



Utrecht University

Water governance in South Africa: Capacity development in river basin management

The potential of transnational capacity development for good multi-level water governance between the Netherlands and South Africa: the case of Pongola-Umzimkulu.

Master's Thesis Project



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Abstract

Climate change results in a disproportionately drier earth and the consequences can already be seen all over the world, so too in semi-arid areas such as South Africa. Here, persistent drought, induced by longer and more frequent dry months caused by climate change, increasingly leads to water scarcity. In addition to sufficient water, water quality is of vital importance. This thesis deals with the challenges of clean and sufficient water in South Africa. The results show how eight empowering conditions for policy translation can enable governance capacity developments in river basins for better access to clean and sufficient water in the Pongola-Umzimkulu Proto Catchment Management Agency (CMA). Development of the necessary governance capacity for river basin governance is crucial. The analytical framework of eight empowering conditions has been combined with the City Blueprint Approach. This yields a synthesis between literature and empirical analysis. The results show that four out of eight empowering conditions are present in the case study area. Recognition of the asymmetrical relationship between 'senders' and 'recipients' of policy and the necessary horizontal collaboration and community engagement are observed. The sender-recipient mutuality is an important element in capacity developments towards an integrated river basin approach, which inherently has a long-term scope. Challenges are contextual adjustments, caused by differences in historical and institutional setting. Yet, continued collaboration and strong stakeholder relationships show that these differences do not necessarily have to be an obstacle for encouraging governance capacity developments for clean and sufficient water in South Africa.

Key words: *governance capacity, policy translation, river basin governance, multi-level governance, international collaboration, mutuality.*

Table of Contents

Abstract	4
1. Introduction	8
1.1. Challenges in South African water catchments	8
1.2. Literature gap	9
1.3. Research questions	11
1.4. Reader's guide	11
2. Conceptual design	12
2.1. Research framework	12
2.2. Conceptual model	12
2.3. Analytical framework	14
3. Methods	15
3.1. The Trends and Pressures Framework	16
3.2. The City Blueprint Performance Framework	17
3.3. The Governance Capacity Analysis Framework	18
3.4. Data collection	18
3.5. Consent participants	19
3.6. Stakeholder map	19
3.7. Description of case study	19
4. Results	21
4.1. Empowering Conditions for Policy Translation	21
4.2. The Dutch Decentralised River Basin Approach	27
4.3. Water Governance Performance and Challenges	30
4.3.1. Pressures affecting water management	30
4.3.2. Water management performance of Durban	32
4.3.3. Governance Capacity Framework (GCF)	34
4.3.3.1. eThekweni municipality - Durban	34
4.3.3.2. Pongola-Umzimkulu Proto Catchment Management Agency (CMA)	41
4.4. Empowering Conditions and Empirical Evidence	48
5. Discussion	52
5.1. Place in the international literature	52
5.2. Methodological reflection	53
5.3. Practical application	54
6. Conclusion	55



6.1. Empowering conditions	55
6.2. Dutch Decentralised River Basin Approach	55
6.3. Water Governance Performance and Challenges	55
6.4. Empowering Conditions and Empirical Evidence	57
References	59
Appendix I: Substantiation TPF	69
Appendix II: Substantiation CBF	70
Appendix III: Substantiation GCA Durban	78
Appendix IV: Substantiation GCA Pongola-Umzimkulu Proto CMA.....	91
Appendix V: Coded transcripts interviews.....	102

Abbreviations

CBA	City Blueprint Approach
CBF	City Blueprint (performance) Framework
CBI	City Blueprint Index
CMA	Catchment Management Agency
CMS	Catchment Management Strategy
COGTA	Department of Cooperative Governance and Traditional Affairs
CSCM	Coastal, Stormwater and Catchment Management Department
DEA	Department of Environmental Affairs
DRWA	Dutch Regional Water Authorities (Waterschappen)
DUCT	Duzi-Umgeni Conservation Trust
DWS	Department of Water and Sanitation (South Africa)
EPCPD	Environmental Planning and Climate Protection Department
EWS	eThekweni Water and Sanitation (EWS)
GCA	Governance Capacity Analysis
GCF	Governance Capacity Framework
GCI	Governance Capacity Index
INR	Institute of Natural Resources
IWRM	Integrated Water Resource Management
MLG	Multi-level governance
MoU	Memorandum of Understanding
NWA	National Water Act
OECD	Organisation for Economic Cooperation and Development
PPP	Public-Private Partnership
PRG	Pollution Research Group
TPF	Trends and Pressures Framework
TPI	Trends and Pressures Index
TRMP	Transformative Riverine Management Programme
UEIP	Umgeni Ecological Infrastructure Programme
UKZN	University of KwaZulu-Natal
URWA	Union of Regional Water Authorities (Unie van Waterschappen)
WMA	Water Management Area

1. Introduction

1.1. Challenges in South African water catchments

Climate change may result in a disproportionately drier earth and the consequences can already be seen all over the world, for instance too in semi-arid areas such as South Africa (Balcerak, 2013; Dai, 2011; Gupta & van der Zaag, 2008; Mwenge Kahinda et al., 2010). Here, persistent drought, induced by longer and more frequent dry months caused by climate change, increasingly leads to water scarcity. In addition to sufficient water, water quality is of vital importance. The relationship between water quality and water quantity is mutual. On the one hand, water scarcity increases the concentration of pollutants at equal or increasing levels of water pollution, and on the other hand polluted water in a well can shut that water source down, decreasing water availability (Delpa et al., 2009). This thesis deals with both challenges, i.e. clean and sufficient water in South Africa.

Challenging environmental and social circumstances in South Africa have long impeded the development of governance and administration in the water sector to provide clean and sufficient water for all citizens. After the period of Apartheid the government officially recognised the need for *“the integrated management of all aspects of water resources and, where appropriate, the delegation of management functions to a regional or catchment level so as to enable everyone to participate”* (RSA, 1998, 3). After the establishment of the National Water Act in 1998 (NWA, 1998), South Africa pursued the path of decentralised water governance, thereby diverting from the path of Apartheid centralised water policy and initially establishing 19 Water Management Areas (WMA; Figure 1), which were eventually consolidated into nine Catchment Management Agencies (CMA; Figure 2) in 2011 (Bourblanc & Blanchon, 2014; Meissner et al., 2017; VNG, 2013). The boundaries of the CMAs are based on hydrological areas, or river basins.



Figure 1 19 Water Management Areas (DWA, 2017)



Figure 2 Nine Catchment Management Agencies (DWA, 2017).

In the past, challenges in the successful governance and functioning of these WMAs and later the CMAs ranged from poor administration to mismanagement and lack of training, coordination and communication (Pollard & Du Toit, 2008). In addition, conflicts of interest, including state-driven hydraulic infrastructure projects and river diversion plans impeded integrated river basin governance (Bourblanc & Blanchon, 2014).

In water-scarce countries such as South Africa water scarcity imposes a plethora of water distribution trade-offs that by definition include a range of political, institutional and administrative rules, practices and processes (OECD, 2011; Pahl-Wostl et al., 2010). Accordingly, ensuring the provision of clean and sufficient water represents a complex governance challenge. Historically, one of the main reasons for this has been the disconnection between the technocratic dimensions and the human dimensions of water management (Gleick, 2003; Holling & Meffe, 1996; Ludwig et al., 1997; Pahl-Wostl, 2007). In order to address the complexities of ensuring clean and sufficient water, authorities and stakeholders at different levels have to work together in order to address this common challenge. In order to do so, their joint governance capacity can be considered as an essential precondition.

As an integral concept in this thesis, governance capacity relates to how institutional actors collaborate and address shared problems (Dang et al., 2015; Koop et al., 2017). In the context of this research, governance capacity is the key set of governance conditions that should be developed to enable change that will be effective in finding dynamic solutions for governance challenge of ensuring provision of clean and sufficient water. It is highly contextual and revolves around enabling “*effective change*” (Koop et al., 2017, 3430). Governance capacity with regard to clean water is crucial in preserving the valuable common-pool resource and ensure that humans, animals and the environment can continue to prosper. Moreover, governance capacity can be determined through the ability of stakeholders in social institutional settings, how they collaborate in allocating resources (Pahl-Wostl, 2009) and the actors’ social frame of reference which enables collective problem-solving (Adger et al., 2009). Governance capacity can be measured through a Governance Capacity Analysis using the Governance Capacity Framework as developed by Koop et al. (2017). International collaboration between countries and private actors, for instance in the form of the exchange of practices at various levels of governance, attempt to contribute to enhancing the governance capacity (Bontenbal, 2009).

