizens. *Journal of Environmental Policy and Planning*. **20**(1), 96–113.

Mattijssen, T.J.M., van der Jagt, A.P.N., Buijs, A.E., Elands, B.H.M., Erlwein, S. & Lafortezza, R., (2017). The long-term prospects of citizens managing urban green space: From place making to place-keeping? *Urban Forestry & Urban Greening*. **26**, 78–84.

Mellqvist, H., (2017). *The Connoisseur Method – A Study on Long-Term Participation in Landscape Planning* (Ph.D. Thesis). Swedish University of Agricultural Sciences, Alnarp.

Molin, J.F. & Konijnendijk van den Bosch, C.C., (2014). Between big ideas and daily realities – The roles and perspectives of Danish municipal green space managers on public involvement in green space maintenance. *Urban Forestry & Urban Greening*. **13**(3), 553–561.

Nannini, D.K., Sommer, R. & Meyers, L.S., (1998). Resident involvement in inspecting trees for Dutch elm disease. *Journal of Arboriculture*. **24**, 42–46.

Randrup, T.B., Östberg, J. & Wiström, B., (2017). Swedish green space management – The managers perspective. *Urban Forestry & Urban Greening*. **28**, 103–109.

Roe, M., (2006). 'Making a wish': Children and the local landscape. *Local Environment*. **11**(2), 163–182.

Romolini, M., Bixler, R.P. & Grove, M., (2016). A social-ecological framework for urban

stewardship network research to promote sustainable and resilient cities. *Sustainability*. **8**(10), 956.

Rutt, R. & Gulsrud, N.M., (2016). Green justice in the city: A new agenda for urban green space research in Europe. *Urban Forestry & Urban Greening*. **19**, 123–127.

Seyfang, G. & Smith, A., (2007). Grassroots innovations for sustainable development: Towards a new research and policy agenda. *Environmental Politics*. **16**(4), 584–603.

Sheppard, S., Konijnendijk van den Bosch, C., Croy, O., Palomo, A.M. & Barron, S., (2017). Chapter 15: Urban forest governance and community engagement. In: F. Ferrini, C. Konijnendijk van den Bosch & A. Fini (eds.) *Handbook of Urban Forestry*. London: Earthscan-Routledge. 205–221.

Smith, H., Pereira, M., Hull, A. & van den Bosch, C.K., (2014). The governance of open space: Decision-making around place-keeping. In: N. Dempsey, H. Smith & M. Burton (eds.) *Place-Keeping: Open Space Management in Practice*, 52–75.

Tritter, J.Q. & McCallum, A., (2006). The snakes and ladders of user involvement: Moving beyond Arnstein. *Health Policy*. **76**(2), 156–168.

UN, (1989). *Convention on the Rights of the Child*. UNICEF.

UN, (1992). *AGENDA 21*. Rio de Janerio: United Nations.

UN, (1998). *Aarhus Convention: Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters*. Aarhus: United Nations.

Van der Jagt, A.P.N., Elands, B.H.M., Ambrose-Oji, B., Gerőházi, E., Steen Møller, M. & Buizer, M., (2016). Participatory governance of urban green space: Trends and practices in the EU. *Nordic Journal of Architectural Research*. **28**(3), 11–39.

Van Herzele, A., Collins, K. & Tyrväinen, L., (2005). Involving people in urban forestry – A discussion of participatory practices throughout Europe. In: C.C. Konijnendijk, K. Nilsson, T.B. Randrup & J. Schipperjin (eds.) *Urban Forests and Trees*. Heidelberg: Springer. 207–228.

World Bank, (1993). *Public Involvement in Environmental Assessment: Requirements, Opportunities and Issues*. Environmental Assessment Sourcebook Update, vol. 5. Washington, DC: World Bank.

All figures are used with permission.

8 Urban open space valuation for policymaking and management

David N. Barton, Natalie Gulsrud, Nadja Kabisch and Thomas B. Randrup

Introduction

People living in urban areas rely and depend on urban open space (UOS) to provide key benefits in everyday life. The values of UOS and methods to capture these values are the subject of contentious debate. Such values are represented by the use and the ecological functions of UOS but are often invisible to, or taken for granted by, users, developers, planners, managers and politicians. Despite UOSs seldom appearing as capital assets in business or municipal accounts, they potentially have high economic value for residential or commercial developments. The economic case can sometimes be made that benefits from ecosystem services exceed benefits from development. Multiple qualities of UOSs and their multiple users, with differing roles and a diversity of valuations, also mean that there are potential conflicts of interest in the qualities that should be planned for, designed and managed.

Against this background, it is possible to apply a variety of valuation methods for identifying, demonstrating and capturing the benefits of ecosystem services of UOS (TEEB, 2010). This chapter focuses on the qualities of UOSs and the contribution that mapping and monetary valuation of their benefits can make to governance and management of UOSs (Pascual et al., 2017). The aim is to provide an indication of the high multi-dimensionality of UOSs' qualities, the richness of their potential benefits and the resulting values. We identify the various qualities that characterise UOS and describe the benefits and beneficiaries. Classification and mapping of physical qualities of UOS is needed to identify various values. We provide an overview of monetary valuation methods that can be used to find the economic values of particularly urban ecosystem services. We then discuss how monetary valuation methods can be used to complement non-monetary valuation approaches in support of policymaking. Despite the diversity of values, single metric monetary valuation methods can perform several narrow, but potentially useful, roles in UOS governance.

We conclude by re-examining some challenges raised in the literature on valuation of urban ecosystem services in the context of UOS governance and management.

Ecosystem services

UOSs are often publicly accessible areas within a populated settlement comprising vegetated 'green', derelict 'brown', water-dominated 'blue' and hard-surfaced 'grey' elements (see Chapter 3 for a definition of the urban matrix). Depending on their qualities, UOS provide different urban ecosystem services to urban residents (Voigt et al., 2014; Massoni et al., 2018) (see Box 8.1 and Figure 8.1).

Qualities and benefits of urban open spaces

UOSs provide multiple benefits across diverse scales and infrastructural typologies (Voigt et al., 2014; Massoni et al., 2018) and contribute to quality of life through recreational and aesthetic services (van den Bosch & Nieuwenhuijsen, 2017). The social and cultural perspectives and user values are critical to planning and management, yet they are difficult to measure due to increasing social, cultural and environmental diversity in urban areas (Massoni et al., 2018; Barton et al., 2019a). Addressing the benefits of UOS, therefore, demands a broad focus on both the structural diversity and

BOX 8.1: DEFINITION OF ECOSYSTEM SERVICES

The UOS resources have multiple values, with green spaces in particular providing numerous benefits for people and society through what are often referred to as ecosystem services. Ecosystem services are the benefits people obtain from ecosystems and can be provisioning, regulating, cultural or supporting (MEA, 2005).

- **Provisioning** ecosystem services are the output of products, such as food, fresh water, wood and biochemicals.
- **Regulating** ecosystem services are those that mediate, such as wetlands that absorb excess runoff water and prevent flooding.
- **Cultural** ecosystem services are the non-material benefits ecosystems can provide, such as recreation and cultural heritage.
- **Supporting** ecosystem services are processes that underpin all the other services – for example the formation of soil and cycling of nutrients.

Ecosystem services depend on the biophysical structures, or qualities, and connected functions of UOS, and they lead to benefits which have values for people and society, as described by Haines-Young et al. (2006).

The composition and spatial configuration of different vegetation types – for example trees and shrubs – are critical factors for regulating and cultural ecosystem services, such as moderating the temperature or providing an attractive space for physical activities (Nesbitt et al., 2017; Palliwoda et al., 2017). Trees provide regulating ecosystem services, such as cooling ambient air through shading and evapotranspiration, improving

air quality through filtering out pollutants or buffering noise, regulation of stormwater run-off and mediation of air flow (Nowak, 2017). Green spaces provide arenas for cultural ecosystem services, particularly for recreation. These include spaces not only for sports activities but also for other sorts of social interactions. Tree and shrub species differ considerably in drought resilience and in their capacity to mitigate or even amplify air pollution under certain environmental circumstances. Some of them produce allergens or cause other undesirable impacts, also known as disservices (Gómez-Baggethun & Barton, 2013; Churkina et al., 2015). There is also an ongoing debate about the introduction of non-native species expected to have higher resilience against drought and pests. The link between biodiversity in general and specific ecosystem services needs further exploration at the fine spatial scale of differentiated urban structures (Schwarz et al., 2017).

the social and cultural values attributed to those places (Dempsey & Smith, 2014; Voigt et al., 2014).

Human health and well-being have long been acknowledged as key benefits of UOS (Nowak et al., 2018), while biodiverse UOSs have been shown to benefit users through indirect cultural pathways (Clark et al., 2014). Structurally complex vegetation, such as a diversity of flowers, birds and other wildlife, is highly valued by users (Harris et al., 2018) and can thereby provide restorative effects (Nordh & Østby, 2013). In densely urbanised non-Western settings, cleanliness, beautiful views within parks, tranquillity, high green coverage provided by mature trees and good maintenance have all been proven to be important for use (Jim & Chen, 2006). There are also education benefits, especially to younger users, as interaction with biotic and abiotic elements at an early age can have positive effects on appreciating trees and nature in later life (Lohr & Pearson-Mims, 2005).

The benefits of UOS are frequently discussed in terms of human nature

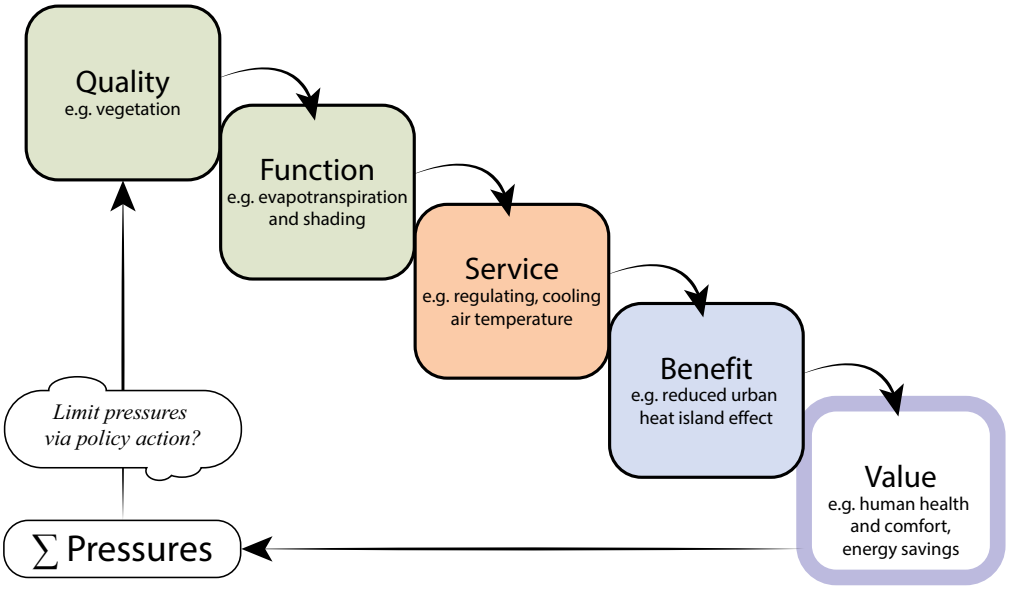


Figure 8.1 The ecosystem services cascade. *Source*: Adapted from Haines-Young et al. (2006)

interactions, with the focus on ecosystem structure and function (Voigt et al., 2014; Massoni et al., 2018). The ecosystem function approach involves a landscape and population-scale framing of ecosystem services and benefits. This framing is different from an urban ecosystem services discourse that links park users' perceptions to a variety of social-ecological contexts and relations. The socioecological approach highlights elusive and less tangible values (Zwierzchowska et al., 2018), recognising plural and diverse individual and social valuation contexts (Jacobs et al., 2016). Framing benefits within a UOS perspective thus provides an opportunity to integrate place-specific socioecological perspectives with an ecosystem functional approach. Such a place-based approach recognises dynamic human emotions and relationships involved in individual and group attachment to a specific location or place and can be used to improve understanding of how people perceive and experience urban nature and thereby stimulate public engagement in urban stewardship (Tuan, 2001). An integrated place-based and structural approach to UOS management has the potential to encompass and embrace diverse biocultural perspectives, contextualising and shedding light on new and reflexive platforms for environmental governance (Buizer et al., 2016). Examples of different UOSs and their relations to ecosystem services are shown in Table 8.1.

Valuation of benefits from urban open spaces

As a mix of biotic and abiotic qualities, UOS represents a diverse and rich set of contexts in which perspectives, preferences and values of cultural ecosystem services may vary. Values and preferences are influenced by seasonal variations (Box 8.2 and Figure 8.2). They are also conditioned by individuals' capabilities in relation to the specific biophysical and social contexts and are articulated in ways that reflect the individuals' roles and the norms they adhere to in their social contexts (Vatn, 2005). Value-articulating institutions (Jacobs, 1997) are a framing that accommodate value diversity in the 'high-context density' of UOS, where individuals may have different preferences depending on activity. Values articulated by any particular valuation method reflect only specific dimensions of mixed-use and multi-purpose environments. Figure 8.3 shows a hierarchy of ecological, economic, sociocultural and institutional contexts which may determine values of UOS.

Basic information concerns the extent and condition of UOS (Massoni et al., 2018). Mapping and indicator methods can be described as ecological valuation methods that identify important qualities explaining the capacity and suitability of UOS. Modelling UOS capacity as a habitat for plants, insects, urban wildlife and human recreation may be combined with indicators of species-specific suitability to map the potential supply of ecosystem services. This is used in the ESTIMAP (Ecosystem Service Mapping Tool) approach to mapping pollination and recreation potential (Zulian et al., 2018). These methods articulate 'ecological values' of UOS. Economics is concerned with the next level of how revealed choices, either directly through purchases in markets or indirectly through expenses, allocation of time or stated willingness to pay, reveal monetary values for access to, and suitability of, UOS. These 'economic choices' are conditioned by individuals' physical, social and financial capabilities. Social capabilities are also determined by the social contexts

Table 8.1 Qualities and functions of UOS (green, blue, brown and grey) leading to benefits and values

UOS category	*Quality*	*Function*	*Service*	*Benefit/value*
Green	Vegetation: Trees, wooded areas, hedges, shrubs, flowerbeds, grassed areas	Evapotranspiration and shading Air filtration and CO_2 sequestration	Regulating ecosystem services, cooling air temperature, improving air quality, flood protection	Cooling of urban heat island effect, clean air and limitation of CO_2 emissions, stormwater management
	Recreation infrastructure: playgrounds, goals for football, benches, walls, picnic tables, drinking fountains, shelters, landmarks, pavilions, sanitation, lighting, restaurants, cafes, kiosks	Stimulation of senses and aesthetic values, provision of space for recreation and physical activity Regulation of water flow	Cultural ecosystem services, inspirational and spiritual engagement, opportunities for relaxation, play, inspirational and spiritual engagement social interaction and physical activity	Maintaining health and well-being
Blue	Natural or near-natural lakes/ponds/ pools	Air temperature regulation	Regulating ecosystem services, cooling air temperature	Cooling of urban heat island effect, provision of water, source of food (fishing)
	Fountains/ flowing watercourses in parks, rivers	Water supply	Supporting ecosystem services, water supply	
	Visually dominant water elements in neighbourhoods	Provision of space for recreation, play and physical activity	Cultural ecosystem services, inspirational and spiritual engagement, opportunities for recreation and physical activity, sense of place	Maintaining health and well-being
	Coastlines, wetlands	Stimulation of senses and aesthetic values Landmark		
Brown	Diverse spontaneous vegetation, herbs, tree seedlings, diverse water edge (wetland plants)	Air temperature regulation Air filtration and CO_2 sequestration	Regulating ecosystem services, cooling air temperature, improving air quality, flood protection	Reduced heat island effect, clean air and limitation of CO_2 emission, stormwater management
		Regulation of water flow and capacity for water absorption Provision of space for recreation, relaxation, play and social interaction	Cultural ecosystem services, opportunities for relaxation, play, social interaction and physical activity	Maintaining health and well-being
Grey	Squares, plazas, pedestrian areas	Provision of space for recreation, relaxation, play, social interaction and active travel	Cultural ecosystem services, opportunities for relaxation, play, social interaction and physical activity	Maintaining health and well-being
	Active recreation infrastructure, streets, bicycle paths, footpaths, running paths, athletics fields		Regulating ecosystem services; improving air quality	Limitation of CO_2 emissions

BOX 8.2: CHALLENGE MAPPING AND VALUATION – SEASONAL AND AD HOC UOS QUALITIES IN OSLO

There are UOSs that include temporary pedestrian areas with no or few green elements in the middle of city streets, where most of the qualities may be built and architectural. The ecosystem services of vegetation may then be predominantly due to aesthetic qualities providing mental recreation. In winter, UOSs in temperate climates may temporarily become 'white space', as broadleaf vegetation is no longer green. For some months, trees function as urban fabric and perhaps retainers of memories of green. Trees in groups may function as space makers in a way akin to built infrastructure, providing a semi-transparent, rich-texture enclosing UOS. During all seasons, people provide vitality to UOS that might otherwise be devoid of biotic qualities (Gehl, 2011). Taken together, multi-dimensional, dynamic, ad hoc and seasonal variations in qualities of UOS at eye-level spatial scales pose methodological challenges when mapping qualities and modelling functions of UOS. Methods for valuing the benefits of UOS also need to be calibrated to the appropriate spatial and temporal resolution and need to control for a large number of contextual factors (Gómez-Baggethun & Barton, 2013).

Figure 8.2 A temporary pedestrian area in Oslo. *Photo*: David N. Barton

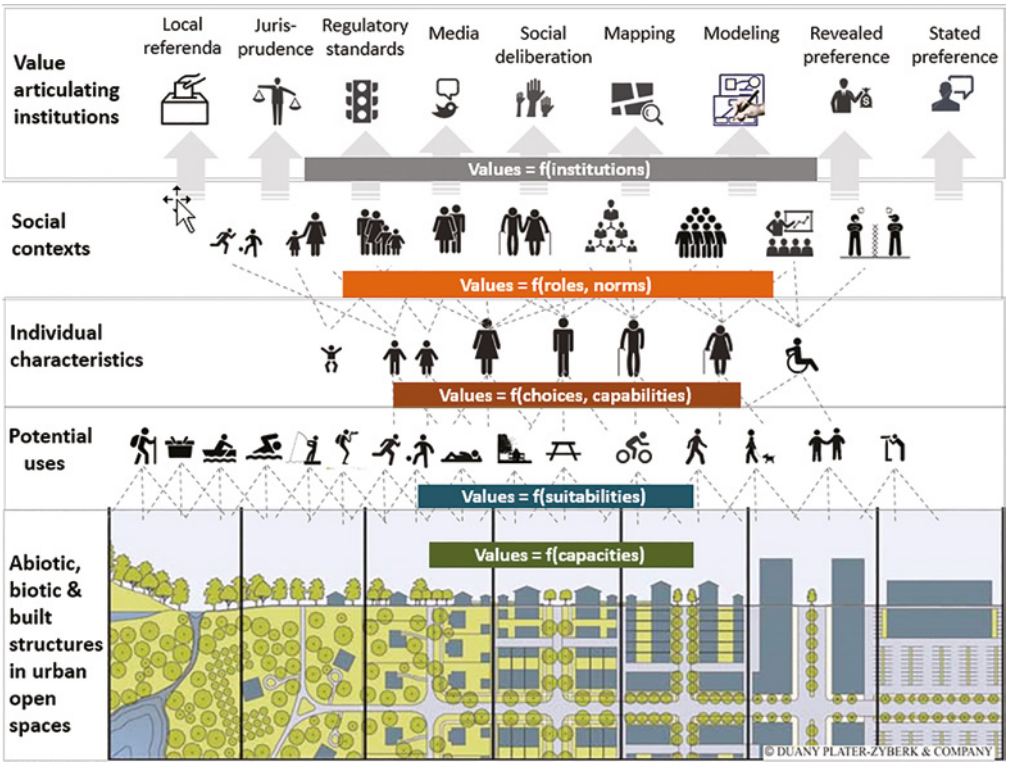


Figure 8.3 Integrated framework showing diverse value contexts of UOS addressed by a range of value-articulating methods and institutions. *Note*: The notation value = f(quality) in the diagram indicates that values are a function of different hierarchical types of UOS qualities. *Source*: Adapted from Barton (2015). People icons by Shutterstock/Freestock, landscape gradient by Duany Plater-Zyberk and company.

in which UOSs are used. Different social settings in UOS encourage people to act in different roles. There are different social norms for use of UOS, which may also vary depending on the social setting. Without self-contradiction, the same individual may hold different values in different social contexts and express different preferences in different choice situations. Therefore, UOSs are high 'context density' environments (Gómez-Baggethun & Barton, 2013). Single valuation methods will reflect only a part of the plural valuation picture.

The highest level in this framework concerns how institutions (see Box 8.3) formalise methods – for example by researchers. Qualities of UOS are mapped, biophysical capacities are modelled and capabilities and choices of UOS users are assessed using sociocultural and economic valuation methods. Sociocultural valuation methods appraise shared values by studying social deliberation by groups and sharing of information about preferred UOS on social media (Irvine et al., 2016). Social values are also expressed through local referenda, court rulings on environmental damage and establishment of environmental quality standards (e.g. water and air quality in UOS) by relevant authorities. Biophysical mapping and modelling are also value-articulating institutions to the extent that they express the relative importance of structures or functions of UOS. Value-articulating institutions emphasise that values do not exist independently of institutional settings in a wide sense. Thus it follows that economic

BOX 8.3: DEFINITION

Institutions (as shown in Figure 8.3) are the conventions, norms and formally sanctioned rules of a society. They provide expectations, stability and meaning essential to human existence and coordination. Institutions support certain values and produce and protect specific interests (Vatn, 2015).

values do not exist independently, and social norms co-determine individuals' choices about the use of UOS. Where and when public norms govern urban inhabitants' behaviour is an empirical question, but it is likely that these norms play an important role in UOSs that are public and shared. In conclusion, the greater diversity of preferences associated with the rich context of UOS requires an inclusive and plural approach in valuation methods (Jacobs et al., 2016; Barton & Harrison, 2017) (Table 8.2).

Use of monetary values of UOS in policymaking and management

Monetary valuation methods are a subset of available plural valuation methods (Harrison et al., 2017). Within the set of monetary valuation methods (Box 8.4), there are a number of different approaches available for decision support in UOS governance and management (Gómez-Baggethun & Barton, 2013; Harrison et al., 2017). Figure 8.4 provides a general overview of the different decision contexts in choosing a monetary valuation method (Harrison et al., 2017).

A starting point for monetary valuation could be local governments wanting to raise awareness about the monetary value of UOS (Barton, 2015). The type of valuation method used may not be a deciding factor but rather the availability of credible results from similar cities. In that case, VT methods may be used in both stated or revealed preference methods – for example recreation amenity values from green spaces in other cities (Brander & Koetse, 2011). Another context is local government accounting. Built infrastructure represents capital assets that provide local government services. Similarly, parks and street trees are assets that provide a stream of cultural and regulating services. Their management requires budgeting for maintenance and replacement costs. To better justify the costs, the value of these assets can be used alongside other local government assets. Ecosystem accounting guidance recommends using valuation methods based on observable market prices (exchange based) (Baro et al., 2014). For example, Czembrowski and Kronenberg (2016) determined the contribution of proximity to urban parks to property prices after controlling for other neighbourhood characteristics. This proximity value capitalised in the housing market represents a monetary asset value of urban parks.

Local governments may be faced with a choice of whether to re-regulate an area previously dedicated to industry to housing, commercial activity or UOS. In principle, cost-benefit analysis could be used to screen and rank the profitability of alternative zoning options of UOS. In practice, the use of monetary cost-benefit analysis in zoning is limited due to multiple cultural and regulating ecosystem services being affected and only partial monetary valuation of this suite of services being possible (Gómez-Baggethun & Barton, 2013). In a plural values context of UOS, the ranking

Table 8.2 Monetary valuation methods and decision-support approaches

Valuation methods:	
Market price/ exchange-based methods	Values are observed directly or derived from prices in markets. This is a large category of monetary methods that includes cost-based methods (next). Revealed preferences methods (next) are sometimes included in exchange-based methods because market prices (house prices, costs of travel) are used to derive values of ecosystem services indirectly. Shadow pricing is also an implicit form of market price defined as the marginal price society 'puts' on the provision of non-marketed ecosystem services through setting environmental targets (e.g. Konrad et al., 2017).
Cost-based methods / mitigation costs	A group of 'exchange-based' techniques that use the cost of actual measures to maintain ecosystem service provision as a proxy for the value of actions undertaken in the mitigation hierarchy (BBOP, 2009), including actions to avoid, minimise, restore or replace ecosystems and their services that are potentially at risk in connection with a development. As a valuation technique, the costs of actions are taken as proxies for the value of the ecosystem services lost. This group of methods, therefore, includes (i) restoration cost, (ii) replacement cost and (iii) clean-up cost.
Revealed preference methods	Values of ecosystem services are revealed indirectly through purchases (e.g. house prices) (Czembrowski & Kronenberg, 2016) or recreation travel costs (Bertram & Larondelle, 2017). Examples include (i) hedonic pricing, which is the study of multi-correlation between environmental characteristics of a good and its sales price, and (ii) travel cost methods, which are based on the observation that recreational services can only be realised through physical access to nature. Random utility models consider travel choices between many sites (Day & Smith, 2018).
Stated preference methods	Stated preference valuation is a family of economic valuation techniques which use individual respondents' stated hypothetical choices to estimate change in the utility associated with a proposed increase in quality or quantity of an ecosystem service or bundle of services (Bateman et al., 2002). The methods include (i) contingent valuation, (ii) choice experiments and (iii) contingent ranking.
Time-use studies	This method is an innovation of the conventional stated preference techniques taken from the contingent valuation approach. Surveys are used to estimate the value of ecosystem services by asking people how much time they would be willing to invest for a change in the quantity or quality of a given service (García-Llorente et al., 2016).
Resource rent	A method that derives the value of the ecosystem service as a residual after the contributions of other forms of capital have been deducted from the operating surplus (e.g. Obst et al., 2016).
Simulated exchange	Based on a derived demand function, it is possible to estimate a marginal exchange value by choosing a point along the demand function, either based on observed behaviour or through intersection with a modelled supply curve. This is an experimental method proposed for ecosystem accounting (see Campos & Caparrós, 2011; Obst et al., 2016).
Production/ cost function	These approaches relate the output of marketed goods to the inputs of ecosystem services through the use of econometric techniques (e.g. Bateman et al., 2011).
Value transfer	Benefits transfer or, more generally, value transfer (VT), refers to applying quantitative estimates of ecosystem service values from existing studies to another context (see Johnston et al., 2015). Brander and Koetse (2011) estimate VT functions for green space using meta-analysis.
Decision-support approaches:	
Cost-effectiveness analysis	A decision-support tool for ranking alternative ways of meeting the same policy goal by their ratio of effectiveness to cost (see Boardman et al., 2006).
Benefit-cost analysis	A decision-support tool for screening alternatives by their internal rate of return or ranking alternatives by their discounted benefit/cost ratio or net present value (see Boardman et al., 2006).
Multi-criteria decision analysis (MCDA)	An umbrella term to describe a collection of formal approaches that seek to take explicit account of multiple criteria in helping individuals or groups explore decisions that matter. Spatial MCDA are carried out in Geographic Information System (GIS) in order to enable visualisation of the multiple criteria (see e.g. Munda, 2004).

