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Understanding Water Security at Local Government Level in South Africa

Edited by

Richard Meissner · Nikki Funke
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ISBN 978-3-030-02516-8 ISBN 978-3-030-02517-5 (eBook)
https://doi.org/10.1007/978-3-030-02517-5

Library of Congress Control Number: 2018957677

This Palgrave Pivot imprint is published by the registered company Springer Nature Switzerland AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Acknowledgements

A number of people contributed to the success of this book. Firstly, the researchers that formed part of the water security project team that laboured over a four year period to gather data in the two municipalities through personal interviews and focus group discussions. We would, secondly, like to acknowledge the contributions made by Engela van Heerden, Blessed Matsi and Siphethile Gcukumana who conducted literature searches over the project's duration. We would also like to thank Luanita Snyman-Van der Walt and Chantel Peterson for producing some of the maps contained in the book. Suzan Oelofse agreed to share her photos of the Lesotho Highlands Water Project and we are very grateful to her for doing so. Paul Oberholster also made photos of the Theewaterskloof Dam available to us, and for this we are grateful. We received funding for the water security project from the Parliamentary Grant funding stream of the South African Department of Science and Technology.

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Ngowenani Nohayi is a Social Sciences graduate at the University of Fort Hare. She currently holds a Bachelor of Social Science degree and Honours degree in Sociology (Development Studies). Her background includes Environmental Sociology, Psychology and Philosophy. Her skills lie in analytical analysis and applying sociological theories that produce powerful insights. Specifically, looking at relations between development, health and environmental conditions and youth, gender and development.

Her primary research interests are trying to understand the relationship between society and our natural environment, with more emphasis on factors that cause environmental issues, the social impact of those issues and efforts to solve those issues. Currently, she is pursuing her

masters with the University of Johannesburg in Development Studies. Her masters are looking at the extent environmental change has on young people migrating from their countries of origin.

Karen Nortje's key competencies lie in researching and understanding socio-economic and socio-cultural issues which often means that her research is directed at the local and individual level of society. Her expertise therefore includes understanding community organisation, working with communities local and regional level, and determining social, cultural and socio-economic impacts.

Cebile Ntombela holds a Master's in Environmental Law from the University of Cape Town and is currently studying towards a Ph.D. in Geography and Environmental Sciences. Cebile is currently a lecturer at the University of Mpumalanga's School of Biology and Environmental Science. She is a member of the International Association for Impact Assessment South Africa, the Water Institute of Southern Africa and the Young Water Professionals. At the time of the water security study, Cebile was a researcher at the CSIR's Natural Resource and Environment division.

Chantel Petersen holds an M.Sc. degree in Environmental Science. She has 14 years of experience in research related to riverine ecosystems, aquatic ecology and river health, which was mainly focussed around ecological water requirements, water quality and water security in both urban and rural environments. More recent interests include freshwater biodiversity and conservation planning.

Justinus Shadung holds an M.Sc. from the University of Johannesburg with specialisation in water quality monitoring and assessment as well as ecotoxicology. Justinus is a Research Scientist at the CSIR's. Justinus's areas of research interest are in the use of freshwater toxicity testing as a tool to inform water resources management. Related to this, Justinus is also interested in sediment exposure effects on water quality due to over-abstraction and/or drought. He is also adept in chemical fate assessment and risk characterisation. He is also a member of the Water Institute of Southern Africa (WISA) and has been a co-author of numerous publications dealing with water quality and ecotoxicology.

Maronel Steyn holds an M.Tech. Environmental Health degree and has more than 15 years' research experience in water and health-related projects. Her experience includes chemical and microbiological human

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Introduction

How the Book Unfolds

Investigating water security at local government level in South Africa can a rewarding endeavour since it can open new and exciting avenues and topics. This is what we experienced during the research we conducted in the Sekhukhune District Municipality and the eThekwini Metropolitan Municipality. In this book, we report on a four-year research project we conducted from 2014 to 2018 in these two areas.

For the purpose of reporting on this endeavour, we have divided the book into a number of parts or chapters. In Chapter 1, we will discuss water security in the South African context. The purpose of this chapter is to show how a number of issues inform the water security discourse in South Africa. The first issue under discussion is the notion of hydro-ingenuity or the way in which successive governments have developed numerous engineering works across the country to get water from where it is in abundance to where it is needed. These projects include large dams, inter-basin transfer schemes as well as extensive irrigation projects and water supply systems to cities and industries. The built infrastructure that supplies the country's population with water is also dependent on ecosystems. These ecosystems are essential for the supply and purification of the country's water resources. As such, these systems play an important role in water security for all through access to, and use of the resource. It is not only built infrastructure and ecosystems that are necessary to supply water to the country's population. Since the