Decentralised river basin governance is a well-known practice in the Netherlands. Water governance in the Netherlands goes back centuries. There are currently 21 Dutch Regional Water Authorities (DRWAs) working together at multiple levels while remaining independent and decentralised. In 2013, the DRWAs and the South African Department of Water and Sanitation (DWS) signed a Memorandum of Understanding (MoU) in which they committed to – the continuation of – collaboration and exchange of practices and ideas. Shortly thereafter, the Kingfisher I programme was initiated, followed in 2017 by Kingfisher II, with the aim of supporting the nine CMAs in drafting Catchment Management Strategies (CMS). These CMS would play a leading role in the governance of the CMAs. The main focus in the strategies was to encourage Integrated Water Resource Management (IWRM), stakeholder participation, stakeholder empowerment and the deployment of water governance tools. On the other hand, the Dutch were taught more sustainable water practices from local South African experts and to find creative results when faced with limited financial resources. The Kingfisher programmes were succeeded by the Blue Deal, a commitment of the Dutch government to provide 2.5 million people in at least three WMAs in South Africa to have better access to clean & sufficient water by the end of 2030. This thesis builds upon the commitment of the Blue Deal and the water challenges of clean and sufficient water.

1.2. Literature gap

Enhancing transnational capacity developments in order to provide clean and sufficient water to water-scarce countries requires adequate governance capacity. A vast body of literature on the advantages and disadvantages of international exchange of practices, ideas and policies exists. More specifically, there are two main premises that often underpin this study. First, the concept of Multi-Level Governance (MLG) that in many cases promotes IWRM (OECD, 2011). This entails engagement from a range of public stakeholders across ministries, departments, institutions and agencies on different levels of government, between the layers of government ranging from the local to the national scale and finally between different private stakeholders such as business actors and NGOs. From a

theoretical perspective, it enables analysis both “above” and “below” the nation-state and horizontally between public and private actors (Stubbs, 2005). River basin governance requires such an MLG approach, because the source of the river basin often lies in a different geographical, political or administrative area than the mouth of the river basin. It can cross multiple national borders, requiring alignment of policies with regard clean and sufficient water for everyone benefiting from it. IWRM is a manifestation of MLG that safeguards and encourages economic and social welfare without compromising the integrity of the ecosystem (Hassing et al., 2009). According to the concept of IWRM, water plays a key role in many facets of life including health, environment, transportation, energy, spatial planning, agriculture and poverty alleviation (Akhmouch & Correia, 2016; Grigg, 2008).

IWRM follows hydrological boundaries rather than administrative or political ones and therefore requires the participation of people and the integration of different social, political and environmental interests across these boundaries (Saravanan et al., 2009). The second premise that underpins this thesis is translating decentralised governance approaches to a foreign context. An important concept here is policy translation (Hasan et al., 2020; Mukhtarov, 2014), derived from the policy transfer framework (Dolowitz & Marsh, 1996; 2000). For this research, the policy transfer framework is tailored in two ways:

- (1) Even though the authors acknowledge that the term transfer can be interpreted as a one-way stream without the possibility for mutual learning and that mutuality (Bontenbal, 2013) can occur, the word policy translation will be used, which more accurately captures the interaction between the Netherlands and South Africa through the Blue Deal. Hereinafter, policy translation refers to the travel of ideas and practices that allows recognising and giving credit not just to those who initiated the process, but to all involved, how the ideas or practices in a particular environment can change in other environments, emphasises the mutual learning benefits and is most importantly process-driven (Hasan et al., 2020; Mukhtarov, 2014).
- (2) The framework emphasises the transfer of policies into a political system. Even though a river basin approach is a political choice and therefore inherently political, the ideology and ideas behind the approach and the translation of practices is at least equally important.

The translation of policies, practices and ideas has been studied in many forms and under many names, including ‘institutional transplantation’ (De Jong et al., 2002), ‘policy mobility’ (McCann & Ward, 2011), ‘policy mutation’ (Peck & Theodore, 2012), ‘policy diffusion’ (Rogers & Hall, 2003), ‘institutional transfer’ (Jacoby, 2001), ‘lesson-drawing’ (R. Rose, 1991) and ‘policy translation’ (Mukhtarov, 2014). Policy translation, in particular, captures how the global, national, regional and local approaches become blurred, how the ideas or practices in a particular environment can change in other environments and emphasises the contingency of proposed policy translations in terms of the process and outcomes (Mukhtarov, 2014). In addition, policy translation emphasises the need for aligning the asymmetrical relationship between ‘senders’ and ‘recipients’ of policies or practices by giving credit to all stakeholders involved (Hasan et al., 2020), and therefore best captures the MLG approach chosen in this thesis. In the literature, various conditions for the successful policy translation are identified, including the harmonisation of policies (Swatuk, 2005; Van der Zaag, 2007), acknowledging the nature of the relationship (Van der Zaag, 2007), community engagement (Hasan et al., 2019; S. Hasan et al., 2020), mutuality of learning benefits (Bontenbal, 2013; Johnson & Wilson, 2009; Rijke et al., 2012), strong transnational networks (Betsill & Bulkeley, 2004) and informed, complete and appropriate policy transfer (Dolowitz, 1996; Dolowitz & Marsh, 2000).

Much of this research is focused on policy translation and the consequent lesson-drawing that results from these projects at urban scale (Bontenbal, 2009), between institutions that share similar functions (Bontenbal, 2013) or at international level (Dolowitz & Marsh, 2000). Moreover, many (policy) translation processes are aimed at providing a technical or operational solution and exporting expertise

on a specific topic or solution in order to solve a specific problem (Hasan et al., 2019; Villamayor-Tomas et al., 2014).

Little research has focused on the potential long-term governance capacity developments in South African river basins. As such, the most recent report that concerns governance aspects in South African river basins originates from 2018 and the recommendations stipulate that there is *“an urgent need to generate a set of quantifiable indicators that are able to assess the performance of a CMA. Such indicators should be given a value in order to determine whether it is a successful practice or not, as values are often the easiest to illustrate effectiveness and efficiency. Secondly, these indicators should be uniform, and have the ability to be applied to various CMAs across the globe.”* (Stuart-Hill & Meissner, 2018, 14). As such, measuring governance capacity is a comprehensive method that can be used to provide a clear overview of the (water) governance challenges and opportunities. This has not been conducted on river basin level yet. Moreover, where a lot of literature exists on theories relating to policy translation, no comprehensive framework exists that links eight empowering conditions of policy translation to empirical water governance performance.

1.3. Research questions

This thesis explores the possibilities of the Dutch decentralised river basin approach to address the governance capacity of water governance challenges in South Africa, identifies capacity developments needs and formulates recommendations to meet these needs.

The research question for this thesis is therefore:

“Under what governance conditions does the translation of the Dutch river basin approach enable better access to clean and sufficient water in South Africa by 2030?”

To answer this question, four sub-questions are devised. The sub-questions are structured such that they start from the literature (sub-questions 1 and 2) and build up to the empirical evidence (sub-questions 3 and 4) in order to discover the conditions under which a river basin approach is appropriate to address the challenges of clean and sufficient water by 2030, as stated in de Blue Deal. The sub-questions are as follows:

1. *What empowering conditions for successful policy translation can be found in the literature?*
2. *What are the key characteristics of the Dutch decentralised river basin approach?*
3. *What are the governance challenges to ensure clean and sufficient water on urban and river basin scale?*
4. *To what extent are the empowering conditions for a successful policy translation present in South Africa?*

1.4. Reader's guide

Chapter 2 presents the conceptual design, including the research framework, conceptual model and analytical framework. Chapter 3 highlights the methods, including the data collection, stakeholder map and a description of the case study areas. Chapter 4 presents the results of the three methodological frameworks and addresses the four sub-questions. Each sub-chapter addresses one sub-question. The sub-questions are addressed under the titles 4.1. Empowering Conditions for Policy Translation, 4.2 The Dutch Decentralised River Basin Approach, 4.3 Water Governance Performance and Challenges and 4.4 Empowering Conditions and Empirical Evidence. Chapter 5 discusses the results and places them in the context of international literature, concluded by Chapter 6 which answers the research questions concisely and contains recommendations.