Source: Adapted from Harrison et al. (2017)

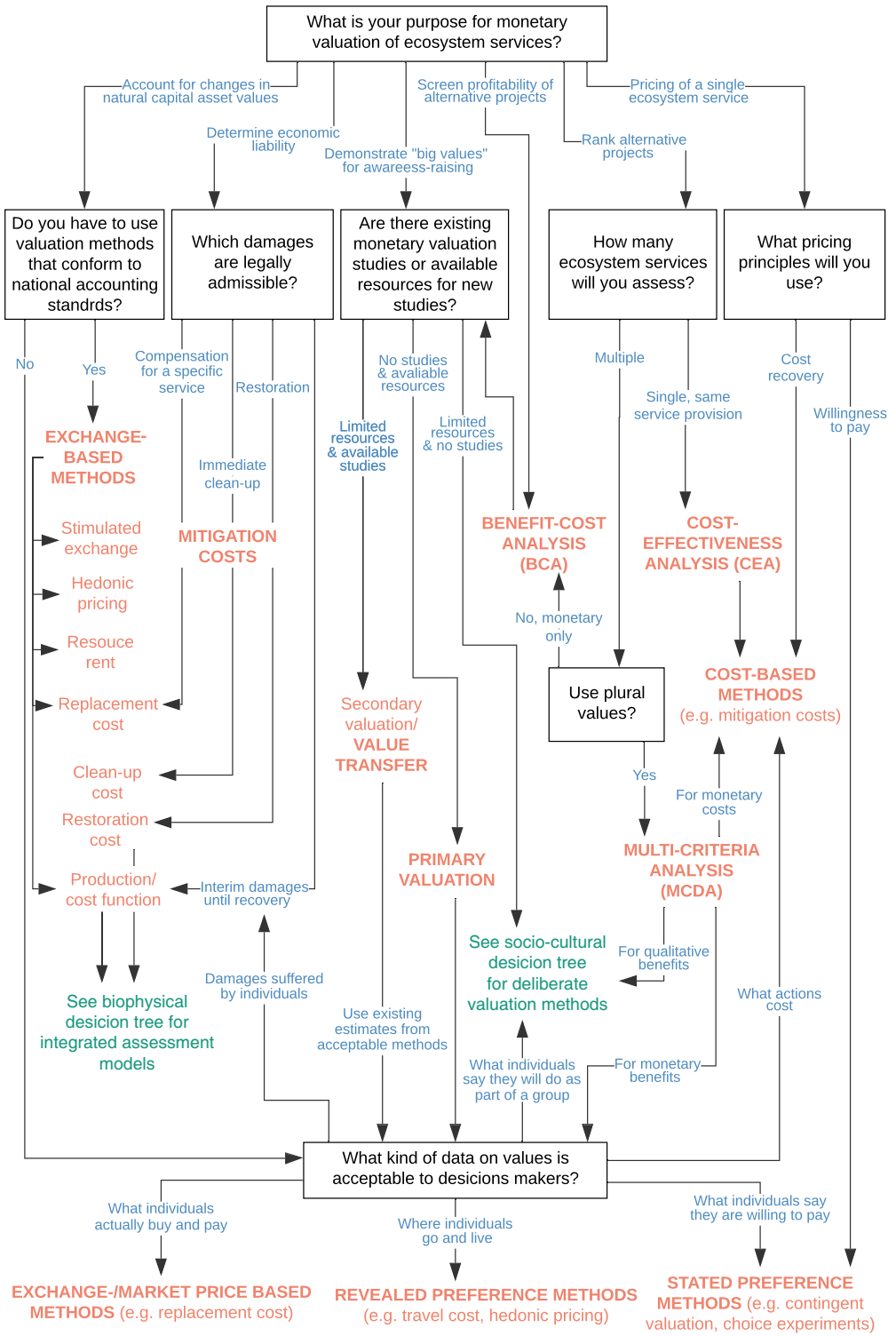


Figure 8.4 Decision tree for choosing an approach for monetary valuation of ecosystem services based on the purpose of the analysis. *Source*: Reproduced from Harrison et al. (2017).

of different land-use options may only be possible using multiple criteria analysis (Saarikoski et al., 2016). Once a decision has been made to zone an area for UOS, simple cost-effectiveness analysis may be used to determine the cheapest means to achieve a specific level of service provision – for example choosing the cheapest tree species with a minimum life expectancy to line a new avenue or the cheapest way of providing a required playground area. Cost-effectiveness approaches do not compare alternative quality levels, only the cheapest way of reaching regulated norms for outdoor areas. In some cases, green elements in UOS will be damaged, willingly or not. Local governments may have regulations in place requiring assessment of damage in order to set compensation levels or fines. For example, the VAT03 method for valuation of trees (Randrup, 2005) is used by local governments in Denmark and Norway to calculate fines for damage to public trees. The replacement cost of a tree is adjusted for the quality of the damaged tree in terms of tree age, health and location characteristics.

In choosing a monetary valuation method, the decision-support context will in part determine the kind of data on values that are acceptable to decision makers. In addition, different policy questions in UOS require different levels of precision for valuation estimates (Figure 8.5).

The fact that UOS can be highly heterogeneous, involving large numbers of diverse users with different perspectives (Gómez-Baggethun & Barton, 2013), means that the variation in valuation results can be expected to be higher for cultural ecosystem services, for example, than for single recreation destinations in rural areas. Before using a valuation method to assess UOS, an understanding of the accuracy and reliability requirements of the situation is needed. In the following, based on Barton (2007), we discuss whether the expected accuracy of the valuation information is sufficient for the requirements of the decision-support context.

- **Demonstration of 'big numbers'** for awareness raising about the economic importance of UOS does not necessarily involve comparing this value to alternative land uses. The expectation is often that valuation methods will yield 'big numbers' – in the millions or billions – depending on the currency, number and size of the UOS considered. The required accuracy is low and benefit-transfer techniques using available estimates of ecosystem services values from other UOSs may be acceptable. Valuation to reflect big numbers can be used in a strategy of 'city branding'.
- **Accounting for trends** in the value of UOS. Local governments may wish to include the natural capital value of UOS in their accounts. The aim of economic valuation is to allow detection of significant trends in asset value over time and relate this to city-level policy targets, such as 'no net loss of city trees' or increasing the availability of UOS within 500 m of residences. Accounting-compatible valuation methods are based on exchange values observed in markets. Only a share of economic welfare is captured by exchange values. For example, I-Tree Eco (Nowak, 2017) is a tool for monetary valuation of a suite of ecosystem services from urban forests with a level of accuracy that is appropriate for observing trends in asset value for urban forests as a whole but lacking the spatial resolution to assess individual trees. In some cases, monetary valuation methods may not be robust enough to value the use of UOS for accounting, and applying physical measures of use may serve to track trends in importance equally well (Box 8.4 and Figure 8.6).

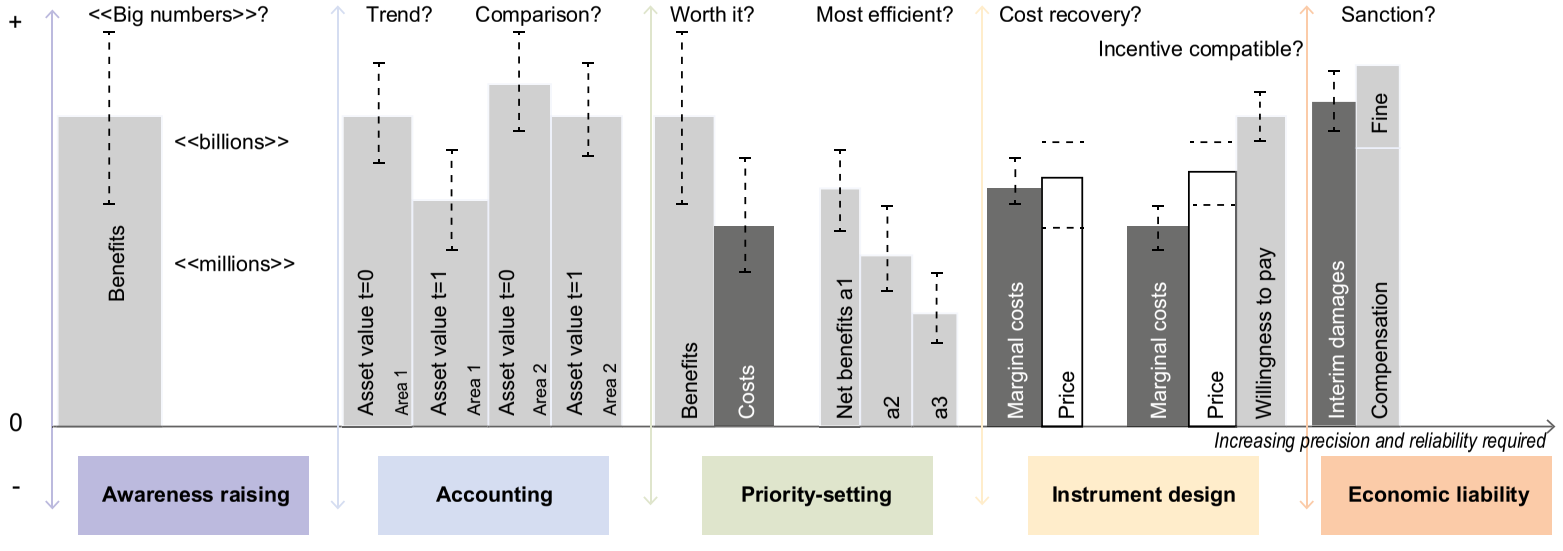


Figure 8.5 Different policy purposes of monetary valuation of ecosystem services and their different requirements for accuracy. *Source*: Adapted from Barton et al. (2019b)

BOX 8.4: NON-MONETARY VALUATION – ACCOUNTING FOR RECREATION TIME IN UOS IN OSLO

The gradient of UOS in Oslo ranges from city streets with trees in the urban core to old growth forest wilderness areas in the peri-urban Marka forest. The importance of visits can be valued in non-monetary terms as the amount of time spent per site for each visit. Time spent on-site is greatest for wilderness areas and lowest for urban areas with trees (Figure 8.6). Combining the data suggests that the part of the Marka forest that is closest to the city is the most important UOS in Oslo in terms of total time spent on-site for recreation. Estimates also suggest that Marka wilderness areas, although visited much less frequently, may be as important in terms of time on-site as parks and cemeteries or nature areas within the city. This example shows the power of non-monetary valuation methods for communicating the importance of UOS.

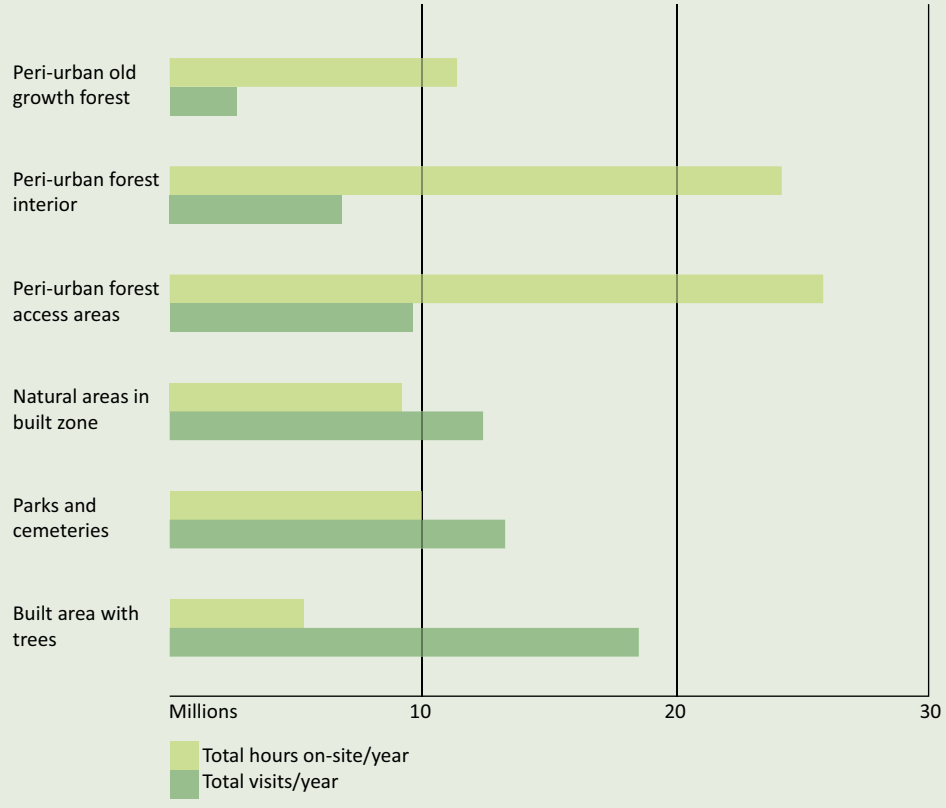


Figure 8.6 Estimated number of visits per year and total hours spent in six different UOS transects in Oslo local government. *Note*: Recreational trips were only in urban areas with trees. *Data source*: OpenNESS Survey 2016 by NORSTAT. N = 1,147

- **Screening and ranking profitability of alternative projects for priority setting** means asking whether an action is worthwhile rather than which alternative will give the most benefits from the investment. Cost-benefit analysis (CBA) of UOS is rare. Previous CBA – for example of green roofs – has tended to focus on selection of the most important ecosystem services. Nurmi et al. (2016) found that even when green roof benefits are limited to scenic benefits, the inclusion of benefits from just one ecosystem service can tip a cost-benefit screening of roof designs in favour of green over grey roofs. The results are sensitive to green roof design, and this sensitivity to the actual design of blue-green spaces – rather than just counting surface area – could be expected to be even greater for multiple-use UOSs.
- **Pricing and incentive design.** The benefits from UOSs are often public goods from which it is physically difficult to exclude people and thus charge a fee. On the other hand, local governments provide and charge for public utilities, recovering costs directly through water and sanitation fees or through property taxes. Economists have estimated the loss of tax revenue due to brown spaces (Mihaescu & Vom Hofe, 2013). Similarly, one would expect gains in tax revenues from maintenance of UOS. For example, Escobedo et al. (2015) estimated the contribution of urban trees to higher property values versus a loss in value for grass. Where there are property taxes, there seems to be scope for using hedonic pricing to assess the impacts on local government revenue. Where there are no property taxes, their introduction may be motivated by significant positive effects on property prices. However, hedonic pricing methods are sensitive to model specification and the accuracy requirements for property tax design may exceed the capabilities of the valuation method.
- **Determining economic liability and sanctions.** The requirements of monetary valuation methods for determining damage compensation to qualities of UOS are perhaps the highest of all the decision contexts discussed so far. Typically, damage occurs at small scales associated with property development or vandalism, in particular to trees. At this scale, original valuation studies are much more expensive than the damage itself. Consequently, cities use standardised appraisal methods for valuing damage to urban trees (Randrup, 2005; Ponce-Donoso & Vallejos-Barra, 2016).

Valuation challenges in UOSs and a research agenda

Assessing the values of UOS is complex and varies depending on beneficiaries. Managing organisations (local governments, housing companies, cemeteries, etc.), may not always see the direct values and outputs of the ecosystem services they provide via the UOS they own and manage. While a local government or a housing company may see it as an important management aspect to optimise ecosystem services for the benefit of its users, a developer may gain less due to building restrictions caused by prioritising of ecosystem service provision. The question is whether the immediate loss of profit to the developer can be justified by increased values for the future residents or the developer can increase the gains of the development project due to the existence of ecosystem services.

In addition, it is difficult to compare different types of values, even if the monetary value is the same for two different solutions, simply because the beneficiaries may differ. Therefore, although valuation would be easy, cheap and accurate, it could not stand alone in a management situation. Next, we describe a number of technical challenges in assessing monetary valuations of UOS. How to use these valuations in a meaningful way is a matter of management approach, which is dealt with more in Chapters 4 and 11.

Gómez-Baggethun and Barton (2013) list ten challenges in valuation of urban ecosystem services for urban planning, governance and management. Here we review these challenges in light of UOS and offer some ways forward.

- **Population density and use.** The combined scarcity of UOS in densely built areas and the high density of beneficiaries lead to variations in time spent between different urban transects. Time spent in different UOS may be more accurately accounted for as global systems for mobile communication tracking data become more widely available (De Nadai et al., 2016), with new challenges arising regarding privacy of individual-tracking data.
- **Non-linear distance decay of benefits.** Depending on residents' perception of their neighbourhood, attractiveness and willingness to walk to UOSs may be highly non-linear and local. Computing network walking distances and perceived distances in street networks is becoming more common using GIS-based Place Syntax Tools (Heyman et al., 2017).
- **Recreational substitution possibilities.** Larger substitution possibilities generally reduce the value of any individual UOS. In urban areas, there may be many alternative recreational activities competing for free time. Multiple-site discrete choice recreation models offer an approach to control for the effect of substitute sites (Day & Smith, 2018), although the challenge remains how widely to define recreation alternatives.
- **Substitution possibilities between ecosystem services and man-made services.** In densely populated urban areas, space is scarce and UOS that provides multiple benefits can be more cost-effective than maintaining or restoring, for example, extensive natural systems. Replacement cost methods offer a partial approach to valuation. The method may not capture all the plural benefits of UOS – for example the value of time spent exercising in a space estimated by the cost of exercising in an indoor gym addresses only physical exercise effects (Barton et al., 2017).
- **Heterogeneity of inhabitant spatial 'perspectives'.** Higher density of population is expected to be associated with a larger number of perspectives – i.e. inhabitants literally experience more sides to the same structural qualities of UOS. Monetary valuation has not reached the sophistication of being able to disentangle the inter-personal effects of different structural elements of UOS. Environmental psychology research can identify inter-personal preferences for structural attributes of UOS (Nordh et al., 2013).
- **Socioeconomic and cultural diversity.** Sociocultural diversity varies more over smaller spaces with clustering of similar populations in specific neighbourhoods or even streets. Integrated valuation methods, such as

participatory mapping in combination with hedonic property pricing, offer avenues for considering plural values of UOS (Czembrowski et al., 2016).

- **Connectivity/infrastructure value.** By acting as corridors and habitats for human transit, UOSs have an 'infrastructure value' (a 'between-ness value'), which has begun to be appreciated in hedonic pricing through the use of urban network integration measures to identify the connectedness of a property through UOS (Heyman et al., 2017).
- **Urban growth and time stability of values.** Rapid urban growth and re-zoning raise questions about the time stability of monetary valuation estimates. Both market-based and survey-based valuation methods show that valuation results for UOS are sensitive to population density (Brander & Koetse, 2011). Hedonic pricing methods should account for zoning plans, as well as existing accessibility (Kendall & Tulip, 2018).
- **Multiple environmental stressors.** The multiple stressors in urban environments create difficulty in attributing health effects to UOS. Although the pathways have been documented in controlled environments, studies must have large samples and be able to control for confounding variables sufficiently to identify physical health outcomes of greenness in UOS (Kardan et al., 2015). Recent studies also control for a number of personal mediating factors and evaluate more subtle impacts on mental health outcomes (Dadvand et al., 2016).
- **Spatial clustering of services.** Where spatial clustering of ecosystem services and disservices is present, a CBA of excessively limited spatial scope would have a higher likelihood of showing that costs of UOS exceed benefits. Advanced spatial modelling is available to map the recreational potential of UOS, but classification of qualitative values in ecosystem service mapping is very sensitive to the specification of spatial resolution applied in the analysis (Zulian et al., 2018). Future research should evaluate the impacts of the modifiable area-unit problem (Avelino et al., 2016) on valuation of recreational qualities of UOS.

Finally, a generic research challenge for monetary valuation of UOS is to study the cost in relation to the number of beneficiaries. The cost of carrying out original valuation studies is high, and so justifiable studies from an information value point of view should address a large number of beneficiaries. At the same time, changes in urban environments are incremental – plot by plot. At the individual property development level, almost no valuation study is worthwhile because few beneficiaries are involved while study costs are high. A general challenge for monetary valuation methods in urban environments in the future is to use valuation methods to generate site-specific predictions of value that are representative of an urban population.

References

Avelino, A.F.T., Baylis, K. & Honey-Roses, J., (2016). Goldilocks and the raster grid: Selecting scale when evaluating conservation programs. *PLoS One*. **11**(12), e0167945.

Baro, F., Chaparro, L., Gomez-Baggethun, E., Langemeyer, J., Nowak, D.J. & Terradas, J., (2014). Contribution of ecosystem services to air quality and climate change mitigation policies: The case of urban forests in Barcelona, Spain. *Ambio*. **43**, 466–479.

Barton, D.N., (2007). How much is enough? The value information from benefit transfers in a policy context. In: S. Navrud & R. Ready (eds.) *Environmental Value Transfer: Issues and Methods*. Dordrecht: Springer. 261–282.

Barton, D.N., (2015). Monetary valuation of urban ecosystem services-operationalization or tragedy of well-intentioned valuation? An illustrated example. In: S. Nuss-Girona & M. Castañer (eds.) *Ecosystem Services: Concepts, Methodologies and Instruments for Research and Applied Use*. Girona: Documenta Universitaria. 65–85.

Barton, D.N., Caparrós, A., Conner, N., Edens, B., Piaggio, M. & Turpie, J., (2019b). *Defining Exchange and Welfare Values, Articulating Institutional Arrangements and Establishing the Valuation Context for Ecosystem Accounting*. Discussion paper 5.1: Version 9 June. SEEA Experimental Ecosystem Accounting Revision 2020. Glen Cove, NY: The 2019 Forum of Experts in SEEA Experimental Ecosystem Accounting.

Barton, D.N., Grimsrud, K., Greaker, M., Heyman, A., Chen, X., Garnåsjordet, P.A. & Aslaksen, I., (2017). *Monetary Valuation Methods in Urban Ecosystem Accounting – Examples of Their Relevance for Municipal Policy and Planning in the Oslo Metropolitan Area*. Presentation at London Group meeting, "Methodology of SEEA CF and the Ecosystem Accounts", 17–20 October 2017, Costa Rica.

Barton, D.N. & Harrison, P.A., (2017). *Integrated Valuation of Ecosystem Services. Guidelines and Experiences*. OpenNESS Project Deliverable 33–44. European Commission FP7, 2017. EU FP7.

Barton, D.N., Obst, C., Day, B., Caparrós, A., Dadvand, P., Fenichel, E., et al., (2019a). *Discussion Paper 10: Recreation Services from Ecosystems*. Version of 25 March 2019. New York. Expert Meeting on Advancing the Measurement of Ecosystem Services for Ecosystem Accounting: United Nations.

Bateman, I.J., Carson, R.T., Day, B., Hanemann, M., Hanley, N., et al., (2002). *Economic Valuation with Stated Preferences Techniques. A Manual*. Cheltenham: Edward Elgar Publishing.

Bateman, I.J., Mace, G.M., Fezzi, C., Atkinson, G. & Turner, K., (2011). Economic analysis for ecosystem service assessments. *Environmental & Resource Economics*. **48**(2), 177–218.

BBOP, (2009). *Biodiversity Offset Cost-Benefit Handbook*. Washington, DC: Business and Biodiversity Offsets Programme (BBOP).

Bertram, C. & Larondelle, N., (2017). Going to the woods is going home: Recreational benefits of a larger urban forest site – A travel cost analysis for Berlin, Germany. *Ecological Economics*. **132**, 255–263.

Boardman, A.E., Greenberg, D.H., Vining, A.R. & Weimer, D.L., (2006). *Cost-Benefit Analysis. Concepts and Practices*. Upper Saddle River, NJ: Pearson Prentice Hall.

Brander, L.M. & Koetse, M.J., (2011). The value of urban open space: Meta-analyses of contingent valuation and hedonic pricing results. *Journal of Environmental Management*. **92**, 2763–2773.

Buizer, M., Elands, B. & Vierikko, K., (2016). Governing cities reflexively: The biocultural diversity concept as an alternative to ecosystem services. *Environmental Science & Policy*. **62**, 7–13.

Campos, P. & Caparrós, A., (2011). *RECAMAN Project: Mediterranean Monte Ecosystems Total Income Green Accounting*. Presentation to the Expert Meeting on Ecosystem Accounting, May 2011. Copenhagen: European Environment Agency.

Churkina, G., Grote, R., Butler, T.M. & Lawrence, M., (2015). Natural selection? Picking the right trees for urban greening. *Environmental Science & Policy*. **47**, 12–17.

Clark, N.E., Lovell, R., Wheeler, B.W., Higgins, S.L., Depledge, M.H. & Norris, K., (2014). Biodiversity, cultural pathways, and human health: A framework. *Trends in Ecology & Evolution*. **29**(4), 198–204.

Czembrowski, P. & Kronenberg, J., (2016). Hedonic pricing and different urban green space types and sizes: Insights into the discussion on valuing ecosystem services. *Landscape and Urban Planning*. **146**, 11–19.

Czembrowski, P., Laszkiewicz, E. & Kronenberg, J., (2016). Bioculturally valuable but not necessarily worth the price: Integrating different dimensions of value of urban green spaces. *Urban Forestry & Urban Greening*. **20**, 89–96.

Dadvand, P., Bartoll, X., Basagana, X., Dalmau-Bueno, A., Martinez, D., et al., (2016). Green spaces and general health: Roles of mental health status, social support, and physical activity. *Environment International*. **91**, 161–167.