country's surface- and groundwater resources are under government custodianship, legislation plays a facilitating role in people having access to water and the right to use water. In this regard, we briefly discuss the National Water Act (No. 36 of 1998) and how it links the water reserve for human use and ecological utilisation. Since water quality is an important component of water resources management, we also report on the Green and Blue Drop Programmes. This initiative, from the Department of Water Sanitation (DWS), is not only playing a role in ensuring that wastewater treatment plants and water purification plants are functioning correctly, but also link directly to municipal water and sanitation services and the politics involved. Water for growth and development is the next issue we write about in Chapter 1. We argue that societies do not have unlimited resources to prioritise all aspects influencing water for human populations and the environment. It is here where the concept 'green economy' plays an important role because of its environmental risk reduction aspirations. This speaks to some of the future risks for achieving water security in South Africa, and one of the most severe risks in this regard is climate change. Climate change will have a variety of influences on the South African water sector not only in terms of reducing water resources through droughts but also influencing water quality in the case of floods. Urban migration also links to climate change and as more people move to the countries large cities, municipalities would face an ever growing population in need of good quality water. In this regard, technological changes, as the so-called 4th industrial revolution, are driven by advances in digital systems impacting on most, if not all, economic sectors. Even so, technological fixes through the 4th industrial revolution, are not the only ones that will solve the country's water security woes, with human ingenuity and resilience needed for this as well.

In Chapter 2, we report on an analysis we conducted of the international and South African water security discourses and perspectives. We discovered that few academics have written about water security from a South African perspective. This, despite the importance of water security as an aspiration and end goal. There is an international water security debate and this translates into the South African water security context. That said, it is not only South Africa's arid climate with frequent droughts and floods that had infused in the South African public the notion that water resources are scarce, it is also pronouncement in the international and local media that brings the issue of water security close to home for the South African public. Those academics that write about

the topic have given a number of interpretations of water security over the years. These interpretations range from water security in transboundary river systems to water security at the individual and household levels. To understand the South African water security discourse it is imperative to understand the origin, intent and use of the concept water security.

Chapter 3 discusses the state of water security in the two case study areas. We discovered that people not only hold divergent views on what constitutes water security but that they also have varying perspectives on whether the municipalities had achieved water security for all. What is telling about the notions of water security at local government level is that people define water security based on their lived experience when coming in contact with water resources for a variety of uses. How people define water security is also influenced by their contact with other people and the environment, especially those environmental elements that supply water resources for daily consumptive use such as rivers and streams. In this chapter, we also advance a new definition of water security based on these lived-experiences. In this chapter, we also showcase a methodology we developed on how to determine the state of water security at municipal level in order to assist municipal officials that are responsible for the attainment of water security at household and communal level.

In Chapter 4, we present our water security typology. We developed this typology based on the research we conducted in Sekhukhune and eThekwini and in an effort to assist municipal officials to develop policies and programmes specifically targeted at some of these typologies. Chapter 4 defines what a typology is and gives a rendition of some of the literature on typologies and their functioning in developing policies. We also outline the rationale for developing typologies and situate this rationale within the wider scientific endeavours and particularly how to inform policy. The chapter is also replete with water-related typology examples, other than our water security typology. Our typology identifies 11 different water security types or categories, which ranges from water security expressed in numbers to water security as a local government function. Chapter 5, briefly discusses the individual-centred water security perspective. This water security theory focuses attention on the individual, and more specifically individuals with varying lifestyles. The theory does not highlight the role of those individuals that were responsible for the construction of water engineering works, or those at the top of South Africa's government apparatus responsible for developing and implementing water policies and strategies. The main objective of the

individual-centred water security perspective is that it attempts to create a bottom-up view of water security because we see water security as being closely aligned to the daily water-related practices individuals perform when utilising for a variety of reasons.

Richard Meissner

CHAPTER 1

Water Security and South Africa

Maronel Steyn, Richard Meissner, Karen Nortje, Nikki Funke and Chantel Petersen

Abstract In this chapter, we will give an overview of water security in the South African context. To do this we will discuss a number of issues pertaining to water security in terms of elements that are 'good', 'bad' and 'ugly' found within and outside South Africa influencing water security. These issues include South Africans' ability to cope with water scarcity through the construction of water infrastructure projects like large dams and extensive irrigation projects. This hydro-ingenuity started in the late nineteenth century and was influenced by government observers wanting to put agriculture on a sustainable footing. That South Africa's water

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R. Meissner et al. (eds.), *Understanding Water Security at Local Government Level in South Africa*,
https://doi.org/10.1007/978-3-030-02517-5_1