2. Conceptual design

Through the lens of multi-level governance, IWRM and policy translation, this thesis aims to address the water challenges of clean and sufficient water in South Africa. This chapter addresses the conceptual approach towards achieving this objective. The project is practice-oriented, because the project context serves a highly practical goal. Verschuren & Doorewaard (2010) identify types of practice-oriented research. This research is design-oriented, a type of research that focuses on the successful implementation and potentially making recommendations on a particular “design model” (Verschuren & Doorewaard, 2010, 77). In this case, the design model is the implementation of a decentralised river basin model in CMAs. The methods used in this research are particularly suited to meet this end.

2.1. Research framework

The research is structured in three phases. Based on the two main literature premises used in this project, the theoretical foundation is laid. These theories are tailored so they become relevant to the water challenges of clean and sufficient water in South Africa. This leads to the second phase of the research: the desk research and the empirical research. Sub-questions 1 and 2 will be answered through Dutch policy documents and international literature. The empirical evidence will answer sub-questions 3 and 4. The final phase is devoted to the integration and the suitability of Dutch policy translation with regard to the river basin approach. This leads to a comprehensive integration of the empirical analyses, applied methods and sub-questions, which form the answer of the main research question.

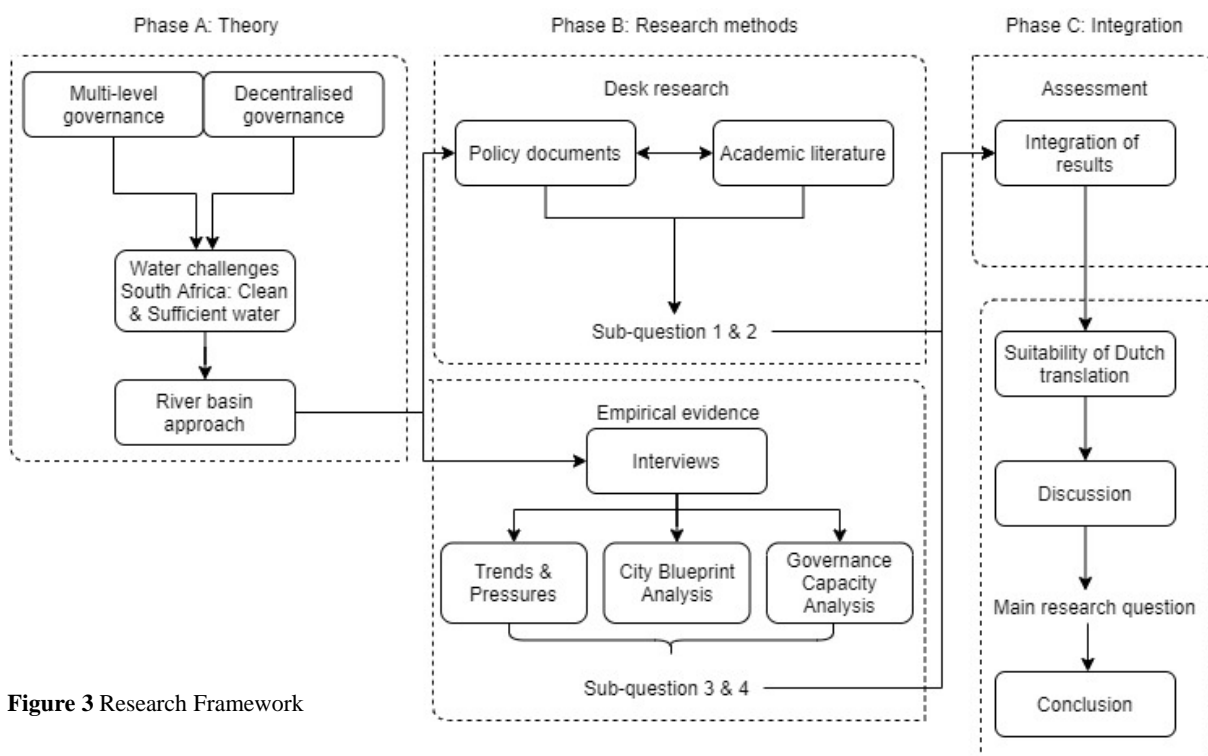


Figure 3 Research Framework

2.2. Conceptual model

In order to clearly visualise the relationships between the core concepts of IWRM, decentralised governance and the success of policy translation, thus appropriately addressing the water governance challenges of clean and sufficient water. The conceptual model is visualised in Figure 4. It represents the assumed relationships explained in Table 1. The causal loop is reinforcing, which means that all relationships are positive, thus aiming to continuously encourage governance capacity.

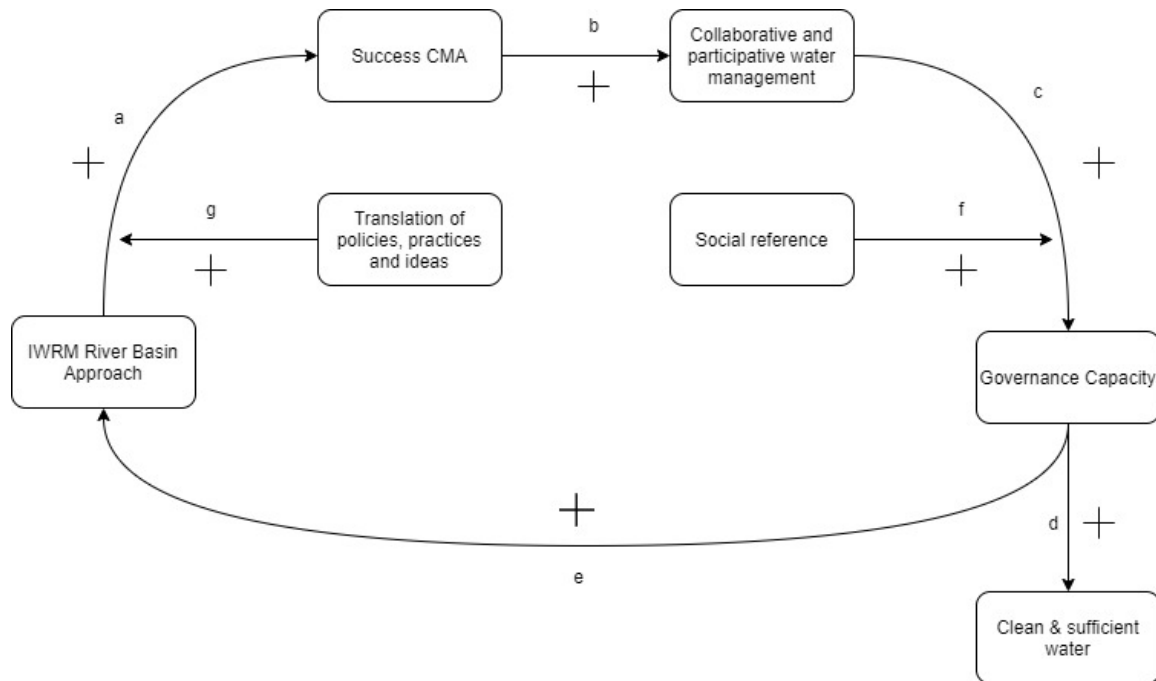


Figure 4 Conceptual model

Table 1 Explanation conceptual model

Relationship	Type of relationship	Explanation	Key sources
a	Direct effect	A decentralised multi-levelled river basin approach is assumed to have a positive effect on the success of the Catchment Management Agencies (CMAs), based on existing literature.	Meissner et al (2017) Stuart-Hill & Meissner (2018)
g	Moderating effect	The moderating effect of the correct translation of policies, practices and ideas can strengthen the direct effect between integrated water resource management (IWRM) and the success of the CMA.	Dolowitz & Marsh (2000) Hasan et al. (2020) Van der Zaag (2007)
b	Direct effect	The ability of the CMA to provide clean and sufficient water according to a river basin approach is inherently multi-levelled and is assumed to encourage collaborative and participative water governance.	
c	Direct effect	Governance capacity is by definition collaborative and participative.	Dang et al. (2015) Koop et al., (2017)
f	Moderating effect	Governance capacity is further moderated by actor's social reference.	Adger et al. (2009)
d	Direct effect	Governance capacity is assumed to have a positive effect on the governance of clean and sufficient water, which is the hypothesised outcome of this research.	
e	Direct effect	Governance capacity enables IWRM, since it is multi-levelled, decentralised and is of participative and collaborative nature.	Koop et al. (2017)