Day, B. & Smith, G., (2018). *Outdoor Recreation Valuation (ORVal) User Guide: Version 2.0*. Land, Environment, Economics and Policy (LEEP) Institute, Business School, University of Exeter.

Dempsey, N. & Smith, H., (2014). Understanding place-keeping of open space. In: N. Dempsey, H. Smith & M. Burton (eds.) *Place-Keeping: Open Space Management in Practice*. New York: Routledge.

De Nadai, M., Staiano, J., Larcher, R., Sebe, N., Quercia, D. & Lepri, B., (2016). *The Death and Life of Great Italian Cities: A Mobile Phone Data Perspective*. Proceedings of the 26th International ACM Conference on World Wide Web (WWW), 2016.

Escobedo, F.J., Adams, D.C. & Timilsina, N., (2015). Urban forest structure effects on property value. *Ecosystem Services*. **12**, 209–217.

García-Llorente, M., Castro, A., Quintas-Soriano, C., López, I., Castro, H., Montes, C. & Martín-López, B., (2016). The value of time in biological conservation and supplied services. *Journal of Arid Environments*. **124**, 13–21.

Gehl, J., (2011). *Life Between Buildings: Using Public Space*. London: Island Press.

Gómez-Baggethun, E. & Barton, D.N., (2013). Classifying and valuing ecosystem services for urban planning. *Ecological Economics*. **86**, 235–245.

Haines-Young, R., Potschin, M. & Cheshire, D., (2006). *Defining and Identifying Environmental Limits for Sustainable Development. A Scoping Study*. Final Full Technical Report to Defra, Project Code NR0102.

Harris, V., Kendal, D., Hahs, A.K. & Threlfall, C.G., (2018). Green space context and vegetation complexity shape people's preferences for urban public parks and residential gardens. *Landscape Research*. **43**(1), 150–162.

Harrison, P.A., Dunford, R., Barton, D.N., Kelemen, E., Martín-López, B., et al., (2017). Selecting methods for ecosystem service assessment: A decision tree approach. *Ecosystem Services*. **29**, 481–498.

Heyman, A.V., Chen, X., Manum, B., Nowell, M. & Bartno, D.N., (2017). *Attributes of Location and Housing Prices in Oslo: A Monetary Valuation with Spatial Configuration in Mind*. Proceedings of the 11th Space Syntak Symposium. 68, 1–15.

Irvine, K.N., O'Brien, L., Ravenscroft, N., Cooper, N., Everard, M., Fazey, I., Reed, M.S. & Kenter, J.O., (2016). Ecosystem services and the idea of shared values. *Ecosystem Services*. **21**, 184–193.

Jacobs, M., (1997). Environmental valuation, deliberative democracy and public decision-making. In: J. Foster (ed.) *Valuing Nature? Economics, Ethics and Environment*. London: Routledge. 211–213.

Jacobs, S., Dendoncker, N., Martin-Lopez, B., Barton, D.N., Gomez-Baggethun, E., et al., (2016). A new valuation school: Integrating diverse values of nature in resource and land use decisions. *Ecosystem Services*. **22**, 213–220.

Jim, C.Y. & Chen, W.Y., (2006). Recreation – Amenity use and contingent valuation of urban greenspaces in Guangzhou, China. *Landscape and Urban Planning*. **75**, 81–96.

Johnston, R.J., Rolfe, J., Rosenberger, R.S. & Brouwer, R., (2015). *Benefit Transfer of Environmental and Resource Values. A Guide for Researchers and Practitioners*. Dordrecht: Springer Science+Business Media.

Kardan, O., Gozdyra, P., Misic, B., Moola, F., Palmer, L.J., Paus, T. & Berman, M.G., (2015). Neighborhood greenspace and health in a large urban center. *Nature, Scientific Reports*. **5**, Article number 11610.

Kendall, R. & Tulip, P., (2018). *The Effect of Zoning on Housing Prices*. Research Discussion Paper RDP 2018–03. Reserve Bank of Australia.

Konrad, M., Gyldenkærne, S., Andersen, H.E. & Termansen, M., (2017). Synergies and trade-offs in spatially targeted water quality and climate change mitigation policies. *Land Economics*. **93**(2), 3090–3327.

Lohr, V.I. & Pearson-Mims, C.H., (2005). Children's active and passive interactions with plants influence their attitudes and actions toward trees and gardening as adults. *HortTechnology*. 472–476.

Massoni, E.S., Barton, D.N., Rusch, G.M. & Gundersen, V., (2018). Bigger, more diverse and better? Mapping structural diversity and its recreational value in urban green spaces. *Ecosystem Services*. **31**, 502–516.

MEA, (2005). *Millennium Ecosystem Assessment. Ecosystems and Human Well Being. Synthesis*. Washington, DC: Island Press.

Mihaescu, O. & Vom Hofe, R., (2013). Using spatial regression to estimate property tax discounts from proximity to brownfields: A tool for local policy-making. *Journal of Environmental Assessment Policy*. **15**, 1–23.

Munda, G., (2004). Social multi-criteria evaluation: Methodological foundations and operational consequences. *European Journal of Operational Research*. **158**(3), 662–667.

Nesbitt, L., Hotte, N., Barron, S., Cowan, J. & Sheppard, S.R.J., (2017). The social and economic value of cultural ecosystem services provided by urban forests in North America: A review and suggestions for future research. *Urban Forestry & Urban Greening*. **25**, 103–111.

Nordh, H., Hägerhäll, C.M. & Holmqvist, K., (2013). Tracking restorative components: Patterns in eye movements as a consequence of a restorative rating task. *Landscape Research*. **38**, 101–116.

Nordh, H. & Østby, K., (2013). Pocket parks for people – A study of park design and use. *Urban Forestry & Urban Greening*. **12**(1), 12–17.

Nowak, D.J., (2017). Assessing the benefits and economic values of trees. In: F. Ferrini, C.C. Konijnendijk & A. Fini (eds.) *Handbook of Urban Forestry*. New York: Routledge. 152–163.

Nowak, D.J., Hirabayashi, S., Doyle, M., McGovern, M. & Pasher, J., (2018). Air pollution removal by urban forests in Canada and its effect on air quality and human health. *Urban Forestry & Urban Greening*. **29**, 40–48.

Nurmi, V., Votsis, A., Perrels, A. & Lehvavirta, S., (2016). Green roof cost-benefit analysis: Special emphasis on scenic benefits. *Journal of Benefit-Cost Analysis*. **7**(3), 488–522.

Obst, C., Hein, L. & Edens, B., (2016). National accounting and the valuation of ecosystem assets and their services. *Environmental and Resource Economics*. **64**(1), 1–23.

Palliwoda, J., Kowarik, I. & von der Lippe, M., (2017). Human-biodiversity interactions in urban parks: The species level matters. *Landscape and Urban Planning*. **157**, 394–406.

Pascual, U., Balvanera, P., Diaz, S., et al., (2017). Valuing nature's contributions to people: The IPBES approach. *Current Opinion in Environmental Sustainability*. **26–27**, 7–16.

Ponce-Donoso, M. & Vallejos-Barra, O., (2016). Urban trees appraisal, comparison of formulas. *Revista de la Facultad de Ciencias Agrarias*. **48**, 195–208.

Randrup, T.B., (2005). Development of a Danish model for plan appraisal. *Journal of Arboriculture*. **31**, 114–213.

Saarikoski, H., Mustajoki, J., Barton, D.N., Geneletti, D., Langemeyer, J., et al., (2016). Multi-criteria decision analysis and cost-benefit analysis: Comparing alternative frameworks for integrated valuation of ecosystem services. *Ecosystem Services*. **22**(Part B), 238–249.

Schwarz, N., Moretti, M., Bugalho, M.N., Davies, Z.G., Haase, D., Hack, J., Hof, A., Melero, Y., Pett, T.J. & Knapp, S., (2017). Understanding biodiversity-ecosystem service relationships in urban areas: A comprehensive literature review. *Ecosystem Services*. **27**, 161–171.

TEEB, (2010). *The Economics of Ecosystems and Biodiversity: Mainstreaming the Economics of Nature: A Synthesis of the Approach, Conclusions and Recommendations of TEEB*. TEEB October 2010.

Tuan, Y., (2001). *Space and Place: The Perspective of Experience*. Minneapolis: University of Minnesota Press.

van den Bosch, M. & Nieuwenhuijsen, M., (2017). No time to lose – Green the cities now. *Environment International*. **99**, 343–350.

Vatn, A., (2005). *Institutions and the Environment*. Cheltenham, UK: Edward Elgar Publishing.

Vatn, A., (2015). *Environmental Governance: Institutions, Policies and Actions*. Cheltenham: Edward Elgar Publishing.

Voigt, A., Kabisch, N., Wurster, D., Haase, D. & Breuste, J., (2014). Structural diversity: A multidimensional approach to assess recreational services in urban parks. *AMBIO*, 480–491.

Zulian, G., Stange, E., Woods, H., Carvalho, L., Dick, J., et al., (2018). Practical application of spatial ecosystem service models to aid decision support. *Ecosystem Services*. **29**, 465–480.

Zwierzchowska, I., Hof, A., Iojă, I.C., Mueller, C., Poniży, L., Breuste, J., Mizgajski, A., (2018). Multi-scale assessment of cultural ecosystem services of parks in Central European cities. *Urban Forestry & Urban Greening*. **30**, 84–97.

Taylor & Francis
Taylor & Francis Group
http://taylorandfrancis.com

Part III

Practising urban open space governance and management

9 Managing the maintenance of urban open spaces

Thomas B. Randrup, Andrej Christian Lindholst and Nicola Dempsey

Introduction

Management practices, which integrate and align the performance of maintenance within a comprehensive planning framework, are critical for ensuring the functionality and continuous development of ecosystem services in urban open space (UOS). Ideally, management should take into account long-term 'development' and short-term 'maintenance' responsibilities, ensuring that activities are carried out for specific purposes and that UOSs are able to meet the needs of current users and future generations (Jansson & Lindgren, 2012; Dempsey et al., 2014). This chapter reviews and discusses a range of management approaches for organising maintenance in UOS, with particular emphasis on practices in Western Europe.

The type and level of maintenance will differ according to the characteristics and type of the specific UOS – for example operations for maintaining nature-like areas will differ from those for maintaining many historical parks. Management organisations are often responsible for the maintenance of several UOSs spread over many geographical locations. This requires logistics and investments in physical facilities and machinery. The wider economic and political context means that many management organisations have experienced dramatic cuts in their funding over recent decades. The extent and consequences vary – for example the financial cuts have been detrimental to many public UOS organisations in the UK (Beer, 2002; Neal, 2016), whereas cuts and related consequences have not been as pronounced in, for example, Scandinavia (Randrup et al., 2017). The general focus on reducing costs in the public sector has been sustained by various management tools introduced in the mid-1980s as part of New Public Management (NPM) reforms (see, e.g. Hood, 1995; Gruening, 2001). With the NPM came a range of alternatives for organising the management of maintenance, such as purchaser-provider models and contracting out. Later reforms have introduced various community-based models. As a

consequence, multiple governance alternatives have become available.

In this chapter, we describe the prevalent management models for maintaining UOS and discuss the general understanding of maintenance, how the organisation of UOS maintenance has developed in relation to governance and the standards and systems most frequently applied when describing and monitoring maintenance operations.

General understanding of UOS maintenance

Specialised departments within landowning organisations, such as local governments, housing companies or cemetery organisations, typically conduct UOS maintenance routines. Management is carried out at three different levels: (i) visionary and long-sighted policy level, (ii) tactical level and (iii) operational level (Randrup & Persson, 2009) (see Figure 11.1 in Chapter 11). The need to integrate long- and short-term responsibilities means that the management of maintenance includes, but also goes beyond, mere technical aspects based on horticultural and arboricultural expertise. Up to 80% of the management activities conducted in specialised departments are concentrated on direct operations (Randrup & Persson, 2009). Such activities relate to organising and carrying out maintenance, which includes operations such as planting, pruning and weeding but also repairing equipment, painting and cleaning. With this focus, organisational activities often concentrate on technical and budgetary questions rather than long-term planning, strategizing and policymaking. This is the case around the world, including in, for example, the Nordic countries (Randrup et al., 2017), the UK (Neal, 2016) and Hong Kong (Chan et al., 2014). It means that much attention and resources are devoted to allocating sufficient maintenance resources (skills, labour and machinery) for minimum upkeep of the spaces in question.

However, experiences from the UK show that park organisations need to do more than just 'maintain', as dynamic systems, such as parks and green spaces, that are just maintained gradually degenerate and can lose their functionality as providers of ecosystem services (Jones, 2000; Beer, 2002; Neal, 2016) and for various users and uses (see Figure 9.1). Overall societal discourses (climate change, urbanisation and immigration) will also inevitably call for a change to the prevailing mindset of maintenance. There is growing interest and awareness of the need to embed maintenance as a central part of governance and management (Lindholst et al., 2016b; Salbitano et al., 2016). Gustavsson et al. (2005) discussed the values and importance of maintenance operations in relation to the development of green spaces, while Koningen (2004) coined the term 'creative management' to describe an integral approach to design and management (maintenance) and highlighted the inextricable link between spontaneous processes (as provided by nature) and human intervention (as provided through maintenance operations). For Gustavsson et al. (2005), Koningen (2004) and many others, the process of maintaining vegetation (e.g. lawn mowing, hedge cutting and tree pruning) can be used as a central means for the development of a space. This approach to integrated design through maintenance is in contrast with the prevailing UOS management models applied in practice.

Figure 9.1 Mix of users walking, cycling, picnicking and playing in Endcliffe Park, Sheffield. *Photo*: Paul Brindley

Organisation of UOS maintenance – the governance perspective

NPM emerged in the 1980s as an attempt to make the public sector more business-like and to improve government efficiency. It was inspired by ideas and management models from the private sector (e.g. those in Hood, 1995) and focused on a decentralised approach to management. It involved new service delivery models to achieve efficiencies – for example use of private companies in providing public services. Today, organisations show a large diversity in how UOS maintenance is organised. In the following, we describe three generic organisational models, many variations of which can be found.

Carmona et al. (2008) identified three distinct organisational models in public space management that are also relevant for UOS management:

(i) A state-centred model in which hierarchical structures of planning and delivery are dominant, with a clear division between services and use. In general, the state-centred management model is characterised by a public service ethos based on the impartiality of officers and commitment to the public interest.

(ii) A market-centred model in which public service departments employ private resources, bridging skills and expertise between the public and private sectors. This aims to secure services which go beyond those normally provided by the public sector or to engage private companies to perform the various maintenance routines at the same cost (if not cheaper) and possibly in a more efficient way than a public service provider.

(iii) A community-centred model that involves seeking more effective, responsive

and cost-effective ways of delivering public services but also formulation of a new contract between users and public managers by re-distributing responsibilities.

Each of these three organisational models has its pros and cons. The state-centred model may actually increase costs due to a lack of market competition and thus a sort of local monopolism. Carmona et al. (2008) mention costs, lack of flexibility and responsiveness and increased bureaucracy as the main disadvantages associated with this model. The model is likely to reflect a political choice in order to secure internal control of services and thus achieve internal flexibility and responsiveness, despite a potential higher cost than what the market brings (Leiren et al., 2016). The model is dominated by a hierarchical organisational structure, usually informing users rather than engaging them.

The main purpose of the market-centred model is often to lower operational costs, but transactional costs may be incurred instead (Lindholst et al., 2016a). However, the introduction and potential sharing of knowledge and expertise may benefit all partners involved. Different operations and/or areas may be under different contracts, which can lead to the fragmentation of operations.

The community-centred model also risks fragmenting maintenance practices and resulting in unequal provision of services to different user groups, favouring those who can and will take the responsibility at the risk of leaving out those who cannot. However, in general this model is valued as an inclusive co-governance approach to organising UGS maintenance, (Jansson et al., 2019), as explained in Chapter 2.

In practice, many organisations today use a combination of these three organisational models. It is often the case that a state-centred model includes market-centred approaches by outsourcing parts of the maintenance operations while also engaging with local community users in specific areas.

Another way of describing the range of UOS maintenance models is through the changing role and influence of the state and/or authorities, ranging from hierarchical to self-governance, via a continuum from 'closed' to 'open' co-governance (Arts & Visseren-Hamakers, 2012). It is helpful to examine how these models have been applied in practice for maintenance operations. With reference to the different management models identified by Carmona et al. (2008) and to governance arrangements (Arts & Visseren-Hamakers, 2012), these models and their typical variations are described next.

State-centred models

The state-centred, unified organisation is characterised by hierarchical and centralised organisation of responsibilities, where managers can intervene directly in maintenance operations. In some cases, the overall management organisation is predominantly characterised as a 'maintenance organisation' due to a lack of managerial expertise. In Western Europe, unified organisations were the dominant model for organising maintenance responsibilities in local governments up to the 1980s, when NPM was introduced. Today, unified organisations are typically found among smaller local governments and in many cemetery organisations and social housing companies (Coquand et al., 2017).

Before NPM was introduced, many unified organisations had a direct line between the UOS manager and the political level – i.e. the head of the UOS organisation (head of parks, park manager, park superintendent) was employed at the same organisational level as the head of the technical organisation (head of roads, head of infrastructure, etc.). Today, this direct relationship to political decision makers is often diminished as the UOS organisation has gradually 'slipped' from being a unified organisation, with one person being responsible for all, to become a sub-set of a combined technical department with split responsibilities.

THE SPLIT-RESPONSIBILITY ORGANISATION A variation of the state-centred hierarchical model is an organisation in which maintenance responsibilities are divided between a 'purchaser' and a 'provider' within the same department. The purchaser is responsible for formulation and specification of objectives and (quality) standards for maintenance, including the level and type of maintenance, while the provider is responsible for carrying out maintenance in compliance with these objectives and standards. This type of arrangement is often seen when an organisation is striving towards an outsourcing situation in which the existing organisation needs time to build the foundation and related experiences to become a professional purchaser and/or provider. This includes the creation of inventories of the UOS in question as a basis for creation of quality standards. The organisation can then specify actual maintenance costs for a specific space. With exact knowledge of operational costs, such organisations can engage in providing services for other local government departments – for example the social department. Both sub-organisations (the purchaser and the provider) have the same manager/leader, and thus the spilt can be seen as an organisational formality rather than an actual split.

THE DIVIDED ORGANISATION The divided (spilt-responsibility) organisation is characterised by a degree of limited horizontal decentralisation of responsibilities within the same department. A greater and more formal horizontal decentralisation is seen within the divided organisation, where purchaser and provider responsibilities are organised into separate subdivisions of the overall organisation. The provider department is typically responsible for its own budgets, has a separate manager and has its own organisational objectives. Thus the two sub-divisions are in principle separate and operate as autonomous units. They may also be organised across different geographical locations, the purchaser in proximity to political decision makers and city planners, while the provider is located 'in the field' with physical facilities for storage, equipment and machinery. Managers in both parts of the sub-divided organisation report to the same overall leader. This type of structure is often seen in organisations where outsourcing is planned to be implemented within a shorter time frame or when management and maintenance are organised within a market-like framework.

THE LOCAL GOVERNMENT-OWNED COMPANY Many local governments have established their own maintenance organisation and treat it as a private company with separate leadership and its own budget. The maintenance organisation operates almost as a private company and communicates primarily with the purchaser

via annual contracts specifying what needs to be delivered. As both the purchaser and the provider are owned by the same organisation (e.g. a local government), both often report to the same director. However, a local government-owned company differs from a provider in a divided organisation in that it is typically governed by an appointed executive board, is organised to operate outside the local bureaucracy and has an autonomous corporate status, sometimes constituted under private law. Sometimes these companies are jointly owned by several local governments for whom they provide services. Local government-owned companies may or may not be exposed to direct competition for the services they provide. In Sweden, many such local government-owned companies deliver services without direct competition from private providers. When exposed to competition, the model is market centred, with the local government-owned company as a local market player. Evidence from Denmark and Norway indicates that local government-owned companies are vulnerable when exposed to direct competition from private providers (Lindholst et al., 2019).

The market-centred model

In many local governments, some or all maintenance is contracted out to a private provider. Public housing companies or cemetery organisations also contract maintenance operations to private providers to varying degrees. In these cases, there is a formal organisational division between the purchaser and its private providers, and the formal roles and responsibilities of the parties are typically defined by legally binding contracts. The motive for contracting with the private sector and the approach to organising contracts is predominantly a need to reduce costs and an emphasis on formalised market-based competition (Lindholst, 2008). This approach was introduced as part of the NPM reforms and replaced earlier contracting approaches based on the informal and recurrent buyer-supplier relationships described earlier for the state-centred divided organisation. However, many smaller local governments lack the operational expertise for specialist or infrequent work and, therefore, rely on private providers for a range of maintenance tasks (e.g. Leiren et al., 2016).

Market-centred models have been the cornerstone in the NPM-style local government reforms since the 1980s, and different contracting models have emerged over the years (Lindholst, 2009; Dempsey et al., 2016). These models can be viewed as variations of a conventional, partnership-based contracting model. Conventional contracting follows the logic of NPM reforms, and conventional outsourcing models can be categorised as hierarchical governance arrangements due to their emphasis on low costs and price competition (see Box 9.1) in combination with a management style characterised by reliance on detailed service specifications, unilateral contract monitoring and financial penalties if the specified tasks are not delivered. Partnership-based contracting is characterised by a broader range of rationales, such as service development, strategic objectives, investments and flexibility. The management style is characterised by joint cooperation, reliance on a broader and more complex framework for specification of services, a formalised framework for communication and some degree of delegation of responsibilities for planning and user involvement to the private contractor. Such partnership-based cooperation may be categorised as closed

BOX 9.1: LOWEST PRICE – LOWEST QUALITY?

Contracting is often based on the assumption that the lowest price is preferable in order to keep the cost as low as possible. However, the lowest price in a competitive bid may not always result in the lowest cost over the total contract period (Lindholst et al., 2017). Depending on the quality of the tender material – for example the ease and understanding of all tasks and the market situation – there are numerous incentives to interpret the actual delivery of a UOS maintenance contract. Such interpretations can lead to additional tasks and thus extra costs during the contract period. Therefore, many contracts are based on aspects other than cost – for example the provider's documented qualifications, track record, certifications. Such criteria are often a prerequisite, but the final determinant is the price. In some cases, the provider's ability to cooperate and descriptions of incentives to develop the agreement and the tasks involved are also included as determinants for granting a contract. Such contracts are often called 'partnering based'. The use of aspects other than cost has prevailed in some countries, while in others, they have been ignored due to a general mistrust in the use of qualitative (subjective) determinants.

The effects of procurement approaches based on the lowest price have been discussed over many years (Jones, 2000). Lindholst (2008) described the 'vicious circle of lowest price' (Figure 9.2), whereby a focus on low prices (saving of resources) in procurement may eventually lead to insufficient resources (too low prices), poor working conditions, unattractive jobs, inferior performance of maintenance, loss of quality and an increased need for monitoring. When the purchaser spends more time on monitoring, time spent on the actual development of the UOS may be lost. Lack of focus on UOS development may also be due to the potential lack of skilled workers due to poor working conditions. A prevalence of low-skilled and low-paid grounds maintenance activities can ultimately lead to unattractive working conditions on the operational (maintenance) level of the UOS.

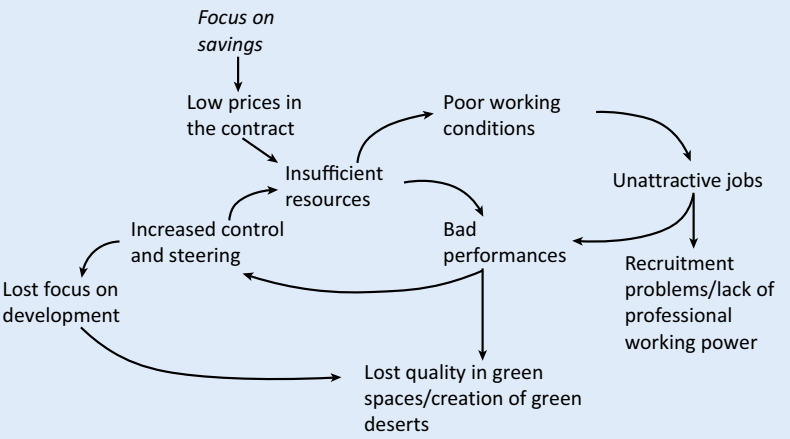


Figure 9.2 The vicious circle of lowest price. *Source*: Reproduced from Lindholst (2008)

co-governance since the formal steering lies within the outsourcing organisation but, via the partnerships, cooperation is in place.

The community-centred model

A variation of the market-centred organisational approach involves the engagement of users in actual maintenance routines and can thus be denoted a community-centred model. Engagement of users in maintenance routines is related to societal changes and norms (e.g. Van der Jagt et al., 2016; Ugolini et al., 2018), including increased interest among users in being locally engaged. Megatrends such as climate change, urban densification, urban regeneration and urban sustainability also play a role in defining new engagement routines.

A simple agreement about who has the responsibility for a certain task may be reached between the management organisation (the purchaser or the provider) and a certain group of users. This can relate to the handling of a peri-urban pasture where grazing cattle are kept by a cooperative (e.g. Rodgers & Mackay, 2018) or to a playground that is maintained by local users (Jansson, 2015). Such arrangements are often hierarchical because they are steered by the formal UOS organisation but may vary in their degree of openness to the actual (co-) governance model, as there are many versions and combinations of engagement and responsibility.

Engagement can have a practical theme, but user engagement is often related to social perspectives in local activities by engaging inhabitants in their local neighbourhoods (e.g. Fors et al., 2015). In the UK and US, there are several examples of community-steered maintenance where responsibilities (and, to a much lesser extent, budgets) are increasingly shared between different combinations of public, private, third-party and community-sector stakeholders (Dempsey et al., 2016). This trend of shifting away from in-house public sector delivery of UOS services to a combination of governance structures related to maintenance operations has also been reported in the Scandinavian countries (Leiren et al., 2016; Lindholst et al., 2016a; Bretzer et al., 2016).