2.3. Analytical framework

The analytical framework is inspired by the literature, created by the author of this thesis and illustrated in Figure 5. It depicts the dependent variable, the independent variables, indicators and applied methods. The main objective of this thesis is presented as the dependent variable. It is theorised that the improvement of clean and sufficient water is impacted by two independent variables; governance capacity and successful policy translation. Successful policy translation is defined, or operationalised, by a number of empowering conditions, based on the vast body of literature (e.g. Bontenbal, 2009, 2013; Hasan et al., 2020; Pahl-Wostl, 2009). Governance capacity is operationalised by three methodological frameworks, together consisting of a mix of 75 quantitative and qualitative indicators, which make up the City Blueprint Approach.

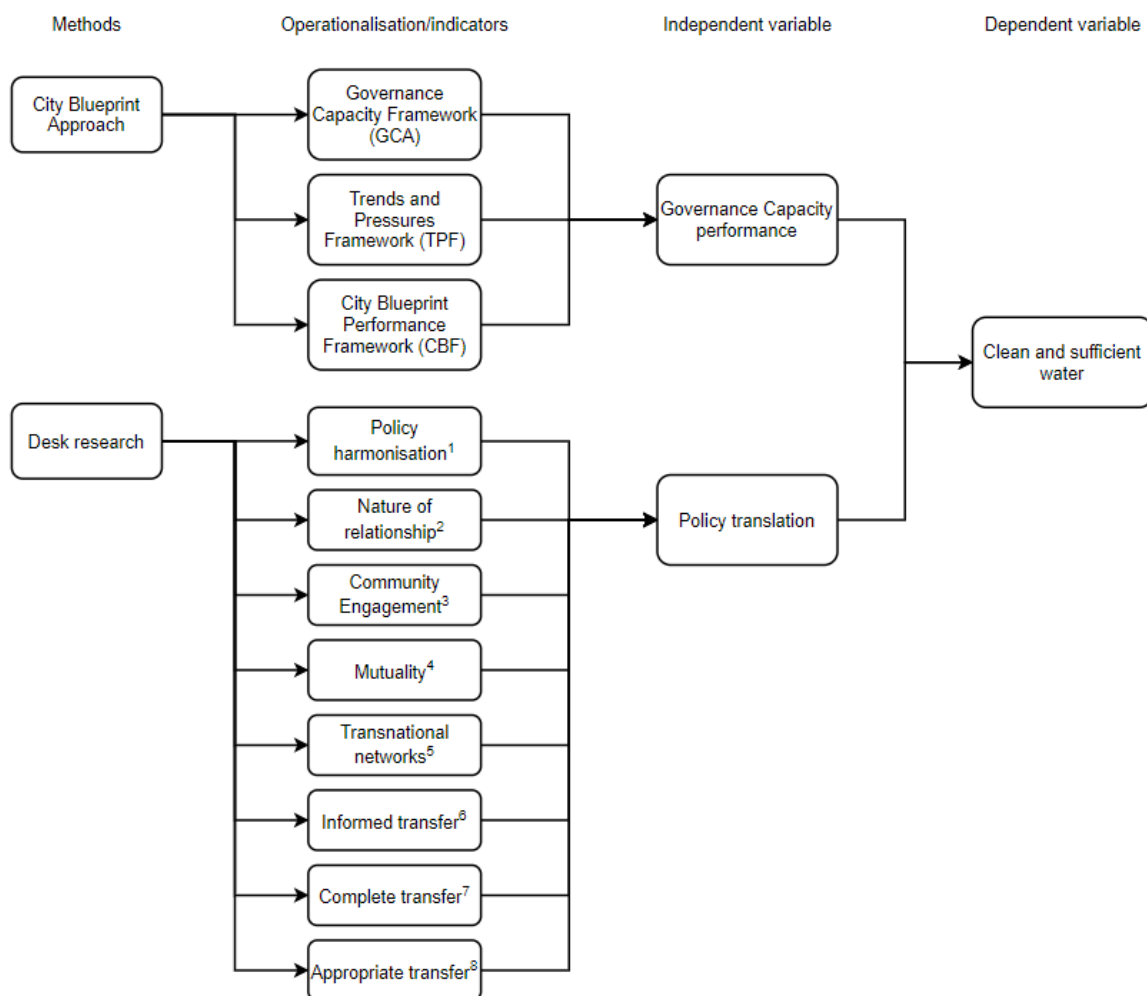


Figure 5 Analytical framework. Source: Author's own, footnotes indicate relevant sources. Inspired by ¹Swatuk (2005) & van der Zaag (2007); ²van der Zaag (2007); ³Hasan (2020); ⁴Bontenbal (2009); Rijke et al. (2012); Johnson & Wilson (2009); ⁵Betsill & Bulkeley (2004); ⁶Dolowitz & Marsh (2000); ⁷Dolowitz & Marsh (2000); ⁸Dolowitz & Marsh (2000).

3. Methods

This research uses a combination of a literature study and empirical analysis to discover the governance conditions for transnational capacity development for good multi-level water governance between the Netherlands and South Africa. The first sub-question addresses the literature on empowering conditions for policy translation. This provides the analytical lens from which to depart with the empirical analysis. The second sub-question addresses the key characteristics of the Dutch decentralised river basin approach. This is necessary, because it is the background about the policy that is to be translated. Both policy translation and river basin governance have a very broad literature base and composing the analytical framework included finding literature with the search terms policy transfer, policy translation, institutional transplantation, transfer of water governance, international collaboration, transnational networks, and multi-level governance, river basin approach, water governance, decentralised water governance, decentralisation and river basin governance respectively. This list is not exhaustive.

For the empirical analysis, the City Approach (CBA) developed by van Leeuwen et al. (2012) is applied. The CBA is a diagnosis tool and consist of three complementary frameworks (Figure 6). The main challenges of cities are assessed with (1) the Trends and Pressures Framework (TPF). How cities manage their water cycle is done with (2) the City Blueprint Framework (CBF). Where cities can improve their water governance is done with (3) the Governance Capacity Framework (GCF). The CBA is a method to assess the sustainability of IWRM in municipalities and cities, and has never been conducted on river basin scale. City Blueprint is one of the Watershare Suite of tools and is a component of the European Innovation Partnership (EIP) Water (KWR, n.d.).

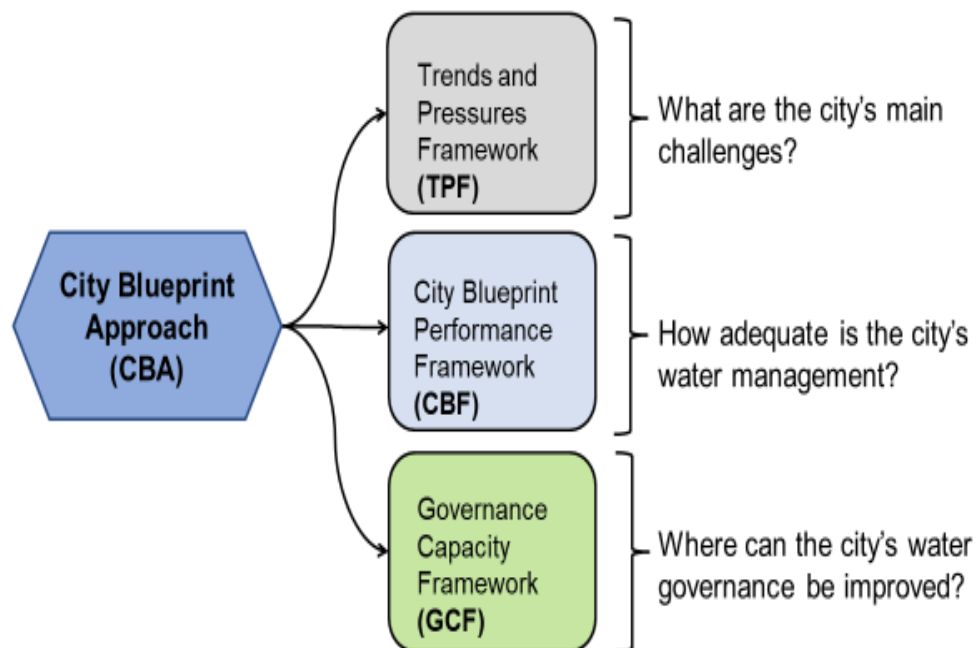


Figure 6 The City Blueprint Approach

3.1. The Trends and Pressures Framework

In order to get insight into the main governance challenges that may impede the provision of clean and sufficient the Trends and Pressures framework was applied for one of South Africa's mayor cities, Durban. It contributes to answering sub-question 3, since it can serve as a starting point from which lessons can be learned on river basin scale. The trends and pressures framework consists of 24 descriptive indicators to assess the city's main challenges. The framework indicators are divided over the following broad categories: social, environmental and financial pressures and include a fourth category, i.e. the World Bank governance indicators (Table 2). Table 3 shows the scoring mechanism, indicating the extent of concern for corresponding values.

Table 2 The Trends & Pressures Framework

Category	Indicators		Indicator number	Score
I SOCIAL	Urbanization rate		1	
	Burden of disease		2	
	Education rate		3	
	Female participation		4	
II ENVIRONMENTAL	Flood risk	Urban drainage flood	5	
		Sea level rise	6	
		River peak discharges	7	
		Land subsidence	8	
	Water scarcity	Freshwater scarcity	9	
		Groundwater scarcity	10	
		Sea water intrusion	11	
	Water quality	Biodiversity	12	
	Heat risk	Heat island	13	
	Air Quality	PM2.5/10	14	
III FINANCIAL	Economic pressure		15	
	Unemployment rate		16	
	Poverty rate		17	
	Investment freedom		18	
IV GOVERNANCE	Voice and accountability		19	
	Political Stability		20	
	Government effectiveness		21	
	Regulatory quality		22	
	Rule of law		23	
	Control of corruption		24	

Table 3 The Trends & Pressures Framework Scoring Table

TPF indicator score	Degree of concern
0 – 2	no concern
2 – 4	little concern
4 – 6	medium concern
6 – 8	concern
8 – 10	great concern

3.2. The City Blueprint Performance Framework

Researching how cities manage their water cycle is another tool for gaining insight in capacity developments at urban/municipal level, and lessons learned can be used at river basin level. Collecting the data for the City Blueprint Performance Framework therefore serves the purpose of sub-question 3. The City Blueprint Performance Framework (CBF) is a set of 25 indicators divided over seven categories: basic water services, water quality, wastewater treatment, water infrastructure, solid waste, climate adaptation and plans and actions (Koop & Leeuwen, 2020a). The CBF provides an easy-to-understand overview of a city or region's strong and weak points. It can be used as a first step for long-term strategic planning by water managers.

Table 4 The City Blueprint Performance Framework

Category	Indicator	Score
I Basic water services	1 Access to drinking water	
	2 Access to sanitation	
	3 Drinking water quality	
II Water Quality	4 Secondary WWT	
	5 Tertiary WWT	
	6 Groundwater quality	
III Wastewater treatment	7 Nutrient recovery	
	8 Energy recovery	
	9 Sewage sludge recycling	
	10 WWT energy efficiency	
IV Water infrastructure	11 Stormwater separation	
	12 Average age sewer	
	13 Water system leakages	
	14 Operation cost recovery	
V Solid waste	15 MSW collected	
	16 MSW recycled	
	17 MSW energy recovered	
VI Climate adaptation	18 Green space	
	19 Climate adaptation	
	20 Climate-robust buildings	
VII Plans and actions	21 Management & action plans	
	22 Water efficiency measures	
	23 Drinking water consumption	
	24 Attractiveness	

3.3. The Governance Capacity Analysis Framework

The Governance Capacity Analysis (GCA) will uncover the data needed to answer sub-questions 3 and 4. It answers sub-question 3, resulting in a spider web chart clearly visualising the governance challenges on urban and river basin scale. The Governance Capacity Framework (GCF) is an assessment method consisting of three dimensions, nine key conditions and 27 indicators (Table 5) and was developed by Koop et al. (2017). It addresses five water challenges: water scarcity, flood risk, waste water treatment, solid waste treatment and urban heat islands. This research focuses on the challenges of ensuring clean and sufficient water, thereby relating to both the challenges of water scarcity and waste water treatment.

Table 5 The Governance Capacity Framework

Dimensions	Condition	Indicators
Knowing	1 Awareness	1.1 Community knowledge 1.2 Local sense of urgency 1.3 Behavioral internalization
	2 Useful knowledge	2.1 Information availability 2.2 Information transparency 2.3 Knowledge cohesion
	3 Continuous learning	3.1 Smart monitoring 3.2 Evaluation 3.3 Cross-stakeholder learning
Wanting	4 Stakeholder engagement process	4.1 Stakeholder inclusiveness 4.2 Protection of core values 4.3 Progress and variety of options
	5 Management ambition	5.1 Ambitious and realistic management 5.2 Discourse embedding 5.3 Management cohesion
	6 Agents of change	6.1 Entrepreneurial agents 6.2 Collaborative agents 6.3 Visionary agents
Enabling	7 Multi-level network potential	7.1 Room to manoeuvre 7.2 Clear division of responsibilities 7.3 Authority
	8 Financial viability	8.1 Affordability 8.2 Consumer willingness-to-pay 8.3 Financial continuation
	9 Implementing capacity	9.1 Policy instruments 9.2 Statutory compliance 9.3 Preparedness

3.4. Data collection

The data is collected through an initial phase of desk research. This answers the first two sub-questions and lays the foundation for the empirical analysis. Also in the empirical analysis, desk research is applied in order to find as much information that is publicly available as possible, both quantitative and qualitative, so the researcher has sufficient background information from which to initiate the in-depth interviews. The second phase of data collection is semi-structured in-depth interviews with water managers and practitioners. As initial data entry points, Dr. Stef Koop opened up his network and via Agnes Maenhout from the World Water Academy (Wateropleidingen) the first two local water managers in South Africa were contacted. Another major entry point was collected through a personal contact who facilitated the connection with the South Africa coordinator of the Dutch Union of Regional Water Authorities (Waterschappen).

Due to the current Coronavirus pandemic, the data will be collected through online interviews through the Microsoft Teams platform and no physical field work will be conducted in South Africa.

Nonetheless, a complete data collection was achieved for all three frameworks and a total of ten interviews have been conducted, of which two were followed up with a second interview. After the interviews, the structured questions according to the GCF are codified on a Likert scale from - - to ++. This is done through a standardised description developed by Koop et al. (2017) clearly assigning each type of response to a particular value on the Likert scale:

<https://library.kwrwater.nl/publication/61397218/>. Additional data sources will consist of Dutch water experts in regional water authorities who have experience in either the Kingfisher projects or are currently involved in the Blue Deal.

3.5. Consent participants

The nature of this project is highly participative, giving all participants ample opportunity to give feedback on the interviews and the answers provided, as well as the interpreted scores. The relevant water managers receive the transcript of the interviews, are given the chance to confirm or deny statements and are sent the full report after completion. All participants are informed about the participative nature as well as receiving the final product and it is expected that therefore the necessary consent for the interviews, as well as the processing of that data, is given. Both follow-up interviews were at the request of the respondents for further elaboration. Both interviewees were satisfied with the results.

3.6. Stakeholder map

The data was collected by conducting ten interviews from seven different perspectives. The stakeholders covered all relevant perspectives and included the academic perspective, in the University of KwaZulu-Natal (UKZN), the municipal perspective, in the form of the EWS and the Coastal, Seawater and Catchment Management Department (CSCM), the NGO's perspective of the Duzi-Umgeni Conservation Trust (DUCT), the public catchment management perspective in the form of a board member of the Proto CMA, practitioners in the field from the Institute of Natural Resources (INR) and the perspective from the Dutch consultants from the DWRA (Figure 7).