Recent austerity policies have led to a range of different ways of organising, if not splitting, local services away from local government responsibility. A study in England found that responsibility, particularly for parks, is increasingly being shared with non-government organisations, including community groups, although this is not reflected in budget re-distributions (Dempsey et al., 2016). Interestingly, this approach is not new; it dates back to the first half of the 20th century when the welfare state was established. However, the approach is still novel given its low levels of implementation and can range from local community groups raising their own funds through subscriptions for individual parks, developing partnerships and philanthropy between businesses and to the city-scale transfer of parks management. In the US, Central Park in New York serves as an example, as the local government, the City of New York, holds the ownership of the park, but a local interest group, Central Park Conservancy, was formed by concerned New Yorkers in the 1970s in response to a decline in the quality of maintenance and services in the park. Now, the incredibly well-funded Central Park Conservancy is the official management organisation for Central Park (Central Park Conservancy, 2019). There are also examples of innovative market-driven cooperation like for the Queen Elizabeth Olympic Park in London, UK (see Box 9.2).

BOX 9.2: THE QUEEN ELIZABETH OLYMPIC PARK

Queen Elizabeth Olympic Park (QEOP; Figure 9.3) is an example of an open co-governance model, with an innovative market-driven approach to cooperation between the (semi-)public purchaser and the private provider. This approach may be seen as a post-NPM model in which the provider will be required to not only do more than technical, operational tasks but also to engage in, for example, securing local employment.

The park was established as a legacy of the 2012 London Olympic Games, envisioned to provide a physical legacy, contributing significantly and positively to the economic, social and ecological future of east London (Dempsey et al., 2017). It was also the largest new park to be built in the UK in over 100 years (Naish & Mason, 2014) and involved prominent landscape designers who, based on innovative and sustainable planting methods, created an award-winning, spectacular large public UOS with over five million annual visitors (Hopkins & Neal, 2012). The park and immediate surroundings will eventually be home to over 10,000 households within five neighbouring boroughs. The London Legacy Development Corporation is responsible for the management, but it is a sunset organisation, meaning that it will cease to exist at some point in the future, after which a trust may manage the park.

Figure 9.3 The QEOP, London. *Photo*: Nicola Dempsey

A private parks maintenance provider was selected after a year-long outsourcing process based on quality criteria, flexibility, experience and track record. There were additional legacy-specific criteria requiring the provider to invest in the locality and generate employment for local residents, which should constitute a minimum of 80% of the total workforce and involve women (45%), ethnic groups (35%) and people with disabilities (10%) and secure volunteers to help manage the park. The regeneration theme for the QEOP has thus been carried over into the maintenance through active engagement of the private provider initiated and specified by the purchaser.

Unlike standard UOS contracts, the foundation of the QEOP management agreement is the London Legacy and its positive social outcomes. For example, employing at least 80% of its workforce from the local area on the London living wage drives up costs, given the high cost of living within London. In addition, the contractor was required to invest in horticultural skills and training, as well as apprenticeships, to comply with a biodiversity action plan, which is often not a principal driver of UOS management plans. The wide range of landscape types also required investment in equipment, but the resources spent on equipment and skills are possible due to the long-term nature of the contract (ten years).

Standards, logics and monitoring of maintenance

Construction of UOS is supported by well-developed systems of general steering documents based on national trade ordinances, templates for project administration and construction techniques. For quality control and project supervision, routines have been developed over decades. Maintenance of UOS rarely has the same kind of well-established, document-based development and in general has received less attention in terms of sector-led development of mutual documents for quality description and quality assurance (see also Chapter 4). When UOSs are established (or re-developed), maintenance plans will often be drawn up (Smith et al., 2014). However, these are often technical plans describing the required maintenance operations (Salbitano et al., 2016). Ideally, maintenance plans should be part of the design process to ensure that all intentions about new spaces are sufficiently considered (Dempsey et al., 2014).

Maintenance standards

As a result of the NPM paradigm, UOS maintenance standards were introduced during the 1990s in many Western countries – for example Sweden and Denmark (Juul et al., 1998; Persson, 1989). It became evident that many local governments did not have a sufficient overview of their resources; costs were based on department spending and not allocated to specific maintenance tasks (Lindholst et al., 2016a). Thus there was a need to develop methods for assessing quality and costs related to individual tasks, such as lawn mowing, hedge cutting and cleaning (Lindholst et al., 2016b).

Today, there are often national standards for maintenance serving as a general reference for descriptions on maintaining the technical quality of UOS. These standards

embed a conceptualisation of quality as 'conforming to specification', where quality is determined by the level of compliance with predefined and quantitative measures (Lindholst et al., 2015). The purpose of these standards is to provide a common outline, which gives a short and precise description of generally accepted UOS elements. The maintenance task can thus be easily described to allow for monitoring and to calculate the necessary resources. In an outsourcing situation, this common basis makes comparisons among different offers easier, while for a maintenance organisation, it becomes easier to assess, plan and evaluate resources. The maintenance quality standards typically divide a space into a subset of separate physical, tangible properties that are maintained to a certain standard. Maintenance operations include four aspects: (i) *activities* performed (mowing, cleaning, etc.), (ii) *resources* used in these activities (manpower, skills and machinery), (iii) technical or physical *results* of the activities and (iv) *effects* of the results for users (Figure 9.4).

Depending on the context, each of the four aspects can be used to define the maintenance operation, even though resources and activities can only serve as a partial measure of the results and effects. They can define the type of maintenance approach taken and serve as a framework for description of individual elements within UOSs, as shown in the example of lawn maintenance and lawns (Table 9.1 and Figure 9.5).

Resource-based descriptions are usually used in combination with the other three types and seldom as stand-alone descriptions. They are also used occasionally to describe the knowledge or technical inputs required to perform the operation (level of education or training, or machinery type).

- An activity-based description specifies, for example, the number of times a lawn should be mown during the season.
- A results-based description specifies the expected condition – for example how high lawn grass should be allowed to grow, perhaps defined as a level of acceptance (6–8 cm).
- A function-based description specifies the expected function of the element – for example the expected use of a lawn.

These three most commonly used description approaches are sometimes combined, and each has its own strengths and weaknesses (Table 9.1).

National or trade-related standards have been introduced in many countries, but it is important to note that the descriptions of maintenance operations should always be adapted to the local context. Acknowledging how local conditions differ from the standard can include highlighting special circumstances via photos or developing local descriptions of the overall goals and expectations for the area or the specific elements.

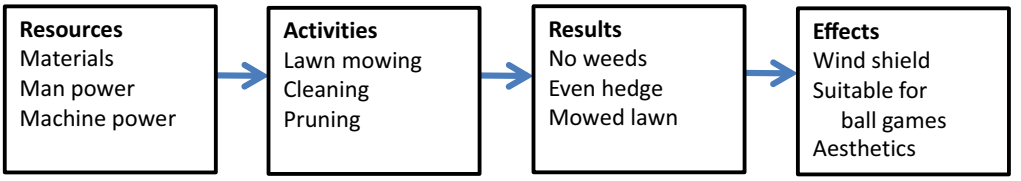


Figure 9.4 The maintenance logic. *Source*: Adapted from Persson & Kristofferson (2018)

Table 9.1 Strengths and weaknesses of activity-, results- and function-based description approaches for maintenance of UOS

	Activity-based description	*Results-based description*	*Function-based description*
Contract type	*Input-based*	*Output-based*	
Worked example: Lawn for general use	The lawn should be mown 25 times per season (defined months).	The height of the grass should always be at least 4 cm and maximum 8 cm.	The lawn should always be useable for ball play or similar recreational activities. The lawn should serve as a mechanism for holding stormwater in the event of pluvial flooding.
Monitoring of lawn for general use	Easy to monitor and document via, for example, worksheets completed by the mowing team, pictures with dates.	In principle, easy to monitor with a ruler/ tape measure but with uncertainty about exactly where the measurement is made.	A subjective form of monitoring, as the exact quality or performance of the lawn can be debated: Is the lawn actually useable in its current form?
Documentation		Documentation can show an average of measurements within, for example, a 1 m^2 frame, where a certain percentage of the measurements should be within the required range.	Documentation is often related to a dialogue between the purchaser and the provider. Use of lawn as a stormwater buffer is documented as the event occurs.
Strengths and weaknesses	These types of input-led activities may be inflexible due to weather conditions – for example in a dry growing season, less mowing and more watering is needed. Descriptions are now moving towards the other two types.	These types of measurements are easy but time-consuming to perform. In practice, they are used when new contracts are being initiated (mutual trust is being built) or when exact documentation is demanded by the purchaser (lack of trust may be the driver).	Functional descriptions require a certain amount of trust between the two parties and are often seen as an instrument to be used on a day-to-day basis, with the other two instruments being applied if uncertainties arise.

MAINTENANCE LOGIC Despite the unique conditions in each organisation, a number of basic management conditions are common in all types of organisations. Many UOSs are characterised by living materials that grow and change over time, as opposed to non-living materials in, for example, the construction of buildings. Thus maintenance work is dependent on seasonal (growing) variations, requiring an openness to change in routines. It also makes the quality of UOS highly dependent on maintenance (Figure 9.6).

Maintenance is based on continued operations, within a time frame of days (e.g. cleaning), weeks (e.g. grass mowing) or seasons (e.g. hedge cutting). Figure 9.7 shows the quality of work delivered over time for

Figure 9.5 Lawn maintenance in central Mexico City. *Photo*: Elizabeth Shelley

Figure 9.6 A site altered through maintenance. *Photo*: Nicola Dempsey

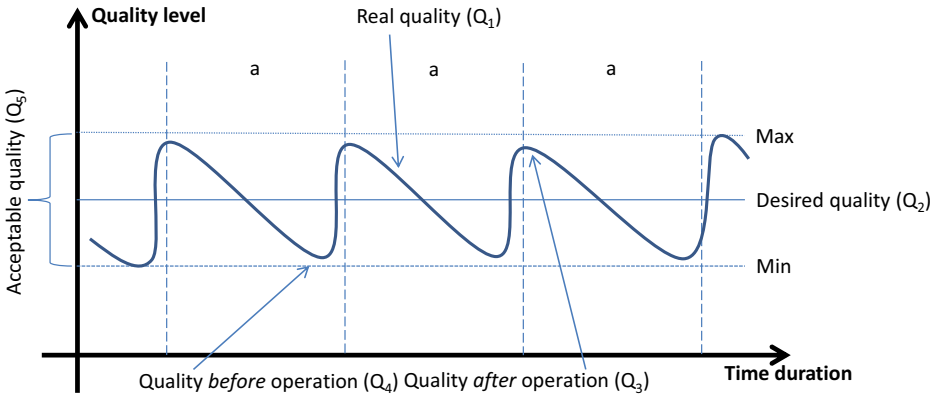


Figure 9.7 Change in maintenance quality over time. *Source*: Adapted from Persson & Kristofferson (2018)

any maintenance operation. At any point, the actual maintenance quality (Q_1) will vary in relation to the desired (described) quality (Q_2), typically defined by technical standards based on professional knowledge within any given operational interval (a). The quality immediately after an operation is considered to be maximal (Q_3), whereas the quality before the operation is considered to be minimal (Q_4). The difference between Q3 and Q4 is the interval described as acceptable by the purchaser (Q_5). The desired quality (Q_2) is seen as an average mode throughout a given operational interval (a) and is ideally embedded in an understanding of user values, taking appropriate economic considerations.

Maintenance monitoring

As the majority of UOS maintenance is carried out under the auspices of public or semi-public administrations, the monetary resources involved are usually tax based. Thus the purchaser has an obligation to document its spending, and the need for monitoring the delivery of a maintenance operation has become a central point for discussion. Based on Van der Meer-Kooistra & Vosselman's (2000) monitoring descriptions, two basic models are applied for UOS maintenance monitoring – namely, market based and trust based.

MARKET-BASED MONITORING A market- or bureaucracy-based monitoring system relates to the state- and market-centred models of Carmona et al. (2008) and covers the quantities and qualities of the operation. The quantity and quality of the output can be (relatively) accurately described and measured as *activities* or *results* (see Figure 9.4). The frequency of the *activities* ('a' in Figure 9.7) could be one week, one month, one season, etc. Monitoring *results* is most common, as it is based on the direct result of an *activity*. The quality requirements and related monitoring mechanisms are challenged by the differences in quality immediately before (Q_4) and after (Q_3) the operation and thus when the monitoring is carried out. Monitoring in relation to *activities* is most often carried out through a quantitative documentation of the amount of activities delivered, either

as exact numbers, or as intervals or at a certain time. An example of results monitoring is when a contractor is required to clear litter in a specific area – for example every day by a specific time – which can be monitored very precisely.

Monitoring in relation to the *resources* used is often based on documentation of the actual use of resources (skills, education level, type of machinery, etc.). This is basically equivalent to keeping a diary of the workplace, recording who and what are engaged, at which level and at which time (Persson & Kristofferson, 2018).

TRUST-BASED MONITORING A trust-based monitoring system is characterised by a high degree of interdependency between the purchaser and the provider as regards knowledge, skills and experience tailored to the other party's needs. The long-term vision for a space may be described via the expected *effects*, but the way of achieving these is not described. In principle, the trust-based monitoring system relates to function-based descriptions of quality (see Table 9.1), and the provider's own monitoring data are often used as documentation. In QEOP in London (see Box 9.2), a 'thin client model' is the main steering mechanism, meaning that the contractor effectively both monitors and delivers the service based on an output-based model. Thus the contractor polices its own performance but is subject to regular checks by the purchaser. Regular evaluation meetings focus on the *exceptions* reported – i.e. where performance needs improving within the contract as a remedial process. If standards are not met by the next monthly meeting, this can result in a financial penalty. Therefore, a contractual relationship with these features must be firmly based on trust.

The resources set aside for monitoring UOS maintenance are often not sufficient to permit control and documentation (Lindholst et al., 2017). Persson and Kristofferson (2018) identified a general need for better integration of measures for monitoring and steering UOS maintenance operations, as the specified requirements are generally unsuitable as a basis for monitoring. They showed that there is a tendency for purchasers to increasingly introduce the 'thin client model'. It seems evident that (at least in Sweden) the issue of monitoring and control is shifting from rigid measuring of, for example, grass height to an increased focus on trust and providers' own monitoring. Whether this is due to a general lack of funding, insufficient monitoring methods or a general reluctance by the parties involved to spend time and resources on monitoring is not clear. It is probably a combination, but there seems to be a trend for mutual discussion of effects and progress rather than focusing on monitoring mechanisms alone.

Conclusions

Management practices integrate and align the performance of maintenance operations within a comprehensive planning framework in order to secure the functionality and continuous development of ecosystem services in UOSs across a local area or an entire city. Short-term maintenance responsibilities have become the main focus in many UOS management organisations, with a lack of strategic development of UOS as a main risk.

The organisation of UOS maintenance has been described as being state, market or community oriented. These different organisational models determine the degree to which maintenance is carried out within a closed or open governance system. Certain organisations usually have a preference

for a specific model, but combinations of the three models are often used within the same organisation.

Despite the lowest price not always generating the overall lowest cost, it is often used as the principal criterion when contracting out UOS maintenance. This is due to a lack of verified qualitative evaluation models for determining UOS contracts. Likewise, description and monitoring of UOS maintenance is still in the development phase and would benefit from a simple, replicable and measurable way of communicating the expectations and wishes of the purchaser to the provider. Performance monitoring is hampered by unclear descriptions, as these often include elements covering resources, activities, results and effects. There is a tendency for the greater use of trust-based arrangements, as demonstrated by increasing use of function-based or effect-driven descriptions, community groups acting as providers and providers' own monitoring. However, as these arrangements may often be driven by reduced funding, there is a need to develop new organisational models for UOS maintenance in order to enable suitable long-term management.

Trust- and function-based arrangements include descriptions of what a UOS should be but often do not require how operations are performed or documented. Contemporary approaches, such as nature-based solutions (European Commission, 2015), are likely to alter the way in which maintenance is described and performed, as they require holistic and inclusive arrangements and are suited for function-based descriptions, where visions rather than exact definitions of activities or results are set. There is a general need for new ways of organising, describing and monitoring UOS maintenance that can incorporate the community and be flexible for future needs.

References

Arts, B. & Visseren-Hamakers, I.J., (2012). Forest governance: Mainstream and critical views. *Moving Forward with Forest Governance. ETFRN News*. **53**, 3–10.

Beer, A.R., (2002). The decline of the urban park in Britain: The impact of over twenty years of neglect on the quality of parks and greenspaces. *Stads & Havneingenioeren*. [In Danish], English version www.greenstructureplanning.eu/COSTC11/uk-parks.htm.

Bretzer, Y.N., Persson, B. & Randrup, T.B., (2016). Is public procurement efficiency conditioned by market types? A critical test in park and road sectors in Sweden. *International Journal of Public Sector Management*. **29**(5), 488–501.

Carmona, M., de Magalhães, C. & Hammond, L., (2008). *Public Space – The Management Dimension*. London: Routledge.

Central Park Conservancy, (2019). About us. *Central Park Conservancy – Central to the Park*. www.centralparknyc.org/about/

Chan, C.S., Lawal, M.M. & Konijnendijk Van Den Bosch, C.C., (2014). Changing perspectives in urban park management: A longitudinal study of Hong Kong. *Managing Sport and Leisure*. **20**(1), 56–76.

Coquand, N., Johnson, L., Kristoffersson, A., Persson, B., Randrup, T.B., Sundevall, E., Sandskär, B. & Sunding, A., (2017). State of the sector. In: L. Ekelund, T. Hansson, L. Johnson, A. Kristoffersson, S. Lundqvist et al., (eds.) *Branschbeskrivning Trädgård*. Enheten för samverkan och utveckling: SLU, LTV-fakulteten.

Dempsey, N., Burton, M. & Selin, J., (2016). Contracting out parks and roads maintenance in 682 England. *International Journal of Public Sector Management*. **29**(5), 441–456.

Dempsey, N., Martinez Velarde, C. & Burton, M., (2017). Queen Elizabeth Olympic Park, London, UK: Experiences with long-term partnership based contracting In: A.C. Lindholst (ed.) *INOPS Fire Internationale Casestudier*. Aalborg: Department of Political Science, Aalborg University.

Dempsey, N., Smith, H. & Burton, M., (2014). *Place-Keeping: Open Space Management in Practice*. London: Routledge.

EC, (2015). *Nature-based Solutions & Re-Naturing Cities*. European Commission. [October 2019] https://op.europa.eu/en/publication-detail/-/publication/fb117980-d5aa-46df-8edc-af367cddc202

Fors, H., Molin, J.F., Murphy, M.A. & Konijnendijk van den Bosch, C., (2015). User participation in urban green spaces – For the people or the parks? *Urban Forestry & Urban Greening*. **14**, 722–734.

Gruening, G., (2001). Origin and theoretical basis of new public management. *International Public Management Journal*. **4**, 1–25.

Gustavsson, R., Hermy, M., Konijnendijk, C. & Steidle-Schwahn, A., (2005). Management of urban woodland and parks – Searching for creative and sustainable concepts. In: C.C. Konijnendijk, K. Nilsson, T.B. Randrup & J. Schipperjin (eds.) *Urban Forests and Trees*. Heidelberg: Springer. 369–397.

Hood, C., (1995). The "New Public Management" in the 1980s: Variations on a theme. *Accounting, Organizations and Society*. **20**(2/3), 93–109.

Hopkins, J. & Neal, P., (2012). *The Making of the Queen Elizabeth Olympic Park*. Chichester: Wiley.

Jansson, M., (2015). Children's perspectives on playground use as basis for children's participation in local play space management. *Local Environment*. **20**(2), 165–179.

Jansson, M. & Lindgren, T., (2012). A review of the concept 'management' in relation to urban landscapes and green spaces: Toward a holistic understanding. *Urban Forestry & Urban Greening*. **11**(2), 139–145.

Jansson, M., Vogel, N., Fors, H. & Randrup, T.B., (2019). The governance of landscape management: New approaches to urban space development. *Landscape Research*. **44**(8), 952–965.

Jones, R., (2000). Managing the green spaces: Problems of maintaining quality in a local government service department. *Managing Service Quality*. **10**(1), 19–31.

Juul, J.O., Bjerregaard, S. & Dam, T., (1998). *Kvalitetsbeskrivelse for drift af grønne områder*. Frederiksberg: Skov & Landskab, KVL.

Koningen, H., (2004). Creative management. In: N. Dunnet & J. Hitchmough (eds.) *The Dynamic Landscape: Naturalistic Planting in an Urban Context*. London: Spon Press. 256–292.

Leiren, M.D., Lindholst, A.C., Solfjeld, I. & Randrup, T.B., (2016). Capability versus efficiency: Contracting out park and road services in Norway. *International Journal of Public Sector Management*. **29**(5), 474–487.

Lindholst, A.C., (2008). *Partnerskaber i parkforvaltningen: grøn drift på kontrakt* (Ph.D. Thesis). No. 40–2008 Forest and Landscape Research Series. Forest & Landscape, University of Copenhagen.

Lindholst, A.C., (2009). Contracting-out in urban green-space management: Instruments, approaches and arrangements. *Urban Forestry & Urban Greening*. **8**(4), 257–268.

Lindholst, A.C., Dempsey, N., Randrup, T.B. & Solfjeld, I., (2019). Lessons from case studies: Working with marketization. In: A.C. Lindholst & M.B. Hansen (eds.) *Marketization in Local Governments: Diffusion and Evolution in Scandinavia and England*. London: Palgrave Macmillan.

Lindholst, A.C., Hansen, M.B. & Petersen, O.H., (2016a) Marketization trajectories in the Danish road and park sectors: A story of incremental institutional change. *International Journal of Public Sector Management*. **29**(5), 457–473.

Lindholst, A.C., Konijnendijk van den Bosch, C.C., Kjøller, C.P., Sullivan, S., Kristoffersson, A., Fors, H. & Nilsson, K., (2016b). Urban green space qualities reframed toward a public value management paradigm: The case of the Nordic green space award. *Urban Forestry & Urban Greening*. **17**, 166–176.

Lindholst, A.C., Randrup, T.B., Kristoffersson, A., Hansen, M.B. & Persson, B., (2017). The many outcomes from contracting out: The voice of public managers. *Environment and Planning C: Politics and Space*. **36**(6), 1046–1067.

Lindholst, A.C., Sullivan, S.G., Konijnendijk van den Bosch, C.C. & Fors, H., (2015). The inherent politics of managing the quality of urban green spaces. *Planning Practice and Research*. **30**(4), 376–392.

Naish, C. & Mason, S., (2014). London 2012 legacy: Transformation of the Olympic park. *Proceedings of the Institution of Civil Engineers – Civil Engineering*. **167**(6), 26–32.

Neal, P., (2016). *State of UK Public Parks*. Research Report to the Heritage Lottery Fund. London: Heritage Lottery Fund.

Persson, B., (1989). *Skötselmanual för utemiljö*. Alnarp: Swedish University of Agricultural Sciences.

Persson, B. & Kristofferson, A., (2018). *Skötsellogiken: redskap för uppföljning av skötselkvalitet*. Movium Fakta 2. Alnarp: Movium.

Randrup, T.B., Östberg, J. & Wiström, B., (2017). Swedish green space management – The managers perspective. *Urban Forestry & Urban Greening*. **28**, 103–109.

Randrup, T.B. & Persson, B., (2009). Public green spaces in the Nordic countries: Development of a new strategic management regime. *Urban Forestry & Urban Greening*. **8**(1), 31–40.

Rodgers, C. & Mackay, D., (2018). Creating 'new' commons for the twenty-first century: Innovative legal models for 'green space'. *Journal of Environmental Planning and Management*. **61**(5–6), 1051–1069.

Salbitano, F., Borelli, S., Conigliaro, M. & Chen, Y., (2016). *Guidelines on Urban and Peri-urban Forestry*. FAO Forestry Paper. 178. Rome: Food and Agriculture Organisation of the United Nations.

Smith, H., Perreira, M., Hull, A. & Konijnendijk Van Den Bosch, C.C., (2014). The governance of open space: Decision-making around place-keeping. In: N. Dempsey, H. Smith & M. Burton (eds.) *Place-Keeping: Open Space Management in Practice*. London: Routledge. 52–75.

Ugolini, F., Sanesi, G., Steidle, A. & Pearlmutter, D., (2018). Speaking "Green": A worldwide survey on collaboration among stakeholders in urban park design and management. *Forests*. **9**, 458.

Van der Jagt, A.P.N., Elands, B.H.M., Ambrose-Oji, B., Gerőházi, E. & Steen Møller, M., (2016). Participatory governance of urban green space: Trends and practices in the EU. *Nordic Journal of Architectural Research*. **28**(3), 11–39.

Van der Meer-Kooistra, J. & Vosselman, E.G.J., (2000). Management control of interfirm transactional relationships: The case of industrial renovation and maintenance. *Accounting Organizations and Society*. **25**(1), 51–77.

All figures are used with permission.

10 Digital systems and tools to support urban open space governance and management

Jessica Svännel, Åsa Ode Sang, Neil Sang, Johanna Deak Sjöman and Märit Jansson

Introduction

Managing urban open space (UOS) as a spatial resource requires knowledge on what kind of UOS features there are and where they are (see Chapter 3). In this chapter, we outline how digital systems and tools can be used in governance and management to support planning, design, construction and maintenance of UOS and to enhance interaction between stakeholders. Figure 10.1 shows the complex structure of UOS governance and management work, the processes included and how digital technology can support UOS governance and management using different digital systems and tools. The way in which UOS governance and management can be supported by digital systems and tools depends on how the relationships between different stakeholders and concepts are defined. This is ultimately done within a broad and evolving system of more specific components that are easier to define. For example, Smart Urban Forestry Management has been defined as 'the design, establishment, monitoring, and management of urban trees and vegetation through the use of digital technologies, for the joint purpose of improving the urban environment and engaging all municipal stakeholders, including citizens, in its governance' (Nitoslawski et al., 2019, p. 9). This provides a useful overall template within which the specificity of 'urban trees and vegetation' might be replaced with various other ecosystem services such as 'low-impact drainage' (Sang, 2020) or 'socially equitable access to green space'.

The chapter starts by defining a few key concepts (see Box 10.1), followed by a section on management of spatial data, describing methods for collection, storage and classification of data. This is followed by a review of specific digital approaches that could be used to support UOS maintenance, evaluation, communication, participation and design. We conclude by outlining some possible future directions for digital technology within UOS governance and management.