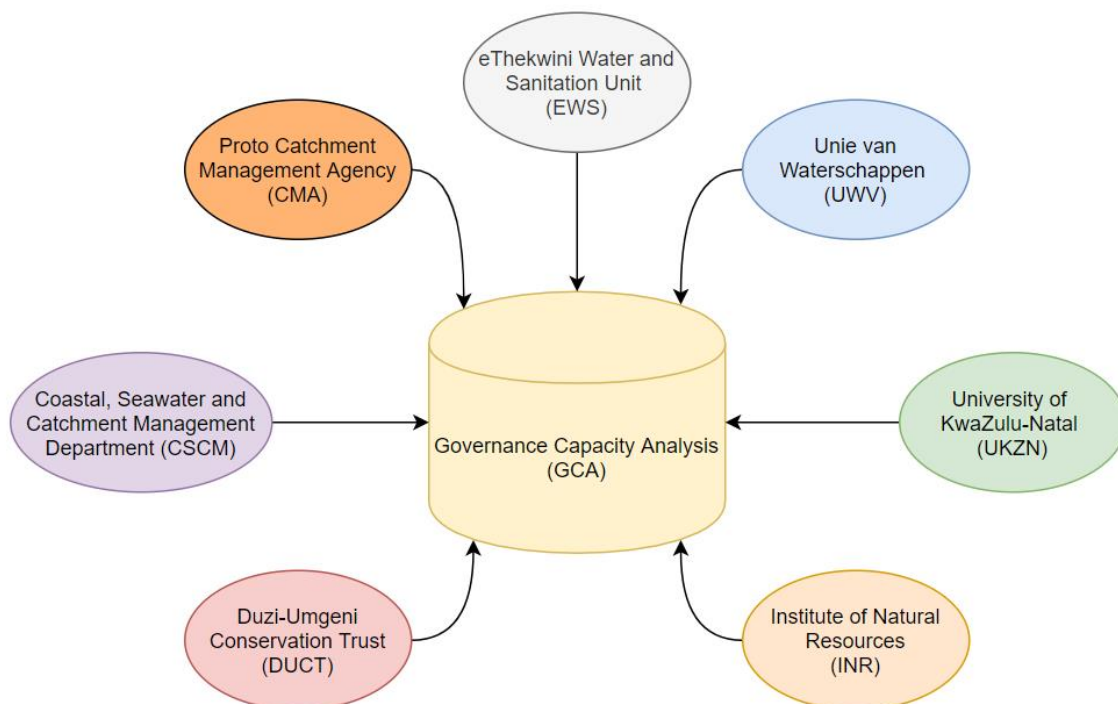


Figure 7 Stakeholder map

3.7. Description of case study

This research focuses on the governance capacity on two scales. First, the eThekweni municipality. The most important city in the municipality is Durban. Durban, is considered a medium-sized city that is likely to experience significant impacts of climate change (Roberts & O'Donoghue, 2013). It is the third largest city in South Africa and with a rapidly growing population currently around 3.5 million and challenging social, economic and environmental circumstances. High urban and peri-urban water demand make sound water governance crucial. The methods for this research are well-

suited for analysis on urban scale. Conducting the analysis at urban level and river basin level allows for comparison of governance capacity between local and provincial level, which can consequently lead to lesson-drawing.

The second scale of analysis is that of the Pongola-Umzimkulu CMA. The Pongola-Umzimkulu CMA is not yet officially established and will hereinafter be referred to as Proto CMA. It has water challenges relating to both clean and sufficient water. It is home to the largest river in South Africa by volume (DWS, 2012). The composition of the catchment is highly diverse. The Northern catchment areas have some heavy industry (mining) and agricultural activity (mostly sugarcane and irrigated crops), activities that require a lot of water. In the middle catchment areas subsistence and commercial farming and acid mining prevails, affecting the quality of the water in these rivers. The Southern catchment areas are dominated by heavy industry and high urban water consumption. With respect to sufficient water, the city of Durban located in the Proto CMA and the agricultural activity put an enormous strain on water availability. Three former WMAs have been consolidated in this Proto CMA (Figure 8). The name is derived from the upper most major river in the Proto CMA, Pongola, to the lowest river in the Proto CMA, Umzimkulu. Its biggest city, Durban, is considered a medium-sized city that is likely to experience significant impacts of climate change (Roberts & O'Donoghue, 2013). It is the third largest city in South Africa and with a rapidly growing population currently around 3.5 million and challenging social, economic and environmental circumstances, such as the harbour as an important economic driver, sound water governance is crucial. For this reason, the analysis for the Blue Deal's challenges of clean and sufficient water is particularly suitable in this area.



Figure 8 Geographical location of relevant Proto CMA (left). The former three WMAs consolidated in the Pongola-Umzimkulu Proto Catchment Management Agency (CMA; right).

4. Results

4.1. Empowering Conditions for Policy Translation

As an important step to answering the research question, there are a number of empowering conditions for successful policy translation. Table 6 gives an overview of the relevant empowering conditions with regard to this research. All empowering conditions listed below are addressed one by one.

Table 6 What empowering conditions of successful policy translation can be found in the literature?

Empowering condition	Description	Source
1. Harmonised policies	Harmonised policies decrease inter-state and international conflict between upstream and downstream users and increase governance efficiency.	Swatuk (2005) Van der Zaag (2007)
2. Recognition of asymmetrical relationship	Recognising the asymmetrical and interdependent relationship between 'senders' and 'recipients' of policy.	Callon (1984) Hasan et al. (2020)
3. Community engagement	Participative processes to overcome the asymmetrical dialogue between 'senders' and 'recipients'.	Latour (1986) Hasan (2020)
4. Sender-recipient mutuality	Making sure learning processes are reciprocal. Personal and professional learning benefits may be different for parties but mutuality safeguards a more durable relationship, leading to a more thorough policy translation.	Bontenbal (2013) Johnson & Wilson (2009) Rijke et al. (2012)
5. Strong transnational networks	The facilitation of mobilisation of information that goes beyond the state level. Crucial in a globalised world.	Betsill & Bulkeley (2004) Bontenbal (2009)
6. Informed translation	Sufficient knowledge about the practice that is to be transferred, or rather translated, must be present.	Dolowitz & Marsh (2000)
7. Completeness of translation	A cohesive set of policies and/or practices in one place must also be adopted in the place it is translated to.	Dolowitz & Marsh (2000)
8. Contextual adjustments	The practice or policy that is transferred must align with the economic, social, political and/or ideological context it is translated to.	Dolowitz & Marsh (2000)

Harmonised Policies

Swatuk (2005) found that transboundary conflict was one of the four major reasons for water reforms in Southern Africa. Rivers are bound by hydrological flows rather than political boundaries. Therefore, rivers sometimes flow through multiple countries and often cross provincial borders. Water governance that is limited to state or provincial borders therefore often leads to conflict. Especially when it concerns the use and the amount of abstraction, for example for (livestock) farmers and or for hydropower generation and pollution, in the case of heavy industry. These conflicts are mostly related to the fair distribution and use among upstream and downstream users (Figure 9 *Figure 9 The direction of the upstream and downstream flow of rivers.*). Moreover, these conflicts tend to occur more often in

the dry season, when water resources are scarce. It was found that inter-state conflict was less frequent than inter-province conflict. One of the reasons for this is that the *“level of inter-state relations major users (e.g. hydropower, plantation agriculture, industry, affluent urban centres) in each state continue to command the lion’s share of water resources. As such, they are not likely to “fight” over water with similar users in neighbouring states”* (Swatuk, 2005, 877). A major implication here is the power dynamics within the water sector. If the notion is that water is a human right, as stipulated by the UN, and embedded in South African culture, states have to ensure equitable access (UNGA, 2010). A comprehensive policy translation can therefore never be the individual national or international initiatives alone, but require both national and international political harmonisation surrounding water extraction and pollution to avoid conflict.

Van der Zaag (2007) argues that whereas downstream users may not affect upstream users, upstream users always cause downstream impacts. This is caused by the fact that every water user aims to maximise their benefit and utility from the available and sometimes scarce water resources. Rules, either formal in the form of laws, or traditional in the form of customary agreements within and between communities impede the excessive water use of individuals. A critical condition for successful IWRM is therefore that upstream users often need to sacrifice some potential water uses for the benefit of downstream users. This may not always be detrimental to the upstream users, but does clearly highlight the asymmetrical relationship between upstream and downstream users (Lundqvist, 1999).

The question then becomes how institutions can successfully harmonise political interests to facilitate equitable and comprehensive water resource management. In an African context, water has always been considered a “God-given right” and can therefore never be denied to anyone. Existing unfair power dynamics dating back to the colonial era and the legal institutions, national rules and regulations that were created during this time shaped water governance in Southern Africa. This included the Berlin Conference of 1884-1885, where the previously non-existing national borders were created by the European colonisers. Since neighbouring African countries were colonised by different European countries, legal arrangement between countries, and therefore across river basins, differed. In the Rio Declaration of 1992, the United Nations (UN) defined the water rights of individual states as:

“States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental and development policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction” (UNCED, 1992, 9).

This principle gives some guidance in the harmonisation of international policies. Inter-provincial and international negotiations on the use of water often end in an alignment of interests and mutual benefits. However, van der Zaag (2007) adds that the economic costs and environmental costs should also be aligned, and that it often comes down to *“the negotiations of relative benefits rather than absolute values expressed in monetary values* (van der Zaag, 2007, 1999). In turn, this leads to the

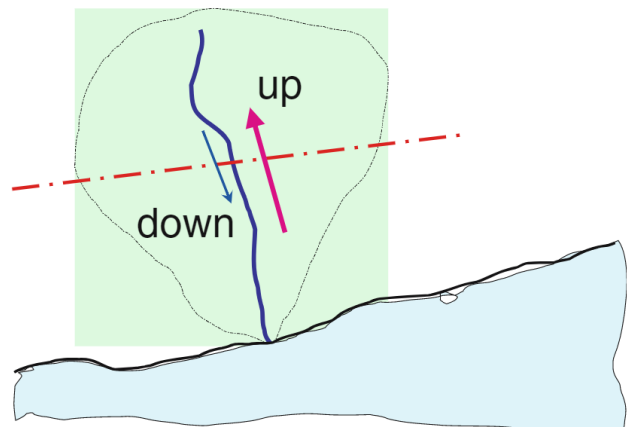


Figure 9 The direction of the upstream and downstream flow of rivers.

concept of “*hydrosolidarity*” (Lundqvist, 1999). Hydrosolidarity refers to the notion that water management should include considerations of ethics and equity (Varady et al., 2009) thereby considering the struggles between upstream and downstream water users and working towards a system where the long-term environmental and economic benefits are prioritised over short-term national or provincial water benefits.

Last, an additional aspect of the harmonisation of national policies must therefore not only align political, economic and environmental aspects, but also those of ethics and equity. This is especially important in South African river basins where social power inequalities remain prevalent and the way these power inequalities result in sharing water benefits is ambiguous (Baland & Platteau, 1999; Turton, 2002). Without harmonised policies, an integrated river basin approach cannot be translated, since upstream-downstream conflict will compromise the governance efficiency.

Recognition of asymmetrical relationship

Departing from the alignment of national and international policies and institutions and continuing down the path of social aspects of equity, stakeholder inclusiveness is another critical empowering condition in successfully translating practices, especially from a river basin perspective. In addition to the asymmetric relationship between upstream and downstream users, Hasan et al. (2020) argue there is an unequal dynamic in policy translation between the ‘senders’ and the ‘recipients’. This asymmetry becomes evident when considering Callon’s (1984) four stages of policy translation. The first is the stage of problematisation, where an expert (or group of experts) from the ‘sending’ country translates the relevant issue into a clear problem definition and a proposed solution. In doing so, they sometimes unconsciously put themselves in a position of crucial importance to the success of solving a particular issue. The second, third and fourth stage are devoted to finding interest and support and finally mobilising the stakeholders to accept the proposed solution.

Li (2007) points out this asymmetry as it “*confirms expertise and constitutes the boundary between those who are positioned as trustees, with the capacity to diagnose deficiencies in others, and those who are subject to expert direction*” (Li, 2007, 7). Rather than trying to eradicate this seemingly unavoidable asymmetry, Mosse (2004) argues that the focus must therefore lie on how alliances, coalitions and consensuses allow the policy to develop.

Community engagement

The translation model does not start with the assumption that success of the policy that is to be translated is based on the speed at which it spreads, but rather that translation happens because the actors have a stake in it, and therefore puts these stakeholders in the central position of whether and how it happens. Subsequently, the original policy that is to be translated is likely to change throughout the process due to “*deflections, betrayals, modifications, additions and appropriations*” (Latour, 1986, 267).

An example of the successful policy translation due to active community engagement is the Dutch Delta Planning cooperation between the Netherlands and Bangladesh, resulting in the Bangladesh Delta Plan 2100. The seemingly asymmetric relationship was overcome through continuous and creative shaping and reshaping of the Dutch Delta Plan, where all actors involved aimed to pursue their interests without jeopardising the interests of others (Hasan et al., 2020). The result was a strengthening of traditional relationships of friendship and collegiality, while also forming new alliances.

The success of translated policy is therefore dependent on the ability of the relevant stakeholders to shape the policy and its implementation, rather than the precise content of the policy. Gauging success

is therefore more accurately achieved by measuring the influence local stakeholders have in the content of the policy.

Sender-recipient mutuality

In aiming to overcome the asymmetric relationship between 'senders' and 'recipients' of policy or practices, mutuality is an important aspect of successful translation. Mutuality is defined as the benefits gained from mutual learning in a horizontal, peer-to-peer cooperation (Brinkerhoff, 2002; Johnson & Wilson, 2006). Partnerships where both parties achieve learning processes and subsequent benefits tend to be more durable, enable communication with fewer constraints, ensure greater legitimacy and create a greater sense of ownership (Brinkerhoff, 2002). Moreover, mutuality can enable different forms of learning benefits, including both professional and personal. Bontenbal (2013) argues that these personal learning benefits in particular are undervalued by Northern partners in North-South partnerships. These factors contribute to decreasing the gap between 'senders' and 'recipients'. In a study on the actual mutuality of North-South partnerships, Bontenbal (2013) found that the main benefits of the Northern partners consisted of personal learning benefits, rather than professional learning benefits. The main personal learning benefit for Northern parties was that many issues in the South, often where resources are limited, require a positive and creative mindset to overcome these issues successfully. The main professional learning benefit for the Northern partners was the *"capacity to translate your own expertise to a different context and make it applicable"* (Bontenbal, 2013, 91). The main personal learning benefit for the Southern party was that it was rewarding, exciting and instructive to learn about different countries and cultures. The main professional benefit for the South was getting a deeper understanding of the own profession and a more thorough understanding of related professions.

This shows that horizontal partnerships can create the empowering conditions for successful translation of practices for both parties. Additional learning benefits for both parties included networking, communication and negotiation skills. This is confirmed by Rijke et al. (2012), who argues that networking events are an important way to share professional information horizontally rather than in a top-down context, causing information to be processed more successfully and learning benefits to be more durable. Rijke et al. (2012) add that these networking events are also important for creating a common vision, particularly important in the early stages of policy translation.

Johnson and Wilson (2009) argue that mutual learning processes take place based on similarity and difference. In peer-to-peer international collaboration between institutions, similarity is key in creating common ground from which to initiate conversation, discussion, trust and to create a shared understanding of relevant issues that need to be addressed. On the other hand, differences in approach, social, political or economic context or values may create a mirror and enable critical self-reflection, which can cause learning benefits for both parties involved (Johnson and Wilson, 2009).