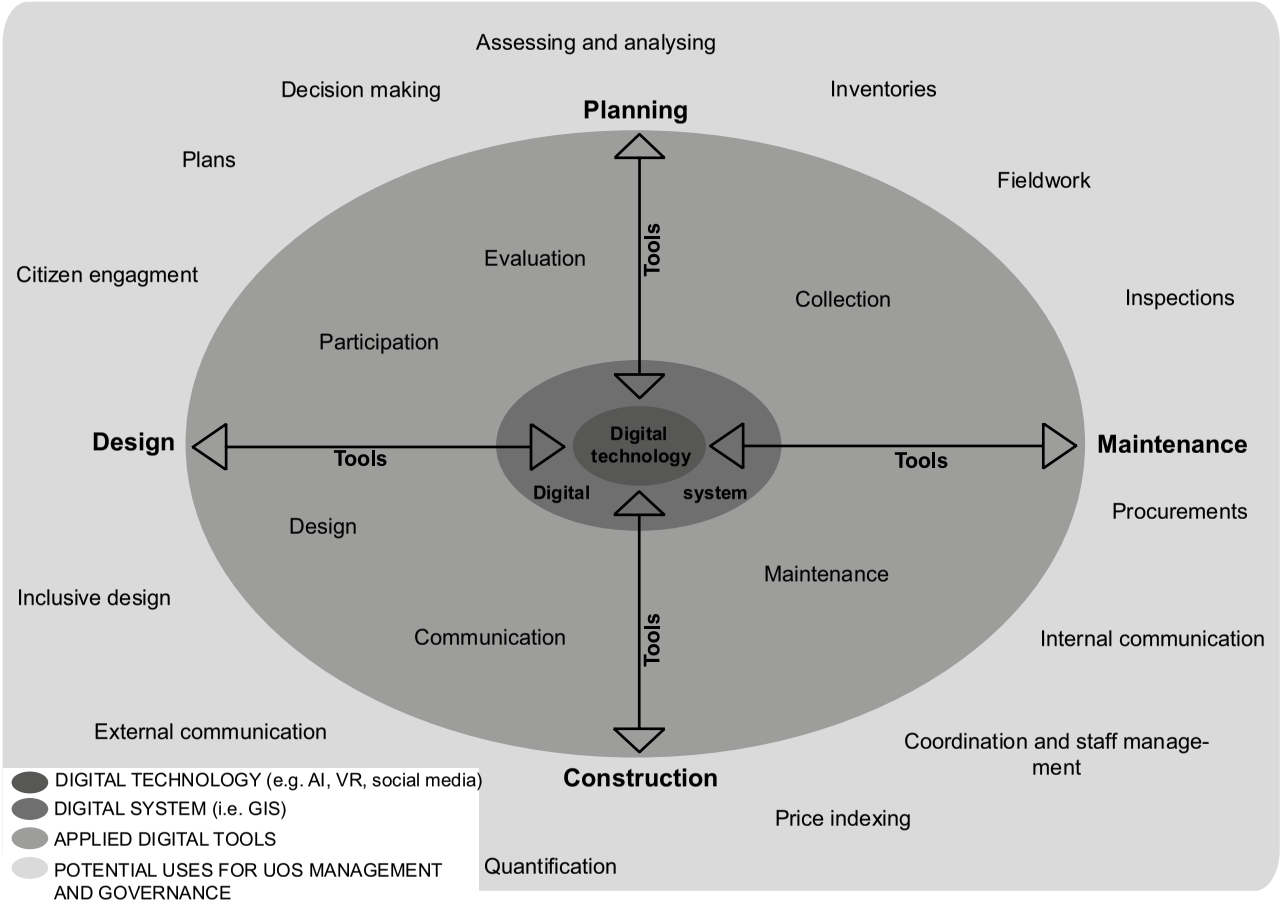


Figure 10.1 Digital system and tools integrated in a strategic management diagram (see also Chapter 2). The tools can be applied for different purposes, but these are affected by the underpinning data infrastructure and the kind of digital technology available. Some uses might also require input from several tools and different technologies.

BOX 10.1: KEY CONCEPTS

Geographic information: Information about features/places/events that occur on the surface of the earth.

Geographic information systems (GIS): Systems used to handle geographic information – i.e. input, storage, manipulation, editing, analysis and visualisation.

Data management: How UOS data are managed regarding storage, organisation and retrieval so that values can be shared, analysed and communicated.

Collection tools: Tools that aid in collecting data that can be used for further UOS analysis and monitoring.

Maintenance tools: Tools that support maintenance of UOS in both long-term and short-term perspectives.

Evaluation tools: Tools that aim to increase UOS management support by, for example, estimating the impact on UOS and green and blue infrastructures.

Communication tools: Tools that can be used to interactively inform stakeholders about UOS, either internally within an organisation or externally to the public.

Participation tools: Tools that aim to increase or facilitate public participation and citizen engagement in UOS governance and management.

Design tools: Tools that can aid in including UOS management aspects within design processes.

Management of UOS data

For digital systems and tools to generate useful values, it is critical to define how the data should be managed regarding storage, organisation and retrieval so that the values can be shared, analysed and communicated (Heywood et al., 2011). The most commonly used structured systems for UOS today are spreadsheets, databases, computer-aided design (CAD) and GIS (Cho et al., 2017), plus unstructured text, such as a pdf or Word doc, with varying spatial abilities. While CAD has historically had little capacity for spatial analysis, recent developments (e.g. through systems such as ACAD MAP, Civil 3D, Rhino/Grasshopper) are strengthening this capacity and increasing the interoperability of the two systems.

Since UOS is a spatial resource and UOS governance and management require storage, analysis and distribution of UOS data, GIS might be the most comprehensive choice. While GIS is often used for analysing various planning aspects of urban and green environments (e.g. accessibility, ecosystem services provision or green justice and equity), there has been insufficient research on the use of digital systems and tools for UOS governance and management (Cho et al., 2016; Nitoslawski et al., 2019). There is a particular lack of knowledge on how to ensure validity and provenance of data.

Digital tools for UOS data collection

The development of the increasingly data-driven city has created tools to aid in collecting and providing UOS data, with the

use of mobile devices, applications and different open-source mapping platforms broadening the potential applications (Nitoslawski et al., 2019). Depending on the purpose and type of data needed, these could include methods such as online mapping tools, field collection, remote sensing tools and open data.

Today, mobile devices and smartphone apps allow for location-based services (LBS) and *field collection of data* for uploading directly in the field. A LBS is any system which makes use of the global positioning system (GPS) of a mobile device to infer the location of the user as an integral part of the information system (Gartner et al., 2007). These tools enable field collection of data on features that require a visit in situ – for example an inspections or inventory (Figure 10.2).

Remote sensing tools can be used to capture information on the earth (e.g. from satellites or drones) (Figure 10.3). The increasing availability of satellite data and drones has made remote sensing data more accessible to all and enables fast analysis and extraction of information not always visible to the human eye (Heywood et al., 2011). Remote sensing can efficiently identify and analyse both the spatial distribution and configurations of UOSs continuously, making it possible to monitor changes over time (Treitz & Rogan, 2004; Chen et al., 2018) and gain a birds-eye perspective on UOS. With remote sensing, it is possible to generate information such as leaf area index, canopy density, vegetation types and Normalised Difference Vegetation Index (NVDI) (Chen et al., 2018).

The smart city concept is making use of the latest development of sensors and small computers to create a digital network of smart digital devices able to communicate with each other and the surrounding environment (Figure 10.3). This collection of heterogeneous objects, capable of both collecting data and sharing information with minimal human interaction, is termed the Internet of Things (IoT). Smart cities can make use of this flow of data in governance processes – for example between connected computers used in industry and digital devices used by private individuals, ideally to improve the quality of life of users (Silva et al., 2018). The smart city discourse has also contributed to a growing interest in using the IoT in sustainable development (Nitoslawski et al., 2019). Today, IoT is visible in UOS management as, for example, smart waste bins with sensors informing when they are full, real-time data on air quality (SKL, 2017) or digital trees monitoring soil moisture through sensors that, together with weather forecasts, can generate simulations informing about maintenance needs (TreeMania, 2019).

The use of digital tools for gathering data, together with increasing accumulation of data, has also opened the way for the use of open data (Nitoslawski et al., 2019) to maximise its reuse. Open data is digital information created by someone else (e.g. local governments or European Union) and freely available, with minimal restrictions on use and reuse. Open data aims to benefit society, creating transparency, growth and efficiency by providing opportunities to develop innovative services from different sectors – for example geography, traffic, forestry and other sciences (Agency for Digital Government, 2019). OpenStreetMap is an online-based mapping tool, functioning as an open-source mapping platform that creates and supports different types of geographical information in the form of maps and a structured database. It is free for people to download data collected by others but also for people to use to collect their own data (OpenStreetMap, 2019). It is, therefore, closely related to both participation tools and open data.

Figure 10.2 Field collection of GPS-linked data as part of a tree inventory enables direct updating of tree databases. *Photo*: Jessica Svännel

Data storage

Databases, or other registers, to monitor conditions and developments in different UOSs are widely used for organising data (Schultz et al., 2015). The data need to be structured to describe both the UOS features and the relationships between them, which requires a suitable data storage model. Common storage methods include spreadsheets, such as MS Excel and databases such as Microsoft Access, Microsoft SQL Server or Oracle, the key criterion being that databases are designed for relating multiple tables via common 'key' attributes, support complex query languages and ensure the integrity of the data with simultaneous users.

(i)

(ii)

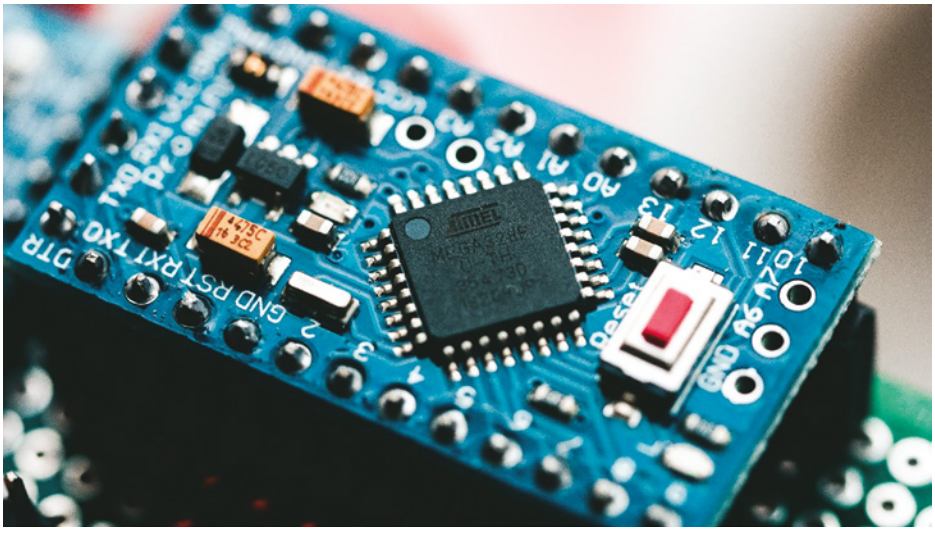


Figure 10.3 (i) Satellites taking pictures of Earth that are then used in remote sensing. (ii) The development of small computers has provided innovative ways for cities to harvest and collect data. *Source*: (i) Nasa, Unsplash, (ii) Harrison Broadbent, Unsplash

The choice of data storage model affects how easily the data can be applied for different end uses, further analyses, presentations, distributions, etc., making the purpose of the system a central consideration for its design. As the purpose differs between organisations, so does the best data storage model. To gain the full benefit

of using a database, it should also be compatible with data produced elsewhere. Effective processes by which a system for collecting, integrating and distributing data can be agreed on are, therefore, essential. For a small project, this may only require consultation with a few people (but may then require later integration with other projects). Larger projects or organisations with many stakeholders are likely to require an ongoing process to build spatial data infrastructure (SDI), which can generate efficiencies by making data more widely accessible (Williamson et al., 2003; Sang et al., 2005). Problems arise when the application starts to exceed the original intention, a condition often encountered as large organisations such as local governments start combining data sources from previously separate fields of operation. It can, therefore, be worth building in potential compatibility via open standards (www.opengeospatial.org/).

Classification and organisation of data

The mapping and classification of data is a process involving decisions on what to represent and how. The wide range of UOSs (i.e. green, blue, grey and brown spaces, see Chapter 3) in the urban matrix offers a plethora of possible values to be classified in the database. Such information can be UOS features (e.g. trees, grass, playgrounds) and related properties (e.g. tree species, grass type, size of playgrounds) but also other data connected to the features, such as inspections (e.g. of playgrounds), inventories (e.g. of trees), UOS usage (e.g. physical accessibility) or other information (e.g. historical value) (Figure 10.4).

The complexity of UOS with different associated values and functions provides challenges when creating a database structure for classification. Depending on their interests, different end users and

Figure 10.4 Image showing the varying green, blue, grey and brown spaces (see also Chapter 3) found in UOSs. These spaces can be diversified into features (e.g. trees, playgrounds and ground materials) whose properties need to be described through classifications and attributes. *Source*: Felipe Santana, Unsplash

organisations will wish to see different types of information recorded. Therefore, using several classification methods is a useful way of being consistent and focused on the specific purpose. Examples of methods that can aid in classifying UOS are sociotope mapping (Ståhle, 2006), biotope mapping (Löfvenhaft et al., 2002) and park maintenance manual (Persson, 1998), all adding different perspectives to UOS governance and management. Sociotope mapping is used to explore public open space usage by analysing both expert and user evaluations (Ståhle, 2006). Biotope mapping is used to classify biodiversity and biotope structure, with the goal of maintaining biodiversity (Löfvenhaft et al., 2002). Both methods can aid management in addressing values associated with different UOSs. In contrast, the park maintenance manual focuses on how to describe the UOS feature itself, to achieve more consistent classification and standardisation (Persson, 1998). Thus it can act as a guide for standardising descriptions of UOS features and their properties, especially for maintenance purposes (Figure 10.5). A drawback is that this also increases collection and maintenance costs, so there is a balance to be struck between more specific and more general classifications.

Sociotope perspective

Place	*Activity*	*Usage*
Name of the place	Social	Calm
		Picnic
		Event
		Sit in the sun
	Physical	Walks
	Nature	Green oasis
	Beauty	Cultural history
		View

Maintenance perspective

UOS Type	*Maintenance product*	*Maintenance type*
Grass	Utility lawn	Spring cleaning
		Trimming
		Fertilisation
Bushes and hedges	Utility bush	Weed control
		Pruning
Trees	Park tree	Pruning
Equipment	Bench	Supervision
		Change
		Repair
		Surface treatment
	Lighting	Supervision
		Change
		Repair
		Surface treatment
	Gazebo	Supervision
		Change
		Repair
		Surface treatment

Biotope perspective

Land cover	*Biotopes and matrix*	*Biotope quality*
Developed land	With dense vegetation (30%–50%)	With trees/ shrubs
Remaining bare ground	Road	Heavy traffic from road maps
	Solitary broad-leaved deciduous trees	

Figure 10.5 UOS data can be classified and described in several different ways, affecting how the information can be used, for example, for further analysis and decision making. *Photo*: Thomas Le, Unsplash.

When classifying UOS, the focus is often more on what features to include and how to describe them and less on the consequences of omitting certain types of data. In a local government context, UOSs excluded from classification are often informal spaces (e.g. vacant lots) and UOSs not managed by the local government. However, as described in Chapter 3, up to 50% of UOSs are not publicly owned but still of interest in an ecosystem service perspective. This highlights the importance of solutions to increase cooperation between different government departments and with other stakeholders that own or manage UOSs in order to include data across management responsibilities (Feltynowski et al., 2018). It is also important to assess how excluded data affect data usage and interpretation of analytical results derived from the data collected.

Digital tools for governance and management support

Digital spatial systems (e.g. GIS) can reveal *what* kinds of UOS assets need to be managed and *where* they are spatially distributed within the landscape, enabling analysis based on different UOS properties (e.g. design, size, use or location) (Schultz et al., 2015). In the following, a selection of digital approaches for maintenance, evaluation, communication, participation and design are explored in relation to potential values for UOS governance and management.

Maintenance tools

UOS management requires planning of day-to-day maintenance (Beer, 2002; Neal, 2016) integrated into a long-term management framework (Ugolini et al., 2018) in order to effectively supply ecosystem services (see Chapter 8). This needs to be based on an understanding of UOS features and their properties (e.g. location and type), as it affects both type and level of maintenance operations (Ugolini et al., 2018). It can also be of importance to document how the monetary resources are spent, by whom and at what level and time in order to understand the UOS resource distribution (Persson & Kristofferson, 2018). To meet these needs, maintenance data (e.g. working hours, costs of internal and external providers) concerning specific UOS features need to be collected (Schultz et al., 2015), described and used in accordance with the specific organisation, depending on its model (state, market or community) and type, including resource distribution, activities, results or effects (as discussed in Chapter 9).

Through analysis of past work, distribution of resources and effective workflows, insights can be gained into how UOSs perform, aiding in developing a long-time framework for the management of UOS. The idea of 'spatial accounting' takes this a step further by identifying hidden extras that different spatial plans imply due to future maintenance costs (Minicozzi, 2019), thereby enabling a transparent approach to resource allocation, as illustrated by an example from Helsingborg, Sweden, in Figure 10.6.

Combining maintenance data with mobile device solutions can further enhance UOS governance by using digital communication between different stakeholders – for example between local governments and external contractors or between these and users, as well as permit more internal communication regarding maintenance between UOS managers (Schultz et al., 2015). Examples of such tools are Cityworks

Figure 10.6 Digital maintenance class map used by Helsingborg local government to provide maintenance data to external contractors. *Source*: The map was created with ArcGIS® software by ESRI using data from the following sources: Helsingborgs stad, Danish Geodata Agency, ESRI, HERE, Garmin, INCREMENT P, USGS (2019)

and FixMyStreet, which both allow an accelerated information flow between stakeholders towards more demand-steered maintenance. Cityworks has created a digital framework for asset management (e.g. UOS, roads) that can create maintenance activities (e.g. preventive and reactive work, inventories) by using GIS to perform spatial analyses of work activities, enable mobile fieldwork and generate real-time operative insights regarding maintenance (Cityworks, 2019). The online tool FixMyStreet allows users to report issues in their environment to the managers responsible (FixMyStreet, 2019), thus functioning as a crowdsourcing app for UOS maintenance, so it can be regarded as both a participation and a maintenance tool. Another example of GIS use is for management organisations to keep control over data connected to maintenance and associated contracts, as described in Box 10.2.

Evaluation tools

The interest in using evaluation methods is increasing with the need to support UOS management (Feltynowski et al., 2018). As discussed in Chapter 8, there are several reasons why local governments want to raise awareness of UOS and green-blue infrastructure. One is to justify management and replacements costs, account for changes in natural capital in conjunction with urban expansion and infill development or make a general demonstration of 'big values'. The use of concepts such as ecosystem services and nature-based solutions in various computer models (Sang, 2020) has helped

BOX 10.2: USING GIS TO GET CONTROL OVER UOS MAINTENANCE

The maintenance unit in Helsingborg local government has in recent years been creating a GIS-based UOS management solution. The UOS maintenance is on a turnkey contract, and the external contractor is chosen through a public procurement process where all UOS features are explained and calculated. During procurement, contractors submit a price for each maintenance code, where the city often specifies a minimum price to maintain quality. In order to cover changes in the urban landscape and other changing conditions, such as petrol prices, price indexing is performed once a year to adjust the budget. To reach a common understanding between the contractor and the local government, a database explaining the UOS resource is crucial.

Initially, unclear routines in how to keep the data up-to-date caused troubles in trusting the calculations for logistics and budgets. The Helsingborg local government, therefore, decided to create effective and clear routines for how to update the data, specifying responsibilities in the different stages of the process and allocating the right competences (Figure 10.7). This resulted in a well-documented workflow in which new UOS features are documented continuously. With a routine set, the database slowly started to build up a well-updated, trustworthy representation of the local UOSs, which could then be applied in several different ways for UOS management. Some examples of values created for UOS maintenance are as follows:

- Digital maintenance class map (see Figure 10.6)
- Quick and trustworthy quantification controls and price indexing
- Maps and narratives for procurement where the size of the project can be easily visualised and competition made fair
- Maps to external contractors, pushing for digital competence and decreasing dependence on printouts that easily become out-of-date

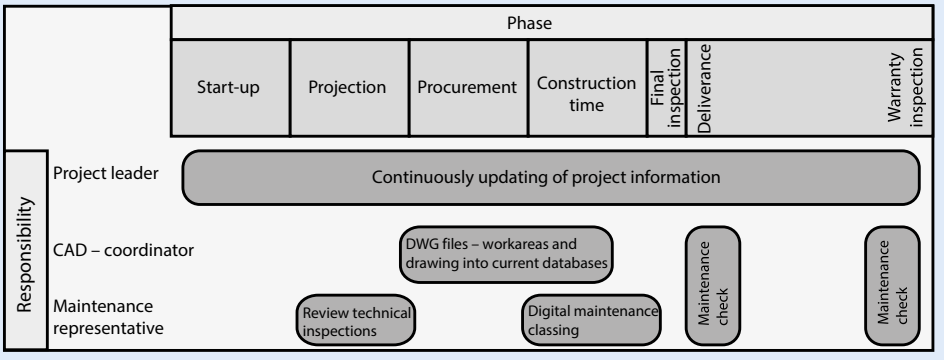


Figure 10.7 The workflow that the Helsingborg local government uses to clarify responsibilities between different units (project unit, surveying unit and maintenance unit) in order to maintain an up-to-date UOS database.

bridge these concerns by providing tangible means to evaluate how, for example, the urban forest contributes to natural capital. Other examples include how trees help mitigate stormwater run-off, reduce air pollution and store carbon. One tool addressing these challenges is i-Tree (see Box 10.3).

Using evaluation tools, such as i-Tree, is one of many stepping stones towards a wider consensus on the natural capital provided by UOS, as there is a lack of integrated ecosystem service knowledge in national regulatory frameworks and established professional norms (Saarikoski et al.,

BOX 10.3: I-TREE ECO – A DECISION-SUPPORT TOOL FOR THE MANAGEMENT OF URBAN FORESTS

One of the most commonly used tools for quantifying the benefits and values of trees in UOS management is i-Tree™, with 247,000 users worldwide (i-Tree, 2019). The tool was developed by the US Department of Agriculture (USDA) in 2006 and is based on long-term peer-reviewed research by several partners and institutes (Nowak, 2017). It includes a suite of software programmes applicable from parcel-scale contexts (e.g. private gardens) and streetscapes (e.g. street tree planting) to the overall population level of the urban forest (e.g. entire cities) (Hirabayashi, 2013). At its core is the interdependence between structural attributes, including tree species and size, leaf area index, etc., the services provided and how the economic value of these influence the continuances in UOS management (Nowak, 2017). i-Tree also provides prognoses for tree risk management and future threats and outbreaks of, for example, pests and diseases and how this in turn may jeopardise the resilience of the tree population (Roman et al., 2013).

The currently most prominent version in the i-Tree software suite that focuses on ecosystem services of entire tree populations is i-Tree Eco. It helps stakeholders capture a broad understanding of the collective services and benefits of urban forests. The programme requires the input parameters of standardised tree inventory data and local climate and pollution data. The output in turn delivers data on air quality, stormwater and carbon (Nowak, 2018), mitigation of building energy use (by strategic location of trees) and the structural value of, for example, replacement costs. The initial tree inventory can be either complete inventories or plot samplings to provide a justified representation of a whole tree distribution (Nowak et al., 2008). Estimates from plot sampling methods are valuable for drawing up policies for planning and management (Figure 10.8), while complete inventories provide a more detailed picture of the trees in a specific area and offer a basis for maintenance. As such, i-Tree Eco can be used in different scalar applications and for different management purposes as long as an understanding of the different inventory methods and subsequent conclusions is embedded at the outset.

Figure 10.8 A group using i-Tree Eco for strategic management purposes in the 'i-Tree Sweden' project. The plot sampling methods aid in drawing up policies where the resource and natural capital of urban trees are the focus in future dialogue (with, for example, decision makers and in trans-sectoral fora) by using the evaluation for communication. *Photo*: Johanna Deak Sjöman

2018). How values are communicated from the output to best reach stakeholders of concern is, therefore, important and should be addressed in detail (e.g. with graphical visualisations).

Communication tools

To communicate geographical data, different visualisations in charts and graphs, maps and diagrams are used. A map is often considered a good communication tool due to its ability to present data and, for example, the value of ecosystem services (Hauck et al., 2013), potentially increasing awareness of hidden values. The rapid development in web mapping has increased the different ways to create, use, share and communicate geographical information (Haklay et al., 2008), resulting in a trend in which an interactive way of explaining spatial data has generated new products for communicating to and sharing information with different users (Møller et al., 2019). Today, citizen expectations of interacting with their local government are changing, with users seeking more effective delivery of services (Nitoslawski et al., 2019). Among the tools that can aid in informatively communicating UOS in an interactive way are multimedia GIS and real-time dashboards.

Developing web-based multimedia GIS enables the users (e.g. UOS managers and the public) to explore data interactively and access it in combination with other media, such as narratives, photographs, videos or sound, creating a multi-sensory learning environment (Peterson, 2003). Story maps are one example of a visualisation product created by ESRI to combine maps with different multimedia (ESRI, 2019), thus enabling a way of telling the story of UOS (Figure 10.9).

Recently, there has been increased interest in using real-time interactive dashboards to transparently explain different benchmarking projects or other indicators (e.g. planning projects and traffic) to the public. This is possible through the increase in

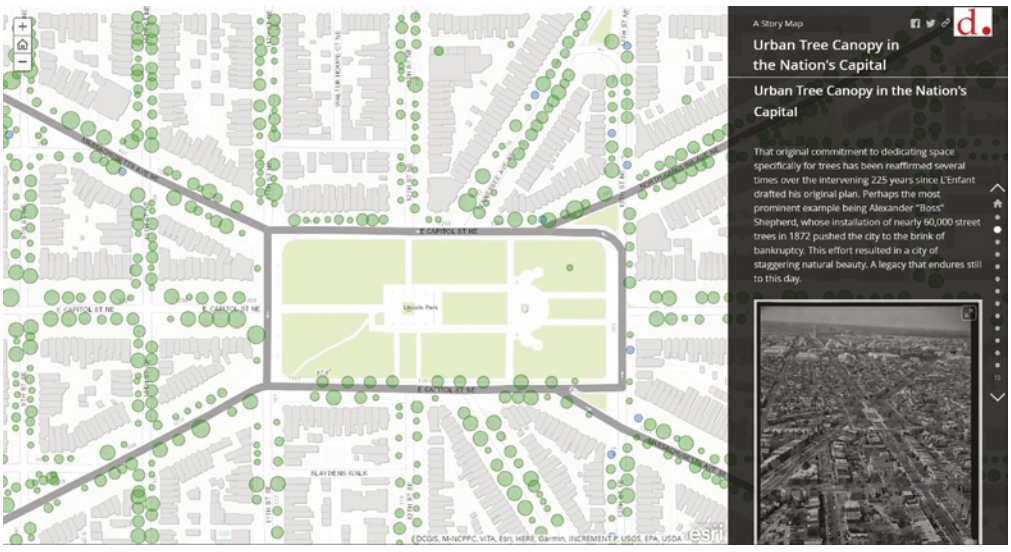


Figure 10.9 Example of a story map used to communicate the value of urban trees in Washington, DC, US, here with a combination of maps, text and photographs. *Source*: Story map created by DC District Department of Transportation Urban Forestry Administration using ArcGIS® software by ESRI. With data from the following sources: DCGIS, M-NCPPC, VITA, ESRI, HERE, Garmin, INCREMENT P, USGS, EPA, USDA (2019)

sensors and cameras and social and locative media, usually underpinned by the concept of smart cities. Through graphs and maps, the dashboards aim to explain how cities perform in different areas. The graphics are often interactive, providing city managers and users with an up-to-date, one-way information channel regarding different aspects of urban systems (Lockab et al., 2019).

Participation tools

Socially sustainable UOS governance and management requires engagement with users, which could be improved by facilitating communication of people's use and values associated with specific UOSs. These place-based values are an important component in order to affect, for example, public health and well-being (Knez et al., 2018). Modern technology has opened the way for new methods and perspectives for knowledge collection, knowledge sharing and co-development of ideas and initiatives to increase the engagement of users and other stakeholders in the governance of UOS (Møller et al., 2019).

A range of spatial digital tools that could collectively be described as place-based e-tools (Møller & Olafsson, 2018) can be used within UOS governance and management. They can create relationships between users, governments and places, expressing spatial relations and meanings and thereby change who has the power over maps and data. These tools could be used to facilitate participatory approaches to UOS governance and management with different levels of participation and engagement of people, ranging from informing and consulting (e.g. information web pages and tools for reporting problems) to involvement and fostering of partnership (e.g. facilitated volunteered geographic information (F-VGI) and public participation geographic

information systems (PPGIS) for identifying values) (Møller & Olafsson, 2018) (see also Chapter 7). Some tools can also potentially support empowerment, allowing users to define their own spaces through collaborative mapping (e.g. OpenStreetMap), collaborative design and collaboratively identifying future scenarios (e.g. geodesign).

The extent to which spatial e-tools foster participation and engagement is dependent on the governance context, including factors such as the kind of organisation using the tools, the resources available for the interaction and the support to top-down and bottom-up approaches (Møller et al., 2019). In the past, engagement was supported through dialogue in meetings, whereas e-tools provide a different type of engagement with rules determined by the application of the tools. This includes data that can be uploaded and registered (e.g. point data, lines and/or areas but also photos and emojis) and how textual information is handled (predefined categories or free text). Depending on the setting, tools such as PPGIS can be used in one-way communication, where information from users is collected, or with added resources and appropriate support from the organisation, it can be used as a two-way dialogue forum around place-based values (Møller et al., 2019). The PPGIS tool allows people to map their use and values of a space, which can later feed back into UOS management. This is often facilitated through online surveys (see Box 10.4).

While PPGIS requires active participation, volunteered geographic information (VGI) can be used to acquire information on place-based values more passively through, for instance, analysis of georeferenced Twitter feeds (Ddamba Kibuuka et al., 2015) or photos from Flickr (Oteros-Rozasab et al., 2018). The geographical information in VGI is provided voluntarily by individuals, including georeferenced data produced through social media. When specific apps are used, this is generally referred to as F-VGI and examples of such are found within citizen science projects, such as reporting of species and children's GIS maps.

Design tools

Design within spatial planning involves a process of management at the strategic level with large impacts on the ability of UOS to generate ecosystem services and benefits. It

BOX 10.4: USE AND IMPROVEMENTS OF UOS IN ESLÖV THROUGH PPGIS

The local government of Eslöv, Sweden (13,000 inhabitants), conducted a survey in order to map the usage and values associated with UOS and asked local residents to map where they want to see improvements in the UOS management. Mapping was conducted using PPGIS and the software Maptionnaire. Over 800 responses were collected, identifying areas used and associated values and frequency of visits. The survey identified places where improvements were wanted (Figure 10.10), mainly related to increased maintenance (25%) but also requests for more play equipment and outdoor gyms. The survey provided spatially explicit material that is being used to support both strategic planning and UOS management.

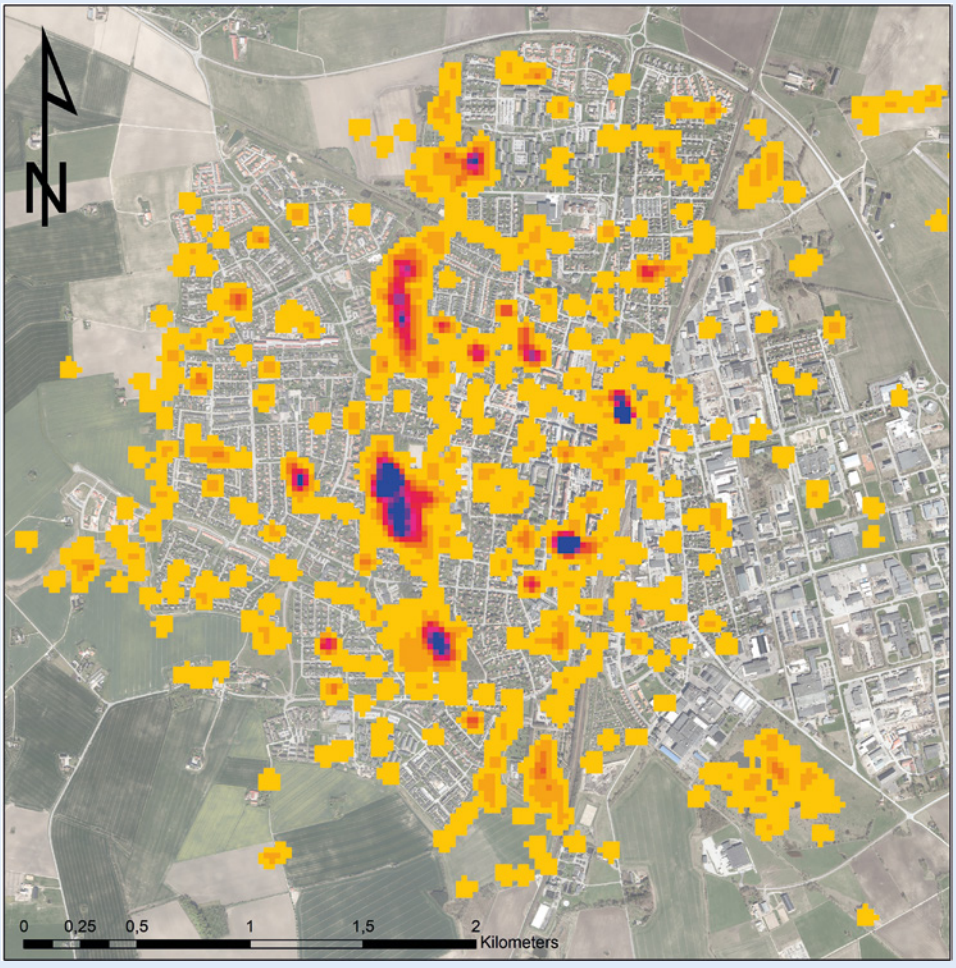


Figure 10.10 Map of use and areas for improvement in UOS in Eslöv, Sweden. *Source*: Map created using Maptionnaire, orthophoto© Lantmäteriet

is premised on an intention to guide a complex reality in the direction desired, choosing what aspects to integrate into the design. Finding consensus about a design proposal is easier when some costs are hidden from view (e.g. loss of agricultural soil or habitat), but as planetary boundaries are breached (Kahiluoto, 2019), the choices become harder, and different costs can no longer be hidden in the process. Therefore, tools must both clearly communicate the impacts of proposed designs on human-natural systems *and* help find consensus within the narrowing range of options. At the simplest level, this might mean using tools already described (e.g. maintenance or evaluations tools) to affect the design (e.g. how much space do we need to provide sufficient UOS for a given set of functions? How many resources will be needed to maintain this UOS?). At the more complex end, it may mean devising budgets for *predicted* scenarios (e.g. how many shady areas do we need in 30 years given climate change?).

Decisions about how to spend resources feed back into the design (e.g. which functions can a city afford to provide, which should be priorities, which are mutually exclusive?). While GIS is good for modelling the impacts of different decisions, in practice, the *optimal* solution may be more difficult to deliver than a *sufficient* and widely acceptable solution. Furthermore, the *effective* solution may be as yet unknown if circumstances change unexpectedly, and scenario planning design can play an important role in visualising and understanding the effects of different decisions involving different stakeholders.

Conventional GIS has struggled in effectively supporting more complex design processes, partly because the software can be unintuitive but also because the role of mediation and conciliation was not the main focus in GIS software design. Geodesign places the focus on that role, with major emphasis on participation and stakeholder inclusion in the design process. In that sense, geodesign as a method offers a collaborative design platform that can combine stakeholder participation and collaboration with design creation, improve understanding of the effects of the design and facilitate the involvement of a wide range of stakeholders. The focus of geodesign tools is on supporting intuitive and iterative design, which can be carried out in real time in a collaborative setting. More complex models may be worked into the process to ensure that decisions are guided by scientific evidence, but the principle is that this should not be at the expense of a fluent discussion or excluding less technically skilled participants.

Geodesign tools combine zone design with map-driven 'dashboards' (Lockab et al., 2019). These allow stakeholders to see information, such as accessibility to different functions (e.g. health care) or risk (e.g. flooding), so that they can select the best locations available and access area-based statistics to determine whether the goal has been met (e.g. ensuring that a new development has sufficient UOS to provide ecosystem services). Geodesign tools are available online for ease of use, including as a distributed session across multiple sites (see Box 10.5 for an example).

BOX 10.5: DELUGE

The International Geodesign Collaboration is a global project aiming to coordinate research on geodesign use to address pressing global trends at the local level (www.envizz1.com/). One associated research project, DELUGE, has been carried out in Lomma, a small town on the south-west coast of Sweden. Through regeneration and gentrification, Lomma has rapidly developed from an industrial town to a fast-growing area. However, space to grow is limited due to rising sea levels on one side and prime agricultural land on the other.

The DELUGE research group worked with local planners and specialists to consider different densification strategies to accommodate a doubling in the population by 2050. The tool geodesignhub.com (2019), structured around six steps described by Steinitz (2012), was used for negotiation and management as much as for design. By including pre-negotiated evaluation criteria as suitability maps against which design suggestions can be compared, proposed changes can be added to the map as zones

and thereafter selected for inclusion in an overall design. Designs can be saved at any step by multiple design teams simultaneously and then compared against the evaluation criteria. At the decision stage, a 'final' design can be negotiated by selecting elements from previous designs. In this way, a 'pyramid' of negotiations is built, combining ideas from multiple interest groups, leading to one consensus design. This is not the end of the process since the software also provides metrics such as costs for different designs and implementation of timescales. Thus the plan feeds directly into management and, if necessary due to unanticipated circumstances, can be altered by a new process of discussions.

In the DELUGE project, geodesignhub.com provided contextual information, such as flood risk and feedback on, for example, types of land cover affected by different designs. Two teams created two different designs and then negotiated a final design. The process helped the planners to explore different combinations of ideas and visualise the changes in 3D (Figure 10.11).

Figure 10.11 Screen shots from output of geodesignhub.com (2019), including (top left to bottom right) design map, 3D visualisation, the priorities for evaluation and land-cover impact statistics. *Source*: Screenshots by kind permission of geodesignhub.com. 3D view generated within geodesignhub.com via CESIUM.com and Bing.com ©CGIAR-CSI. Produced using Copernicus data and information funded by the European Union DEM layers, Earthstar Geographics, ©2016 Digital Globe, © 2016 GeoEye.

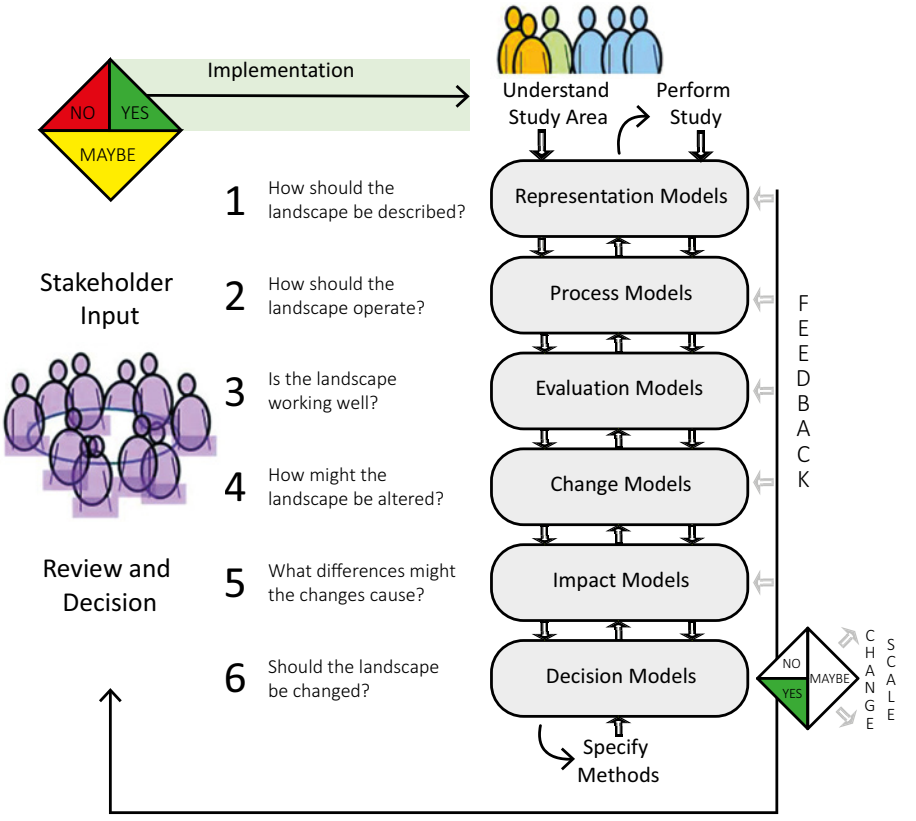


Figure 10.12 The six steps in the Steinitz framework. *Source*: Reproduced from Steinitz (2012)

Steinitz (2012) suggests a six-step process by which consensus can be reached for complex landscape design problems (Figure 10.12). These steps can also be relevant to consider for UOS management. To reach consensus, the process must be iterative, with steps repeated and conditions altered as the discussion progresses. This way of working is poorly supported by conventional GIS, where editing tools are generally built for precision rather than ease of use and data management for security rather than rapid updating.

Future directions

There is growing interest in using digital technology, with its connected devices, data analytics and citizen engagement (the smart city discourse), as an important part of sustainable development, but how UOS governance and management can best benefit from this technological development is still unclear (Nitoslawski et al., 2019). Some local governments are already collecting extensive data through relatively new technology (e.g. deploying sensors, drones and artificial intelligence (AI)) and using this to support decision making. Most local governments manage on more limited, fragmented data solutions, and some may argue that they do so reasonably, while adopting smarter systems carries risk (Brooks, 2017).

The mounting pressures on UOS and the predicted impact of climate breakdown are

placing new demands for evidence-based planning and management. UOS is expected to play multiple, sometimes competing, roles – for example functions for mitigating heat islands and for flood risk or reserves of green and sites for densification. Managing UOS has always required consideration of a complex set of demands, but the range of options for finding an acceptable, yet effective, solution is narrowing. As the pressure on UOS increases, the need to manage it efficiently intensifies and demands a comprehensive overview of UOS assets and characteristics. For this reason alone, the process of collecting and collating relevant data in accessible form will only increase. The technical and cost barriers to doing so are also falling with more GIS and management software becoming freely available online. Yet challenges remain, not least in deciding which technical solutions to invest in, given the pace of change, and how to ensure staff have the skills to manage them, which is particularly problematic for smaller organisations with less spare capacity (Sang & Sang, 2015).

However, making the right balance of investments may be a rather daunting task. First, there is the question of whom to consult on the matter. This risks a shift in focus from users or stakeholders to perhaps scientific or largely accounting issues, which would be undesirable. Ideally, several aspects should be considered in the system, but each may bring different demands in terms of security, content, user interface and so on. This also connects to whether it is better to run multiple specialist systems, with some cost to ensure compatibility, or buy into a single 'ecology' provided by a large company, which raises questions of ethics, privacy, equal access, social justice, maintaining backwards compatibility, licensing and more. As pointed out earlier in this chapter, there is still insufficient research on the use of digital technology for UOS governance and management. There are some common elements underpinning most of the options available, in particular effective SDI that supports the everyday tasks of UOS managers and inclusion of multiple users. It is perhaps the single most important investment in digital systems that a local government can make, as it will form the coordinating hub of the system. Depending on the scale of the investment needed, this can also be a process (Williamson et al., 2003) of small steps in different areas.

In addition to the aim of achieving efficient decision making within a narrowing range of options, there is also the question of how to make *better* decisions for uncertain future scenarios where we can be confident that UOS will play a crucial part. This is where the questions asked need to expand from 'What?' and 'Where?' to 'What if?' and 'When?', thus using analyses to gain a better picture of the potential scenarios towards which UOS management needs to be directed. With data collected and accessible via SDI, various analytical tools can be applied. These might begin with asking simple questions, such as how many people live near a proposed new park, but lead to questions such as how many people *are likely* to be living there in 20 years and how much of a cooling effect might the trees then have on that area? The range of complexity of questions will vary, and at present, some analyses are considered advanced and tend to require specialist input. However, with demand for such knowledge growing rapidly and AI starting to automate more analytical roles, new techniques can be expected to become more available to regional and local government offices and UOS managers. Indeed, more complex and simple models and approaches can also be of interest when addressing broader strategic issues, and both build on the same spatial data and monitoring infrastructure. Investing in the means to gather, store and communicate data, including via

intuitive visualisation, is, therefore, a powerful tool for inclusive UOS governance and management.

References

Agency for Digital Government, (2019). *Öppna Data Och Datadriven Innovation*. [October 2019] www.digg.se/utveckling – innovation/oppna-data-och-datadriven-innovation

Beer, A.R., (2002). The decline of the urban park in Britain: The impact of over twenty years of neglect on the quality of parks and green-spaces. *Stads & Havneingenioeren*. [In Danish], English version www.greenstructureplanning.eu/COSTC11/uk-parks.htm

Brooks, R., (2017). *The Seven Deadly Sins of AI Predictions*. [October 2019] www.technology review.com/s/609048/the-seven-deadly-sins-of-ai-predictions/

Chen, W., Huang, H., Dong, J., Zhang, Y., Tian, Y. & Yang, Z., (2018). Social functional mapping of urban green space using remote sensing and social sensing data. *Journal of Photogrammetry and Remote Sensing*. **146**, 436–452.

Cho, D. & Shin, D., (2016). Utilization strategy of spatial information to maintain urban parks and green space. *Spatial Information Research*. **24**(2), 115–125.

Cho, D. & Shin, D., (2017). Development of general purpose model for park and green space management system in South Korea. *Spatial Information Research*. **25**(4), 593–604.

Cityworks, (2019). *Cityworks*. [October 2019] www.cityworks.com/.

Ddamba Kibuuka, J., Dittrich, Y., Rasmusson, M., Hallin, P., Guldåker, N., et al., (2015). *Urban Decision-Making and Expert Integration*. Urban-Data2Decide: Lund University Press.

ESRI, (2019). *Story Maps*. [October 2019] https://storymaps.arcgis.com/en/

Feltynowski, M., Kronenborg, J., Bergier, T., Kabish, N., Laszkiewicz, E. & Strohbach, M., (2018). Challenges of urban green space management in the face of using inadequate data. *Urban Forestry & Urban Greening*. **31**, 56–66.

FixMyStreet, (2019). *Frequently Asked Questions*. [October 2019] www.fixmystreet.com/faq

Gartner, G., Cartwirght, W. & Peterson, M.P., (2007). *Location Based Services and TeleCartography*. Berlin-Heidelberg: Springer.

Geodesignhub.com, (2019). *Software for Negotiations & Mediation Over the Future of a Place*. [October 2019] www.geodesignhub.com

Haklay, M., Singleton, A. & Parker, C., (2008). Web mapping 2.0: The neogeography of the GeoWeb. *Geography Compass*. **2**(6), 2011–2039.

Hauck, J., Görg, C., Varjopurjo, R., Ratamäki, O., Maes, J., Wittmer, H. & Jax, K., (2013). Maps have an air of authority: Potential benefits and challenges of ecosystem service maps at different levels of decision making. *Ecosystem Services*. **4**, 25–32.

Heywood, I., Cornelius, S. & Carver, S., (2011). *An Introduction to Geographical Information Systems*. 4th ed. Harlow: Pearson.

Hirabayashi, S., (2013). *i-Tree Eco Precipitation Interception Model Descriptions*. [October 2019] www.itreetools.org/eco/resources/iTree_Eco_Precipitation_Interception_Model_Descriptions.pdf.

i-Tree, (2019). *i-Tree*. [October 2019] www.itreetools.org/#mapKahiluoto, H., (2019). The concept of planetary boundaries. *Encyclopedia of Food Security and Sustainability*. **1**, 56–60.

Knez, I., Ode Sang, Å., Gunnarsson, B. & Hedblom, M., (2018). Wellbeing in urban greenery: The role of naturalness and place identity. *Frontiers in Psychology*. **9**, 491.

Lockab,. O., Bednarz, R., Leaoa, S. & Pettita, C., (2019). A review and reframing of participatory urban dashboards. *City, Culture and Society*. https://doi.org/10.1016/j.ccs.2019.100294

Löfvenhaft, K., Björn, C. & Ihse, M., (2002). Biotope patterns in urban areas: A conceptual model integrating biodiversity issues in spatial planning. *Landscape and Urban Planning*. **58**, 223–240.

Minicozzi, J., (2019). *Mapping the Dollars and Sense of Land use Patterns*. Redlands, CA: ESRI Geodesign Summit 2019.

Møller, M.S. & Olafsson, A.S., (2018). The use of E-Tools to engage citizens in urban open infrastructure governance: Where do we stand and where are we going? *Sustainability*. **10**, 3513.

Møller, M.S., Olafsson, A.S., Vierikko, K., Sehested, K., Elands, B., Buijs, A. & van Den Bosch, C., (2019). Participation through place-based e-tools: A valuable resource for urban green infrastructure governance? *Urban Forestry & Urban Greening*. **40**, 245–253.

Neal, P., (2016). *State of UK Public Parks*. Research Report to the Heritage Lottery Fund. London: Heritage Lottery Fund.

Nitoslawski, S.A., Galle, N.J., Konijnendijk van den Bosch., C. & Steenberg, J.W.N., (2019).

Smarter ecosystems for smarter cities? A review of trends, technologies, and turning points for smart urban forestry. *Sustainable Cities and Society*. **51**, 101770.

Nowak, D., (2017). Chapter 11. Assessing the benefits and economic values of trees. In: F. Ferrini, C.C.K. van den Bosch & A. Fini (eds.) *Routledge Handbook of Urban Forestry*. New York, NY: Routledge. 152–163.

Nowak, D., (2018). *i-Tree: The State of the Science*. Presentation at the Swedish University of Agricultural Sciences, Alnarp, Sweden, 11 January 2018.

Nowak, D., Walton, J.T., Stevens, J.C., Crane, D.E. & Hoehn, R.E., (2008). Effect of plot and sample size on timing and precision of urban forest assessments. *Arboriculture & Urban Forestry*. **34**(6), 386–390.

OpenStreetMap, (2019). *Openstreetmap*. [October 2019] https://openstreetmap.se/.

Oteros-Rozasab, E., Martín-López, B., Fagerholmad, N., Bielinge, C. & Plieninger, T., (2018). Using social media photos to explore the relation between cultural ecosystem services and landscape features across five European sites. *Ecological Indicators*. **94**(2), 74–86.

Persson, B., (1998). *Skötselmanual 98*. Gröna Fakta, 8. Alnarp: Movium.

Persson, B. & Kristofferson, A., (2018). *Skötsellogiken: redskap för uppföljning av skötselkvalitet*. Movium Fakta 2. Alnarp: Movium.

Peterson, M., (2003). Maps and the internet: An introduction. In: M.P. Peterson (ed.) *Maps and the Internet*. Amsterdam: Elsevier Science. 1–16.

Roman, L.A., McPherson, E.G., Scharenbroch, B.S. & Bartens, J., (2013). Identifying common practices and challenges for local urban tree monitoring programs across the United States. *Arboriculture & Urban Forestry*. **39**(6), 292–299.

Saarikoski, H., Primmer, E., Saarela, S., Antunes, P., Aszalós, R., Baró, F., et al., (2018). Institutional challenges in putting ecosystem service knowledge in practice. *Ecosystem Services*. **29**, 579–598.

Sang, N., (2020). *Modelling Nature-Based Solutions: Integrating Computational and Participatory Scenario Modelling for Environmental Management and Planning*. Cambridge: Cambridge University Press.

Sang, N., Birnie, R., Geddes, A., Bayfield, N., Midgley, J., Shucksmith, D. & Elston, D., (2005). Improving the rural data infrastructure: The problem of addressable spatial units in a rural context. *Land Use Policy*. **22**, 175–186.

Sang, N. & Ode Sang, Å., (2015). *A Review on the State of the Art in Scenario Modelling for Environmental Management*. Stockholm: Naturvårdsverket.

Schultz, S., Dong, N. & Xhang, S., (2015). GIS-based digital applications on maintenance and preservation for traditional Chinese gardens. *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*. **XL-5/W7**(5), 371–378.

Silva, B.N., Khan, M., Jung, C., Seo, J., Muhammad, D., et al., (2018). Urban planning and smart city decision management empowered by real-time data processing using big data analytics. *Sensors*. **18**(9), 2994.

SKL, (2017). *Digitalisering*. [October 2019] https://skl.se/naringslivarbetedigitalisering/digitalisering.2138.html

Ståhle, A., (2006). Sociotope mapping – Exploring public open space and its multiple use values in urban and land- scape planning practice. *Nordic Journal of Architectural Research*. **19**(4), 59–71.

Steinitz, C., (2012). *A Framework for Geodesign: Changing Geography by Design*. Redlands, CA: ESRI Press.

TreeMania, (2019). TreeMania – Your soilmate. [October 2019] https://treemania.com/

Treitz, P. & Rogan, J., (2004). Remote sensing for mapping and monitoring land-cover and land-use change – An introduction. *Progress in Planning*. **61**, 269–279.

Ugolini, F., Sanesi, G., Steidle, A. & Pearlmutter, D., (2018). Speaking "Green": A worldwide survey on collaboration among stakeholders in urban park design and management. *Forests*. **9**, 458.

Williamson, I., Rajabifard, A. & Feeney, F., (2003). *Developing Spatial Data Infrastructures: From Concept to Reality*. London: Taylor and Francis.

11 Strategic management of urban open spaces

Thomas B. Randrup and Märit Jansson

Introduction

Urban open space (UOS) managers address many of the current environmental and ecological trends and challenges prevailing in society. These include climate change adaptation and mitigation and solutions for modern urban challenges that range from urban stormwater management (Petit-Boix et al., 2017; Qiao et al., 2018) to urbanisation and increased densification of cities, leading to increased pressures and loss of UOS (Soga & Gaston, 2016), individualisation and an increased human demand for engagement and involvement (Buijs et al., 2016), as well as demographic changes resulting in increased pressure on public funding (EU, 2017). There is a general understanding, and demand, that such challenges can be dealt with or even solved by active governance and management of UOS. Nature-based solutions involve the use of green and blue spaces as a response to future urban challenges, such as concerning climate change and human health (EC, 2015; Albert et al., 2019). Nature's Contribution to People (part of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services) (Díaz et al., 2018) and the United Nations Sustainable Development Goals are efforts to address human dependency on nature in restoring and developing not only urban areas but also human life in general. This places great demands on the actors responsible for UOS governance and management.

Frequently asked questions within a UOS organisation are as follows: How can we be efficient without compromising the usability of UOS? Do we have the best people in all positions? Is the organisation an inclusive and attractive working environment? How are the values of the organisation expressed in ecosystem services of UOS (see Chapter 8), and are these sufficient to meet the needs? Each question may require its own approaches and involve both long-sighted and short-term thinking. This calls for a strategic approach to UOS management.

Strategic decisions are needed in an everyday context but affect the long-term well-being of an organisation (Fitzroy & Hulbert, 2005). Within UOS governance and management, and in many other circumstances, managers will be expected to deal with strategic decision making on at least two levels: (i) leading personnel and steering the organisation in the right direction efficiently, effectively and as a good, inspiring working environment and

(ii) managing UOSs so that they remain relevant and valued by users. The management literature has long recognised the difference between being a leader and being a manager (see Box 11.1). According to Zaleznik (2004, p. 2), 'A managerial culture emphasizes rationality and control', where 'a manager is a problem solver' and 'from this perspective, leadership is simply a practical effort to direct affairs; and to fulfill his or her task'. Fitzroy and Hulbert (2005) also make a clear distinction between management and leadership. In line with Kotter (1996), they define management as being about keeping the organisation operating, while coping with complexity. Effective management requires systems and procedures to handle this complexity, using devices such as standard operating procedures, planning and budgeting systems. In contrast, leadership is described as being about change, developing visions and strategies but also about aligning people with that vision and inspiring them to make it happen. The problem for UOS managers may be to address some or all of the aforementioned challenges, while also making UOS relevant for users. Doing so requires leadership in order to direct multiple stakeholders (staff, politicians, users and various interest groups) to achieve this goal.

In this chapter, we describe the characteristics of an UOS organisation in relation to leadership and management. Specifically, we focus on strategic management as a combination of both leadership and management and describe long-term strategy making and governance. The main focus is on the local government perspective, but the leadership and management approaches described apply also to many other organisational settings dealing with UOS.

Characteristics of a UOS organisation

Leadership and management actions will always be conducted under unique circumstances depending on the characteristics of different executives and employees, the goals of the organisation, the financial situation, prevailing labour market conditions, etc. Despite each UOS organisation (local government, contractor, consultant, housing company, etc.) facing different realities and at different stages in the process (planning, design, construction or maintenance), many basic conditions are common to all UOS organisations (see Box 11.2). As described in Chapter 4, the UOS sector in general is characterised by many

BOX 11.1: DEFINITIONS

Manager: A person who is responsible for a certain group of tasks or a certain subset of an organisation, including a team to achieve the designated tasks. A manager is a 'problem solver'.

Management: The art of managing and coordinating an organisation, including setting the strategy of the organisation in order to achieve certain goals.

Leader: A person who is in control or in charge of people or an organisation. A leader 'sets the direction'.

Leadership: The art of motivating, inspiring and directing a group of people to act towards a common goal over a substantial period.

BOX 11.2: CHARACTERISTICS OF A UOS ORGANISATION

- Focus on physical spaces, often with large areas of habitat and vegetation.
- Work with outdoor sites, resulting in unpredictable working conditions.
- Define operational tasks by seasonal changes.
- Understand the importance of communication with staff and users.
- Conduct UOS management across a network of more or less UOS-focused organisations.

organisations of various sizes in which UOS management is often a small part. This includes local governments (main focus on, for example, social issues, education and health), cemeteries (burial services), housing companies (living conditions), facility management businesses (clean and safe environments) and consultancy companies (engineering and architectural expertise). The larger the organisation, the greater is generally the number of organisational levels between the UOS organisation and the 'parent' organisation. In larger organisations, UOS leaders and managers have to adapt to the strategic goals and administrative demands set by the organisational level. In general, this means more formalisation and less room for acting independently than in smaller organisations, where leaders and managers often have to take more initiative and responsibility for strategic work.

Dealing with UOS involves working with living and non-living materials in the different types of UOS (green, blue, brown, grey; see Chapter 3). This means acknowledging the unpredictability of weather and climate (depending on geographical location) and the likelihood of outbreaks of pests, diseases, etc., and seasonal changes that alter labour tasks and needs during the annual cycle. In temperate regions of the world, a long-standing challenge for the UOS sector is to maintain a taskforce during the busy growing season. During months with vegetative growth, there may be many tasks to perform in terms of weeding, mowing, cutting, irrigating, etc., while in months when the vegetation is dormant, the tasks are fewer. This fluctuation in tasks often leads to a similar fluctuation in staff and a risk of losing dedicated and qualified staff members due to the inherent conditions of the sector. This dilemma is dealt with in many ways – for example by appointing extra staff during the vegetative season (temporary workers, students, etc.) or by moving staff to other tasks during the dormant season, e.g. snow clearing and tree pruning. Due to the seasonal working conditions, the staff engaged in operational UOS maintenance often have low or no formal education. This does not mean that they are unskilled but that the leadership role is important in terms of training and allocation of tasks. It might not take much skill to weed a flowerbed, but ensuring that weeding is done correctly is a leadership task requiring horticultural knowledge, delegation of responsibility and motivation.

The increasing general interest in engaging users and local stakeholders in UOS management also affects the leadership role. It may involve accommodation and engagement of the public through various

governance arrangements, often dedicated to operational maintenance tasks. This situation is described in more detail in Chapters 5, 6, 7 and 9. There is a need for inclusive and strategic thinking in order to accommodate and benefit from community engagement. Economic circumstances often dictate the level of local community engagement, creating a need to balance the roles of permanent staff with tasks that can be undertaken by dedicated local community groups.

In addition, the relevance and use of specific UOSs define the leadership role and strategic decisions in relation to output and performance. Most UOSs consist of recreational, ecologically biodiverse habitats, with many diverse and sometimes conflicting uses by different groups. The operational staff working in actual UOS are front-stage representatives of the organisation, and their appearance, behaviour and knowledge in relation to the users is vital for a good relationship between the UOS management organisation and the system in which it performs. Even small mistakes can have detrimental and long-term effects on a UOS and its use, and, due to the inherent location of and interest in a UOS, this can often lead to political interests of a negative nature. Therefore, communication on all levels of the organisation is an important component of the UOS leadership role. Clear communication with staff in all parts of the organisation is needed to engage and stimulate a good working relationship and inform and engage staff about reasons for maintenance work. Communication with the public, the users of UOSs, is important in order to prevent misunderstandings and misconceptions of inevitable or politics-driven maintenance tasks.

Strategy and its relation to UOS management

The word '*strategy*' has its roots in warfare. The Greek verb *strategos* means 'army leader' and *stratego* (from which the word *strategy* originates) refers to defeating an enemy by using resources effectively (Bracker, 1980). For many, strategic thinking is associated with military thinking. Without a smart plan – a strategy – any organisation can lose a battle. A strategy is thus a matter of winning or of survival. The links to corporate strategy making are obvious since it is difficult to survive in a competitive environment without having a plan. The law of extinction (van Valen, 1973) states that the probability of extinction does not depend on the lifetime of a population but rather on each species' probability for survival or evolved adaptive evolutionary supremacy. The theory can be re-formulated thus: 'For an evolutionary system, continuing development is needed just in order to maintain its fitness relative to the systems it is co-evolving with' (e.g. Heylighen, 1993). This is also called the Red Queen theory, based on the observation by the Red Queen in Lewis Carroll's *Through the Looking Glass* that 'in this place it takes all the running you can do, (just) to keep in the same place'. In a UOS management perspective, it can be claimed that relative progress ('running') is necessary just for maintenance ('to keep in the same place').

Mintzberg (1992) used the five Ps (plan, ploy, pattern, position and perspective) as a descriptive analysis of strategy. In Box 11.3, these are used as a framework for applying strategic perspectives in UOS management.

Business management literature has long agreed that in order to survive in competition with other organisations (e.g. other departments within a local government),

BOX 11.3: USE OF MINTZBERG'S FIVE Ps IN AN UOS MANAGEMENT STRATEGY

Plan: A strategy is a plan – a method for achieving an end or a consciously intended course of action or a guideline (or set of guidelines) to deal with a situation. By this definition, a strategy has two essential characteristics: it is created in advance of the actions to which it refers, and it is developed consciously and purposefully.

Ploy: The military or business approach to strategy making (the need for continued development just in order to maintain fitness) is defined as a specific manoeuvre intended to outcompete an opponent or competitor – i.e. a ploy. It must be emphasised that in (public) UOS management, a 'ploy' does not involve outcompeting or even beating a competitor. Rather, it reflects the need to manoeuvre within the often complicated dynamics and consequences of politics and rivalry within an organisation.

Pattern: A strategy is a pattern of many actions and behaviours, whether intended or not. The actions (patterns) can be quite independent of one another: some plans may remain unrealised, while others may emerge spontaneously. While plans refer to intended strategy or specify a direction, patterns are realised strategy or what is actually being done or achieved. If a UOS organisation tends to focus on operational matters, its management pattern becomes operation oriented. Unintended patterns can often develop in the absence of intentions or plans or despite them.

Position: A strategy is a position, specifically a means of locating an organisation in an 'environment'. By this definition, strategy is the mediating force, or 'match', between organisation and environment – i.e. between the internal and external context. In UOS public management, this involves positioning the UOS organisation in relation to current or emerging discourses, such as the health agenda or climate change. By doing so, the UOS management organisation secures relevance as part of future solutions.

Perspective: A strategy is a perspective, and the strategy's content should consist not only of a chosen position but also of an 'ingrained way of perceiving the world'. According to Mintzberg (1992), strategy is to the organisation what personality is to the individual. The key is that strategy is a perspective shared by members of an organisation through their intentions and/or by their actions. In effect, strategy in this context reflects the collective mind of an organisation – individuals united by common thinking and/or behaviour.

efficient action, or at least action that is more efficient than that of the least efficient competitor, is vital (e.g. Warren, 2008). Freedman (2013, p. xi), one of the leading figures in strategy theory, noted that 'strategy comes into play where there is actual or potential conflicts, when interests collide and forms of resolution is required. This is why strategy is much more than a plan'. Such a market-oriented approach is described in the business literature as the basic requirement for profit-driven

enterprises to survive in a competitive environment (e.g. among private contractors). The introduction of New Public Management (NPM) (e.g. Bryson, 2004) has led to strategic planning and a market-oriented approach, also becoming critical for public and non-profit organisations. However, Andrews et al. (2012) noted that the performance of public organisations is (still) highly variable, referring to the efficiency of, for example, hospitals. Investing money in one UOS organisation may produce a very different outcome than investing the same amount in another, owing, for example, to local physical, geographical and socioeconomic circumstances but also to the fact that, in general 'service quantity and quality depends partly in where [tax payers] live and weather local public organisations are performing well or not' (Andrews et al., 2012, p. 1). There are also huge differences in performance within the UOS sector, as recently described by, for example, Randrup et al. (2017) and Fongar et al. (2019). Randrup and Persson (2009) identified differences in expertise and approaches within Nordic UOS management organisations nationally and in different countries. They devised a strategic approach to UOS management, involving three levels within the organisation: policies, tactics and operations (see Figure 11.1).

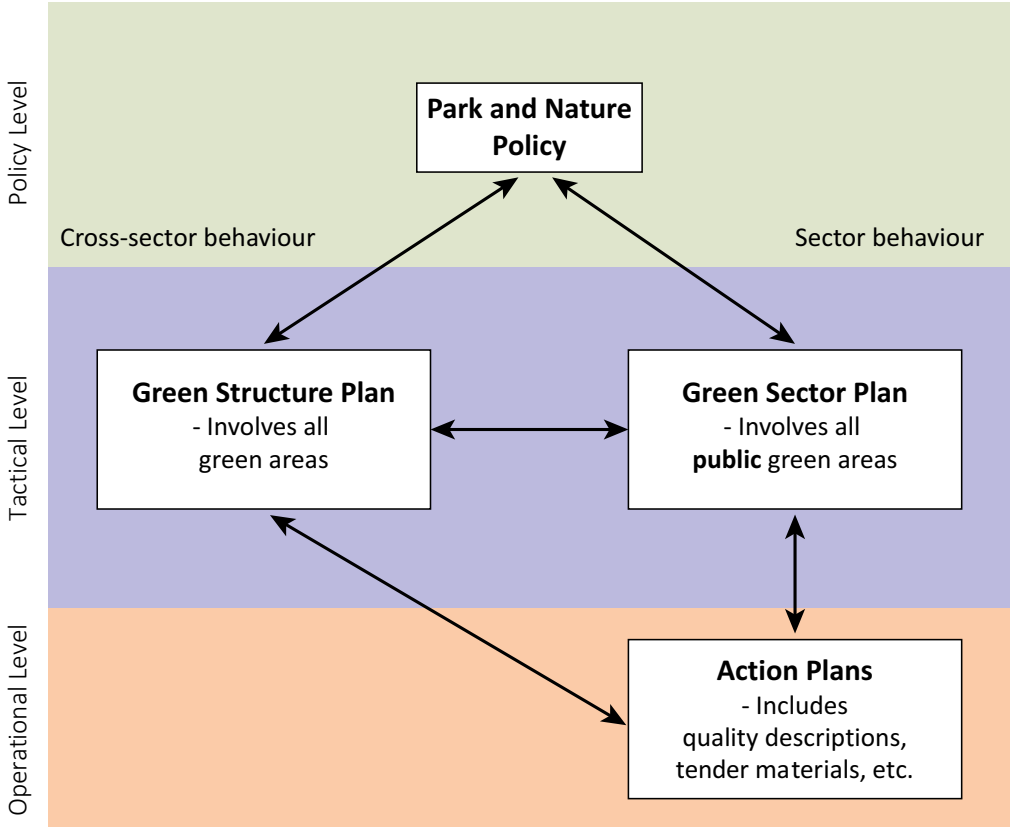


Figure 11.1 Strategic levels of activity within a local government UOS organisation and examples of plans. *Source*: Adapted from Randrup and Persson (2009)

Based on Figure 11.1, there are two sets of behavioural approaches within UOS strategic management, sectoral and cross-sectoral, indicating that the UOS organisation has its own task to fulfil (primarily management oriented within the sector) but also tasks and obligations relating to the larger organisation (cross-sectoral and more leadership oriented).

At the policy level, long-sighted and visionary goals and ambitions set the direction. Policies may also be developed at the tactical level but are generally approved at the political level. A UOS management policy is a statement made by the political level within the organisation, and its purpose is to set a direction. It should cover the entire organisation, or a defined theme (green spaces, playgrounds, trees, etc.) and relate directly to the UOS management organisation in question. Most often such policies are cross-sectoral, relating to other parts of the organisation, such as culture, health care, elderly care and education, and involve positioning, visualising and emphasising the relations between UOS management and other important parts of an organisation.

At the tactical level, plans or guidelines are created, ideally based on an overarching strategy from the policy level. Within the UOS organisation, these may include a tree inventory, an overview of playgrounds or a plan for maintaining cultural heritage. Budgeting is also related to the tactical level, as are contract steering and organisation of staff. Public engagement of various types (see Chapters 5, 6 and 7) is also regarded as a task relating to the tactical level. There is an obvious overlap with the operational level, as steering contracts and organising actual maintenance operations can be regarded as operational tasks. Thus we define steering of actual maintenance operations as operational. Organising and describing how a lawn is mown is an operational task, while defining and describing why the lawn is mown, based on, for example, its cultural, recreational or biodiversity characteristics, and balancing lawn mowing with other tasks, such as public involvement, is a tactical manoeuvre.

In a cross-sectoral approach, a tree inventory might involve a full inventory being carried out, including all urban trees, private and public, which will include more trees than are actually managed and maintained by the UOS organisation. The rationale for this is that all trees provide ecosystem services and thus contribute to the overall benefits of trees in urban areas. While managers can only manage the trees for which they have formal responsibility, planning, prioritising and even operational maintenance routines can benefit greatly from knowledge of the entire resource. This applies in planning future tree planting, establishing or renewing playgrounds, allocating staff and resources, etc. When planning becomes policymaking, a cross-sectoral approach is almost always required.

Ideally, a strategically minded UOS management organisation covers the entire scope of Figure 11.1, although most emphasis is likely to be placed on the operational level. Operational maintenance, often short-term and routine-based activities, may take up the majority of many UOS organisation's resources (see Chapter 9). This poses a risk of the long-term perspectives of UOS (*why* the lawn is mown) being obscured by a focus on the operational part of the organisation (*how* the lawn is mown). A focus on the 'how' is relevant but leaves many UOS organisations with limited or no focus on long-term management perspectives. The sectoral or cross-sectoral pattern of activities on all levels shows whether an organisation has a strategic approach to UOS management.

Strategy making within UOS management

The approach to strategy making is in principle very similar to standard planning approaches or any other analytical-based and reflective approach to creating a vision for the future, as well as specifying the means to achieve the vision. According to the *Oxford English Dictionary*, planning can be defined as 'the process of making plans for something' (*OUP*, 2019). Thus planning is the process of thinking about the activities required to achieve a desired goal. Planning for UOS is usually referred to as green infrastructure (GI) planning. On a landscape scale, GI planning is an approach aimed at creating networks of multifunctional green space in urban environments (EC, 2013). According to Davies et al. (2015), UOS planning involves at least four detailed and interlinked goals: (i) securing a connection between the individual spaces, (ii) securing multi-functionality, (iii) integrating with other infrastructures and (iv) operating on multiple scales (see Box 11.4). Planning of UOS or GI is an ongoing process and operates on different scales, both geographical and temporal. Geographically, planning ensures that these spaces are interlinked through prioritising relevance and preferences among users and resources. In local government planning, UOS is dealt with at different geographical scales, ranging from overall planning, setting long-term priorities for the entire community, to detailed planning, specifying local planning acts and priorities. There is usually an overall plan (e.g. a city master plan) and local plans for specific sectors, design or urban development, including distribution of resources. The master plan may have a temporary time frame of up to 12 years, whereas local plans are developed according to needs and set a direction, usually directly after a formal hearing period. Planning also ensures multi-functionality by raising UOS management from the single space to a wider perspective.

Gibbons and Ryan (2015) performed a content analysis and evaluation of the comprehensiveness of 39 urban forest management plans in Washington State. They defined comprehensiveness similarly to strategic planning, as the degree to which a plan includes a review of the current state of the resource; a vision for the future state, goals and objectives; an action plan for implementation; and a plan for monitoring progress. Accordingly, a strategy is not only a good and thoroughly explained plan or vision but also must include an action plan to describe what needs to be done, when, by whom and how, as well as an evaluation of whether the plan is on track. Therefore, in most strategy processes, four steps are involved: a registration phase, an analytical phase, a visionary phase and an evaluation phase, based on thorough descriptions of the actions needed to achieve the vision. These four steps, commonly applied in relation to UOS practices, are explained in the following section.

The registration and analytical phases

Andrews et al. (2012) characterised the analytical, formal and logical process through which organisations scan the internal and external environment as rational planning. The rational approach within landscape planning and management has been influenced by the likes of Kevin Lynch (1960) and Ian McHarg (1969) who both advocate a rational, analytical approach to landscape planning, design and/or management. Lynch (1960) presented a methodology

BOX 11.4: THE FOUR INTERLINKED GOALS OF UOS PLANNING

Connectivity: UOS planning aims for added values derived from interlinking UOS functionally and physically.

Multi-functionality: The ability of UOS to provide several ecological, sociocultural and economic benefits concurrently. It means that multiple ecological, social and economic functions, goods and services must be explicitly considered instead of being the product of chance. Planning of UOS management aims at intertwining or combining different functions to enhance the capacity of UOS to deliver valuable ecosystem services.

Integration: UOS planning considers green spaces as a kind of infrastructure and seeks their integration and coordination with other urban infrastructure in terms of physical and functional relations – for example blue (water-dominated), brown (derelict sites) and grey (roads, paved surfaces) spaces.

Multi-scale: UOS planning can be considered on different spatial levels, ranging from city regions to local projects, and aims at linking different spatial scales within and above city regions.

Source: adapted and modified from Davies et al. (2015) and related to UOS management

for distinguishing a city through paths, edges, districts, nodes and landmarks, while McHarg (1969) promoted an ecological viewpoint with emphasis on a thorough analysis of the landscape, soil, climate, hydrology, etc. This work has been influential to the promotion of geographic information systems, as described in Chapter 10. However, there seem to be two approaches on how to reach 'the best plan' (e.g. Corner, 1991; Stiles, 1992; Carlson, 1993): a hermeneutical, self-interpretive approach and a more analytical and positivistic approach. Turner (1991) claimed that the traditional survey, analysis, design (SAD) method produces poor design solutions, as it seeks to find values based on facts. The meaning of registration and analysis is then that, regardless of who conducts it, an objective and sober result that can justify a given proposal or plan is produced. In UOS management situations, the more data obtained and the more thorough the analysis performed, the more robust the final visions or plans. However, the gap between the registration phase (what is included) and the analytical phase (what is included, how the analysis is performed) is subjective. Therefore, UOS managers must carefully assess the needs and understand the discourses and the purposes of a plan, even before the registration and analytical phases are performed. Based on Commission for Architecture and the Built Environment (CABE) Space (2006) (see Box 11.5 for more information about CABE and strategy), the following is a checklist of items that could be included in the registration and analytical phases of a UOS strategy:

(i) Strategic context and overview of relevant national, regional and local policies and initiatives, the spatial planning

BOX 11.5: THE CABE SPACE APPROACH TO CREATING A STRATEGY

CABE Space was established in 1999 as an executive public body of the UK government to champion the UOS sector in the UK. The organisation developed a number of programmes for national campaigns, research, best practice and enabling to improve the planning, design and management of UOS before it was merged into the Design Council in 2011. Among many relevant publications, CABE Space developed *Green Space Strategies – A Good Practice Guide* (CABE Space, 2006), according to which a UOS strategy's broad aims and objectives are to

- Generate political and inter-departmental support for parks and green spaces and establish clear lines of responsibility;
- Develop a vision shared by politicians, officers, key partners, stakeholders and communities;
- Define the value and role of parks and green spaces in meeting corporate and community aims;
- Create a comprehensive policy framework for the protection, enhancement, accessibility and use of parks and green spaces;
- Make sure that green spaces enhance the quality and diversity of the environment and the life of local communities and promote civic pride and social inclusion;
- Ensure that the green space network meets the needs of local people, now and in the future;
- Provide a framework for resource allocation that maximises funding to support improvements from internal revenue budgets and external funding opportunities; and
- Create a framework for voluntary and community groups to participate in green space provision and management.

context, the local character/area profile, a review of corporate strategies and objectives and the relationship of the UOS strategy to other strategies and initiatives.

(ii) Supply analysis and identification of UOSs and their functions, a definition of existing provision based on appropriate UOS typology audit and assessment of existing provision, both quantitative and qualitative. An assessment of existing capital and revenue funding of UOS.

(iii) Demand analysis, including the socio-economic and demographic structure of the area. An assessment of survey information to identify needs and aspirations of the community, views on existing provision and current barriers to use and an assessment of mechanisms for community involvement. An assessment of user numbers will also often be highly relevant.

(iv) Analysis of issues, opportunities and priorities, including an analysis of

supply and demand (quantitative, qualitative and accessibility). Identification of catchment areas and deficiencies. Establishment of local standards for quality and quantity, an assessment of values and prioritisation of issues and areas for improvement – for example identifying human resources and skills.

The visionary phase

After the registration and analytical phases, the visions for the future need to be formulated. The terms 'vision' and 'mission' both describe an organisation's aims and abilities but often cause some confusion. Mission and vision statements are tools which can direct the behaviour of any organisation. Ideally, these statements are developed in a collaborative and inclusive process where all parties are engaged in the execution of the work, in this case UOS management.

A mission statement is a public declaration that defines the organisation's purpose and primary objectives and commitments. It covers the entire organisation and spans across all three levels of UOS management (policy, tactical and operational) (see Figure 11.1). A mission statement may be seen as the rationale for the organisation's existence, both to colleagues within the organisation, e.g. within a parks department, and to people outside of it, e.g. politicians; colleagues in cultural, social or health departments; users; NGOs and other relevant stakeholders. Mission statements tend to be short, clear and powerful.

Vision statements define the organisation's purpose but focus on high-level goals and aspirations for the future, essentially, what an organisation wishes to achieve if the mission is fulfilled. These statements are often designed to be uplifting and inspiring and timeless so that even if the organisation changes its strategy, the vision often stays the same. In a UOS strategic management situation, the vision is often described as the plan for the future. This future vision should be aligned with the five Ps listed in Box 11.3, making sure that the UOS organisation is in line equally with the plan, ploy, pattern, position and perspective.

Action plans and evaluations

An action plan includes not only actions but also timescales and responsibility for delivery. This will ensure that thorough evaluations can be applied to assess if the strategy is on track and document if the vision has been achieved. Many tools have been developed to guide or steer action planning processes, with one of the most well-known being 'scientific management', a theory and a management approach developed in the US as a spin-off of industrialisation, peaking in the mid- to late 1800s. It applied science to management, and in response, Henry Gantt focused on production efficiency and in the 1920s developed 'a production scheduling aid' now known as the Gantt chart (Sheldrake, 2003; Figure 11.2). It consists of a graphic schedule for planning and controlling actions and recording progress towards stages of a project. The chart has a modern variation, program evaluation and review technique (PERT), which is a method of analysing the actions involved in completing a given project. The Gantt and PERT charts may be useful in UOS management projects or strategy making, as they can provide an overview of the time needed to complete actions. With an overview, it is possible to incorporate uncertainty, which is especially relevant for long-term projects where the duration of all actions may be uncertain.

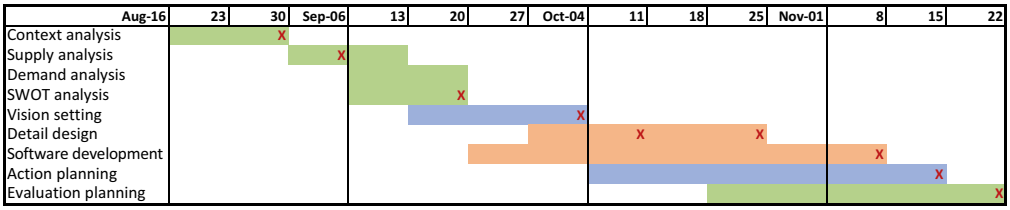


Figure 11.2 Example of Gantt chart for a UOS management project.

Strategic governance and management

The leadership role of contemporary UOS managers is complex and seems to be increasing in complexity. Several trends and contemporary focus areas are more or less directly related to UOS management and its roles and impact on society. These include climate change adaptation, urbanisation, austerity, biodiversity, education, sociocultural and ethical issues, such as immigration, health and user engagement, just to mention a few, as described in previous chapters. All relate to the tripod of sustainability as a combined ecological, social and economic approach. A comprehensive UOS management approach, therefore, needs to deal with both UOS and people and thus requires both leadership and management at all scales (see Figure 11.1). The increasing complexity of being a small specialist organisation within a larger organisation (e.g. local government) is also driving a need for new solutions and approaches.

UOS management cannot be separated from governance, as the process of UOS management involves a wide range of stakeholders and individual users. Similarly, the process by which plans are implemented is linked to governance since plan implementation involves many actors across all sectors – for example NGOs, community groups and many local government departments. Governance arrangements have a particular focus on the inclusiveness of decision making and the role of multiple actors for UOS planning and management. Such types of democratic innovation are high on the agenda in many Western liberal democracies, and many initiatives aiming to stimulate policy innovation by rethinking UOS management are particularly evident at the local government level (Dempsey et al., 2014; Buijs et al., 2016). Many of the current institutional innovations aim to create closer dialogue between politicians, managers and the public, with the planner and manager as key players (e.g. Mellqvist, 2017).

So where is UOS strategic management heading? Do we need to run even faster just to stay in the same place or can UOS management find a pathway to fulfil its role and maintain its relevance, despite all the challenges, threats and competition? Today, UOS management has a tendency to focus on 'the needed' – i.e. operational maintenance – which is partly based on a lack of more strategic expectations and requirements from the policy level. Simply serving the local community while increasing the number of policies that are being put forward by, for example, national and international guidelines, agendas, conventions and programmes may not be enough to maintain momentum. Rather, strategic UOS management encompasses and concerns all levels of management (policy, tactical and

operational while being both sectoral and cross-sectoral) where it can be more effectively used to bridge all scales without running even faster.

One way to look forward is to view the current trends as opportunities, not as threats or challenges. The increased interest in UOS and its management as an effect of current global crises can make future UOS managers have the main aspects of relevance – interest and attention – in place. For them to both lead and manage and set the agenda, they will, hopefully, have relevant resources, balanced between operational and more visionary levels (both policy and tactical). Never before has the UOS governance and management profession had so many opportunities for development and growth through the use of strategic management approaches.

References

Albert, C., Schröter, B., Haase, D., Brillinger, M., Henze, J., et al., (2019). Addressing societal challenges through nature-based solutions: How can landscape planning and governance research contribute? *Landscape and Urban Planning*. **182**, 12–21.

Andrews, R., Boyne, G., Law, J. & Walker, R., (2012). *Strategic Management and Public Service Performance*. Basingstoke: Palgrave Macmillan.

Bracker, J., (1980). The historical development of the strategic management concept. *Academy of Management Review*. **5**(2), 219–224.

Bryson, J.M., (2004). *Strategic Planning for Public and Non-Profit Organizations: A Guide to Strengthening and Sustaining Organizational Achievement*. 3rd ed. San Francisco: Jossey Bass Public Administration Series.

Buijs, A.E., Mattijssen, T.J.M., van der Jagt, A.P.N., Ambrose-Oji, B., Andersson, E., Elands, B.H.M. & Møller, M.S., (2016). Active citizenship for urban green infrastructure: Fostering the diversity and dynamics of citizen contributions through mosaic governance. *Current Opinion in Environmental Sustainability*. **22**, 1–6.

CABE Space, (2006). *Green Space Strategies. A Good Practice Guide*. The Commission for Architecture and the Built Environment. CABE Space archives. [October 2019] https://webarchive.nationalarchives.gov.uk/20110118095359/www.cabe.org.uk/

Carlson, A., (1993). On the theoretical vacuum in landscape assessment. *Landscape Journal*. **12**(1), 51–55.

Corner, J., (1991). A discourse on theory II: Three tyrannies of contemporary theory and the alternative of hermaneutics. *Landscape Journal*. **10**(2), 115–131.

Davies, C., Hansen, R., Rall, E., Pauleit, S., Lafortezza, R., De Bellis, Y., Santos, A. & Tosics, I., (2015). *Green Infrastructure Planning and Implementation. The Status of European Green Space Planning and Implementation Based on An Analysis of Selected European City-Regions*. Green Surge Report 5.1. Brussel: European Union's 7th Framework Program.

Dempsey, N., Smith, H. & Burton, M., (2014). *Place-Keeping: Open Space Management in Practice*. London: Routledge.

Díaz, S., Pascual, U., Stenseke, M., Martín-López, B., Watson, R.T., et al., (2018). Assessing nature's contributions to people. *Science*. **359**(6373), 270–272.

EC, (2013). *Green Infrastructure (GI) – Enhancing Europe's Natural Capital*. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Brussels.

EC, (2015). *Nature-Based Solutions & Re-Naturing Cities*. European Commission. [October 2019] https://op.europa.eu/en/publication-detail/-/publication/fb117980-d5aa-46df-8edc-af367cddc202

EU, (2017). *Key Figures on Europe*. 2017 edition. Eurostat Statistical Books. Luxembourg: Publications office of the European Union.

Fitzroy, P. & Hulbert, J.M., (2005). *Strategic Management. Creating Value in Turbulent Times*. New York: John Wiley & Sons, Inc.

Fongar, C., Randrup, T.B., Wiström, B. & Solfjeld, I., (2019). Public urban green space management in Norwegian municipalities: A managers' perspective on place keeping. *Urban Forestry & Urban Greening*. https://doi.org/10.1016/j.ufug.2019.126438

Freedman, L., (2013). *Strategy: A History*. South Africa: Oxford University Press.

Gibbons, K.H. & Ryan, C.M., (2015). Characterizing comprehensiveness of urban forest management plans in Washington State. *Urban Forestry & Urban Greening*. **14**(3), 615–624.

Heylighen, F., (1993). *The Red Queen Principle*. [October 2019] http://pespmc1.vub.ac.be/REDQUEEN.html

Kotter, J.P., (1996). *Leading Change*. Boston: Harvard Business School Press.

Lynch, K., (1960). *The Image of the City*. Cambridge, MA: The MIT Press.

McHarg, I.L., (1969). *Design with Nature*. American Museum of Natural History. Garden City, New York: Natural History Press.

Mellqvist, H., (2017). *The Connoisseur Method – A Study on Long-Term Participation in Landscape Planning* (Ph.D. Thesis). Swedish University of Agricultural Sciences, Alnarp.

Mintzberg, H., (1992). *Five Ps for Strategy*. In: H. Mintzberg & J.B. Quinn (eds.) *The Strategy Process*. Englewood Cliffs, NJ: Prentice Hall International Editions. 12–19.

OUP, (2019). *Planning*. [October 2019] www.lexico.com/en/definition/planning

Petit-Boix, A., Sevigne-Itoiz, E., Rojas-Gutierrez, L.A., Barbassa, A.P., Josa, A., Rieradevall, J. & Gabarrell, X., (2017). Floods and consequential life cycle assessment: Integrating flood damage into the environmental assessment of stormwater best management practices. *Journal of Cleaner Production*. **162**, 601–608.

Qiao, X., Kristoffersson, A. & Randrup, T.B., (2018). Challenges to implementing sustainable stormwater management from a governance perspective: A literature review. *Journal of Cleaner Production*. **196**, 943–952.

Randrup, T.B., Östberg, J. & Wiström, B., (2017). Swedish green space management – The managers perspective. *Urban Forestry & Urban Greening*. **28**, 103–109.

Randrup, T.B. & Persson, B., (2009). Management of public green space in the Nordic countries – development of a new strategic green space management regime. *Urban Forestry & Urban Greening*. **8**(1), 31–40.

Sheldrake, J., (2003). *Management Theory*. 2nd ed. London: Thomson Learning.

Soga, M. & Gaston, K.J., (2016). Extinction of experience: The loss of human-nature interactions. *Frontiers in Ecology and the Environment*. **14**, 94–101.

Stiles, R., (1992). Determinism versus creativity. *Landscape Design*. July/August 30–32.

Turner, T., (1991). Pattern analysis. *Landscape Design*. October 39–41.

Van Valen, L., (1973). A new evolutionary law. *Evolutionary Theory*. **1**, 1–30.

Warren, K., (2008). *Strategic Management Dynamics*. London: Wiley.

Zaleznik, A., (2004). Managers and leaders: Are they different? *Clinical Leadership & Management Review*. **18**(3), 171–177.

All figures are used with permission.

12 Urban open space governance and management today and in the future

Thomas B. Randrup, Elizabeth Shelley and Märit Jansson

Introduction

Urban open space (UOS) governance and management practices are currently in a development phase, affected by many structural changes and challenges, as described throughout this book. Among the main changes is the complex transition from government to governance, where new stakeholders and engagement processes are affecting UOS management organisations and their related work (Buijs et al., 2016; Jansson et al., 2019). This has included a dramatic shift from larger organisations, such as local governments and housing companies, organising UOS management in a relatively simple hierarchical organisational structure to them becoming the centre of providing important and relevant services to UOS users, often through direct engagement within varying co-governance arrangements (Randrup & Persson, 2009; Randrup et al., 2017; Fongar et al., 2019). Related to this, various approaches to user participation are now promoted, supported and expected (Fors et al., 2015; Jansson et al., 2019). UOSs are also changing, including in terms of the presence of invasive species and plant diseases, the application of new digital tools and major budget reforms (Dempsey et al., 2014). Global challenges, such as climate change (IPCC, 2019) and urbanisation (unpopulation.org, 2018), also have implications and effects that need to be addressed and solved at local levels for which new approaches to UOS management are now sought. Thus shifts and challenges are causing contemporary UOS governance and management to remain in a state of continuous development.

The governance and management of UOS include highly important practices and very loose obligations. There are numerous international conventions related to UOSs and their development, to which a large number of countries worldwide are signatories. These include the Brundtland Convention on Sustainable Development (WCED, 1987), which calls for combined ecological, social and economic approaches; the United Nations (UN) Conventions on the Rights of the Child (UN, 1989) and of

Persons with Disabilities (UN, 2006), which emphasise the need to include and care for vulnerable user groups; the European Habitats Directive (EC, 1992), which aims to ensure the conservation of rare, threatened or endemic animal and plant species; the European Landscape Convention (CE, 2000), which promotes the protection, management and planning of landscapes; the UN Climate Change Conference (UN, 2016), which seeks to keep the increase in global average temperature well below 2°C above pre-industrial levels; and the UN Sustainable Development Goals (UN, 2015), which address, for example, health and well-being, reduced inequalities, sustainable cities and communities, climate action, peace, justice and strong institutions. These conventions all set an agenda emphasising the need for inclusive, long-sighted strategic approaches to UOS governance and management around the world.

While there is much support at the global level, UOS is generally not comprehensively addressed by national law or is addressed in a fragmented manner (Knuth et al., 2008). In general, UOSs and associated practices are activities and responsibilities mainly on a (regional or) local level, most notably for local governments, although other local organisations, such as housing companies and cemetery organisations, also perform some UOS management (Jansson & Lindgren, 2012; Dempsey et al., 2014). Goals set internationally and nationally should, therefore, ideally be implemented and acted upon at local levels. In reality, implementation within local organisations can be very variable.

As a complement to the many international conventions related to UOS, a number of concepts and approaches have also been launched to promote greener and more sustainable cities worldwide. These include, for example, sustainable urban design (EC, 2004), ecosystem services provision (TEEB, 2010), green infrastructure development (Benedict & McMahon, 2006), ecosystem-based adaptation (Colls et al., 2009), and Nature-Based Solutions (NbS) (EC, 2015). These concepts and approaches are all examples of an increased attention for the importance of nature and ecosystems in an urbanising and changing world. Developing and implementing NbS, for example, is helpful to counter local environmental, social and economic issues. However, in doing so, there is a need for local tools and for balancing the many expectations and requirements. This requires strategic and long-sighted management.

Solutions to contemporary challenges

Framing UOS governance and management

UOS governance and management approaches have the potential to address and even provide solutions to several current global challenges, including urbanisation, climate change and human health. In order to cope with an uncertain and fluctuating political and economic climate, a dynamic and flexible system of re-planning, re-design, re-construction and maintenance is proposed in Chapter 2.

The physical urban structures described in Chapter 3 as the urban matrix are complex and intertwined. A comprehensive overview of a city's urban matrix – i.e. its green, blue, brown and grey spaces – is the context in which strategic UOS governance and management are performed. The UOS sector is complex, with fragmented responsibilities and approaches. Chapter 4 describes the significance of the sector, mainly in Sweden, from a financial

perspective and shows how its complex structure has developed from being primarily a public domain to consist of numerous individual sub-organisations within, for example, local governments or housing companies. These organisations have major responsibility for matters other than UOS management, which they often regard as an important task but not as their number-one priority. Therefore, there is a need for collaboration across sectors and across scales in these organisations in order to obtain synergistic effects of governance practices, identify possible contradictions and build capacity for integrative approaches for strategic management.

Understanding relations and values

UOS governance and management also affect societal issues by providing functions and values for different types of uses and user groups. Different types of management approaches are outlined in Chapter 5, which lists a multitude of uses and user groups whose activities range from active to intrinsic. Vulnerable user groups are of particular importance to address in a user-oriented UOS management approach. Clear mandates and policy support will be needed in order to better cope with ethical problems related to UOS use, as highlighted in Chapter 6. It is clear that the current role of UOS managers includes relations to various user groups. Not only are UOS managers expected to engage and involve users to participate in multiple ways, as described in Chapter 7, they also need to make sure that interests and influences of various groups of stakeholders are balanced, and that they are active communicators and negotiators. One reason behind this is that participation in UOS governance and management activities can have several positive effects on, for example, individual and social well-being. New trends of collective UOS governance and management offer examples of new roles and processes and importantly include new voices. Finding ways for inclusion and participation that suit various users is not only important for an ethically just society but also a way of empowering and lifting communities.

UOS managers need a palette of reliable user participation methods in order to make it easier to decide which method to use and when. In Chapter 7, this is referred to as mosaic governance, as a way of respecting the variations and complexities of people and the urban context. Representing the urban population in its entirety is indeed a challenge, and there will always be a need for a suite of reliable methods that can be applied in a site-specific and context-dependent manner. This also applies to assessments of monetary values. In Chapter 8, the many ways in which economic values of UOS can be assessed are outlined. This is in itself complex but becomes even more so when those who provide for UOS benefits (landowners, local governments, housing companies, cemetery organisations, etc.) do not see the direct values and outputs of the ecosystem services they supply via the UOSs they manage.

Practice

Many practical aspects of UOS governance and management are still being developed to meet the rapidly changing needs and demands of UOSs. However, as technical and cost barriers decrease, the need for collecting and collating relevant data in accessible forms will increase and can actively support future management. For example, there is a need for coherent and

clear descriptions and monitoring methods for UOS maintenance, as elaborated on in Chapter 9. Improved descriptions and monitoring of the resources, activities and results of UOS management activities might lead to a simpler, more replicable and measurable way of describing the long-term effects of the activities performed. Some UOS management organisations are already collecting extensive data through relatively new technologies (e.g. deploying sensors, drones and AI) to improve decision making or applying systems, such as smart cities and the IoT, as described in Chapter 10. Digital technology is dependent on effective spatial data infrastructure, making the everyday tasks of UOS managers easier, as well as supporting users. The technological approach to contemporary UOS governance and management may be the single most important investment for many managing organisations rather than any physical or organisational structure.

The links between describing, assessing and valuing UOS for the benefit of users is a strategic task described in Chapter 11. The differences between leading and managing are further explored and described as a combined task for UOS governance and management. Leadership is about setting the long-term goals, being visionary and seeing the opportunities for the future. Management is about delivering the goals through strategic approaches, where strategic management involves doing so through the involvement of three levels within the organisation: policies, tactics and operations. In all cases, UOS management may depart from an individual space, but it is also important to address the relations between the approaches to UOS management of that individual space and overall green infrastructure planning. Flexibility is also needed to remain relevant and adapt to new and future needs, including an awareness of the large impact that UOS governance and management can have in safeguarding quality, value, innovation and uniqueness at scales from local to global.

Conclusions

Although many of the challenges and preconditions for UOS governance and management are known, some aspects are in constant flux. Despite all this, or because of it, UOS managers will need to act strategically and prepare for future UOS governance and management in whatever forms necessary (see Box 12.1).

There is great variation in how UOS management organisations have addressed challenges recently, depending much on individuals, how marginalised the tasks have become within organisations and how much of organisations' work is strategic and long-sighted. UOS governance and management practices require new and more detailed knowledge. As the tasks are complex and differ greatly in their ecological, social and economic aspects, as well as, for example, in leadership, technical, plant knowledge and digital technology requirements, the role of the UOS manager within an organisation cannot be left to one or two people.

To enable a more strategic approach, there is a need for new and innovative collaborations, solutions and organisational approaches that address governance and management in combination, as in the combined G&M model in Figure 2.4 of this book. This model covers three dimensions: (i) UOSs as physical structures delivering ecosystem services (ESS), (ii) users as primary beneficiaries of the ESS and (iii) owners representing the organisations delivering the ESS. The linkages and interconnections between these three

BOX 12.1: CHALLENGES AND OPPORTUNITIES FOR UOS GOVERNANCE AND MANAGEMENT

Challenges	*Opportunities*
■ Address global challenges and related goals locally	■ Apply strategic and long-sighted management approaches (re-plan, re-design, re-construct and maintain)
■ Develop strategic approaches to UOS governance and management	■ Be visionary and set long-term goals ■ Create overviews of the resources and make appropriate plans ■ Operate in accordance to global as well as local needs
■ Combine various values, functions and voices in processes and physical UOSs	■ Build teams and establish collaborations (co-develop, co-create, co-implement, co-manage) and various participatory approaches
■ Provide an overview of local UOS	■ Apply digital tools and make assessments across administrative borders (be cross-sectoral)
■ Document and demonstrate the values of UOS	■ Apply assessments of economic and functional values (be inclusive, communicative and flexible)
■ Set UOS governance and management aspects on the local agenda	■ Relate to global challenges and conventions, communicate with various local stakeholders and develop uniqueness in local UOSs and related approaches

dimensions are considered within a governance framework, set in relation to aspects such as gradients from private to public and various levels of co-governance. Future governance and management must engage in developing UOSs as physical structures, for their relevance mainly to humans, but must also develop valuable relations and collaborations.

The relationship between UOS and its users can be defined as the socioecological nexus and affects human health, for example. The relationship between UOS users and the managing organisations can be defined as the sociopolitical nexus, described in this book as 'government to governance development', with a current move to more engagement and active participation by central stakeholders, including users. The third relationship can be defined as the political-ecological nexus, which is described as the need to be both strategic and long-sighted, with emphasis on visions, tactical means and operational activities. In the future, UOS managers will need to cope with all three relationships, often simultaneously. This requires increased flexibility in management approaches, as changes in the role and the tasks will probably continue. Being context-dependent and finding

local ways to cope and adjust over time will be important. In developing successful local solutions, inspiration and knowledge sharing between managers in different locations through various networks will be key.

Managers will need to think in terms of multi-functionality and to grasp several aspects and aspirations at the same time, which will require them to expand their toolboxes. This includes communication with multiple stakeholders – for example users, media, academics and various organisations; education activities in order to explain and inform; ecological work for habitat and wildlife restoration; technology for handling loads of information, including historical traits; contemporary machines and future digital data solutions; and leadership talent for inspiring politicians and co-workers to set the directions and deliver the expected results. To make all this possible, larger teams on the tactical and possibly operational level of UOS management will be required. An ability to focus more on networking and collaboration over departments or organisations will help to link the necessary professional skills and specialisations to UOS governance and management.

Despite the many challenges, UOS governance and management has the potential to address a large number of complex challenges connected to sustainable development with its multiple aspects, mainly ecological, social and economic. Targeted UOS governance and management can help mitigate and adapt to the effects of crises, such as climate change, urbanisation, pollution, loss of biodiversity and migration. This potential can be exploited if management is viewed in its entirety as strategic and long-term but not if it is reduced to mere maintenance. It is, therefore, essential to put combined UOS governance and management approaches on the agenda at the local UOS management level in research and within education systems.

References

Benedict, M.A. & McMahon, E.T., (2006). *Green Infrastructure: Linking Landscapes and Communities*. Washington, DC: Island Press.

Buijs, A.E., Mattijssen, T.J.M., van der Jagt, A.P.N., Ambrose-Oji, B., Andersson, E., Elands, B.H.M. & Møller, M.S., (2016). Active citizenship for urban green infrastructure: Fostering the diversity and dynamics of citizen contributions through mosaic governance. *Current Opinion in Environmental Sustainability*. **22**, 1–6.

CE, (2000). *European Landscape Convention*. Council of Europe.

Colls, A., Ash, N. & Ikkala Nyman, N., (2009). *Ecosystem-Based Adaptation: A Natural Response to Climate Change*. IUCN Commission on Ecosystem Management. Nature Conservancy, US.

Dempsey, N., Smith, H. & Burton, M., (2014). *Place-Keeping: Open Space Management in Practice*. London: Routledge.

EC, (1992). *Council Directive 92/43/EEC of 21 May 1992 on the Conservation of Natural Habitats and of Wild Fauna and Flora*. European Council.

EC, (2004). *Towards a Thematic Strategy on the Urban Environment*. European Commission.

EC, (2015). *Nature-Based Solutions & Re-Naturing Cities*. European Commission.

Fongar, C., Randrup, T.B., Wiström, B. & Solfjeld, I., (2019). Public urban green space management in Norwegian municipalities: A managers' perspective on place keeping. *Urban Forestry & Urban Greening*. https://doi.org/10.1016/j.ufug.2019.126438

Fors, H., Molin, J.F., Murphy, M.A., Konijnendijk van den Bosch, C., (2015). User participation in urban green spaces – For the people or the parks? *Urban Forestry & Urban Greening*. **14**, 722–734.

IPCC, (2019). *Climate Change and Land, an IPCC Special Report on Climate Change, Desertification, Land Degradation, Sustainable Land Management, Food Security, and Greenhouse Gas Fluxes in Terrestrial Ecosystems*. The Intergovernmental Panel on Climate Change.

Jansson, M. & Lindgren, T., (2012). A review of the concept 'management' in relation to

urban landscapes and green spaces: Toward a holistic understanding. *Urban Forestry & Urban Greening*. **11**(2), 139–145.

Jansson, M., Vogel, N., Fors, H. & Randrup, T.B., (2019). The governance of landscape management: New approaches to urban space development. *Landscape Research*. **44**(8), 952–965.

Knuth, L., Randrup, T.B. & Gauthier, M., (2008). Legal, policy and institutional aspects of urban and peri-urban forestry and greening. The case of West and Central Asia. *CAB Reviews: Perspectives in Agriculture, Veterinary Science, Nutrition and Natural Resources*. **3**(94), 1–13.

Randrup, T.B., Östberg, J. & Wiström, B., (2017). Swedish green space management – The manager's perspective. *Urban Forestry & Urban Greening*. **28**, 103–109.

Randrup, T.B. & Persson, B., (2009). Management of public green space in the Nordic countries – development of a new strategic green space management regime. *Urban Forestry & Urban Greening*. **8**, 31–40.

TEEB, (2010). *The Economics of Ecosystems and Biodiversity: Mainstreaming the Economics of Nature: A Synthesis of the Approach, Conclusions and Recommendations of TEEB*. TEEB October 2010.

UN, (1989). *Convention on the Rights of the Child*. UNICEF.

UN, (2006). *Convention on the Rights of Persons with Disabilities*. United Nations.

UN, (2015). *Sustainable Development Goals*. United Nations.

UN, (2016). *Paris Agreement on Climate Change*. United Nations.

Unpopulation.org, (2018). *The Speed of Urbanization Around the World*. Department of Economics and Social Affairs, Population Division. Population facts. United Nations. January 2018, 2 pp.

WCED, (1987). *Our Common Future*. Report on the World Commission on Environment and Development. Oxford: Oxford University Press.

All figures are used with permission.

Index