Strong transnational networks

Risse et al. (1995) defines transnational networks as *"regular interaction across national boundaries when at least one actor is a non-state agent or does not operate on behalf of a national government or intergovernmental organization."* (Risse et al., 1995, 3). These networks facilitate the mobilisation of information, knowledge and values aiming at *"the integration of new conceptions of ... environmental phenomena into everyday worldviews and practice"* (Lipschutz, 1997). According to Betsill & Bulkeley (2004), successful translation entails that transnational networks go beyond the state and multi-level interaction is crucial. Successful translation requires stakeholder participation and horizontal peer-to-peer information sharing, including managers at municipal level but also in the private sector such as drinking water utilities, wastewater treatment facilities, businesses benefiting from the river and research institutions. International collaboration between the DRWAs and South African CMAs in the Kingfisher programmes of 2013 and 2017, succeeded by the Blue Deal can too be considered a transnational network. According to Betsill and Bulkeley (2004), these transnational

networks require governance that goes beyond unitary nation-state interaction and embrace the multiplicity of actors and institutions across and between different scales of governance.

In contrast, academics argue that while transnational networks that go beyond the state can ensure greater inclusiveness, it can also lead to power imbalances between actors, especially private actors (Sutherland et al., 2015). Powerful private stakeholders can dominate the dynamics of participation and since these actors are not democratically elected, decisions that have significant public relevance such as water governance can be steered by dominant and powerful private actors, creating a democratic deficit (Behagel, 2012; Rose & Miller, 2010; Swyngedouw, 2005). This way, participatory governance can lead to a discourse of exclusion rather than inclusion (Sutherland et al., 2015). However Sutherland et al. (2015) show that this can be countered if the state actor in the (transnational) network is the dominant party, thereby appropriately addressing the democratic aspect of decision-making. By way of example, the eThekweni Water and Sanitation Unit (EWS), as a public stakeholder, holds a central position in water and sanitation provision in the city of Durban, South Africa and is supported by the knowledge and advice of knowledge institutions. Final decisions are therefore taken by the local public actor. Yet, since these decisions are predominantly advised by technological research institutes, it is argued that it lacks inclusion of community stakeholders. There seems to be a constant trade-off between democratic legitimacy and stakeholder inclusiveness that can hinder policy success or continuation.

An important aspect of governing policy translation in transnational networks is city-to-city learning (Bontenbal, 2009). In addition to globalisation, urbanisation in particular experiences an upward trend in developing countries. It is argued that the decentralised nature of cities, with both an institutional and civic society background, are particularly suited to enable this policy translation in terms of administration, service delivery and ability to respond to community needs from an MLG perspective. This is manifested in three ways: 1) strengthening of local governments by sharing expertise, 2) civic society capacity building by teaching leadership and negotiation skills and 3) reinforcing local government – civic society relations by bringing the two together, thus creating more transparency and accountability (Bontenbal, 2009).

Informed translation

The final three empowering conditions are derived from the policy transfer framework created by Dolowitz and Marsh (1996). Dolowitz and Marsh (2000) define success of policy transfer as *“the extent to which policy transfer achieves the aims set by a government when they engaged in transfer, or is perceived as a success by the key actors involved in the policy area”* (Dolowitz & Marsh, 2000, 17). Instead of phrasing conditions for the success of policy transfer, Dolowitz & Marsh (2000) alternatively formulate three causes of policy failure.

The first reason for policy failure is uninformed transfer. This occurs when there is *“insufficient information about the policy/institution and how it operates in the country from which it is transferred”* (Dolowitz & Marsh, 2000, 17). The authors illustrate the argument by using the example of policy transfer of the Child Support Enforcement System (CSES) originating from the US, which was transferred into the British Child Support Agency (CSA). It became evident that the practices and processes of the CSES were predominantly drawn from the Wisconsin CSES, which proved to be too specific to the particular circumstances in Wisconsin and consequently insufficiently comprehensive or representative for the – success of the – policy. As a result, the British overlooked the importance of the courts which were, in Wisconsin, not a significant stakeholder, but turned out to be crucial in other American states and so too in the UK. By focusing too much on one specific state, the UK was insufficiently informed about the details of the CSES.

Completeness of translation

The second reason for policy failure put forth by the authors is incomplete transfer, defined as

“although transfer has occurred, crucial elements of what made the policy or institutional structure a success in the originating country may not be transferred, leading to failure” (Dolowitz & Marsh, 2000, 17). In the example of the CSES, the policy was directly transferred into the British system and replaced the existing structure and institutional arrangement. This led to a wide array of issues not encountered in the US, since the CSES was deeply embedded in the American legal system, which was different than the British legal system. Consequently, transferring the CSES into the CSA resulted in a malfunctioning and ill-aligned system that ran into many problems and caused a lot of resistance.

Contextual adjustments

The final reason for failure of policy transfer is inappropriate transfer, which occurs when *“insufficient attention [is] paid to the differences between the economic, social, political and ideological contexts in the transferring and the borrowing country”* (Dolowitz & Marsh, 2000, 17). Once again they illustrate this with the CSES example, where the CSA implemented in the UK was predominantly aimed at cutting public expenditure, whereas in the US it had the totally different objective of encouraging single parents, and particularly single mothers, back in the workforce. This clearly shows a fundamental difference in economic and ideological context, resulting in much resistance from the public and strong sentiments of illegitimately attacking British parents who already had a significant financial burden of child support.

4.2. The Dutch Decentralised River Basin Approach

The integrated water resource management approach in the Netherlands today was not always present. A series of complete or near-flooding events over the past decades have led to learning processes that gradually steered water management in the Netherlands towards integrated river basin management (van der Brugge et al., 2005). This subchapter starts with a brief overview of the timeline of the DRWA before exploring the characteristics of the Dutch decentralised river basin approach.

The first DRWA, Rijnland, was established in 1255 and still exists today (Waterschappen, 2013). It was a consolidated effort by the college of local water authority officials and the “dijkgraaf”, or dike reeve, who faced the common problem of flood risk and realised cooperation was the best course of action. From this moment, the discourse was focused on keeping water out by building dikes and reclaiming land by pumping out water with wind mills and in the 18th century powered by steam, the largest of which can still be used today in case of extreme water levels. In 1932, the regional water authorities form the Union of Regional Water Authorities (Unie van Waterschappen), which had the main task of coordinating a nation-wide process and protect the interests of all DRWAs internationally. Two of its core values are knowledge exchange and collaboration (Unie van Waterschappen, 2014). Clear evidence of the strategy to keep water out was manifested in 1958 with the commissioning of the Delta Works following the North Sea Flood of 1953. This infrastructure project closed off large parts of the intruding sea in the province of Zeeland with movable arms that can also let water and traffic in when necessary (Deltawerken, n.d.). This extreme flood event also launched the Dutch Delta Programme; a collaboration of the national government, provinces, the Ministry of Infrastructure and Water Management (Rijkswaterstaat) and various societal organisations, led by the Delta Programme Commissioner (Rijkswaterstaat, 2014). The final step towards IWRM in the Netherlands came in 1992 with the Regional Water Authority Act (Waterschapswet), which allowed residents in the DRWAs to vote for their representatives and required them to pay the necessary taxes (Waterschappen, 2013).

Examples of projects that show the integrated nature of Dutch water management are the Room for the River Programme that ran from 2005-2015 and the current programme for Integrated River Management (IRM, 2019; Rijke et al., 2012). With over half of the country's surface area below sea level, and up to 70% of the properties located in this area, the Netherlands relies heavily on technological solutions to keep dry feet (van der Brugge et al., 2005, 176). The overall decision framework for water safety was established by the central government, while the plans, designs and implementation was left to the stakeholders (Rijke et al., 2012). Besides technical interventions, the Dutch have developed a particular style of governance, called the “polder model”, a consensus-based type of decision-making where all relevant parties are heard, and decisions are made based on finding middle ground rather than deploying a “winner takes all” approach. This type of approach, and in particular the Room for the River programme, initiated in 2005, had transboundary success, as countries such as France, Germany, Hungary, Romania, the UK and the USA adopted a similar multi-levelled approach (Opperman et al., 2009; Warner, 2012).

The Room for the River programme was initiated after a series of flooding and near-flooding events hit the country and demonstrate the multi-level governance and IWRM in the Netherlands. The Dutch government identified 30 of the most flood-prone locations and realised that flooding was no longer just a natural hazard, but rather an environmental risk partly driven by unwise placement of infrastructure, predominantly housing and commercial infrastructure (Bergsma, 2017). The discourse and narrative changed from collective state flood protection, the dominant policy strategy for handling high water levels, together with reclaiming land, to a decentralised spatial planning approach which gave land back to the river by allowing it the space to flood in areas where the economic, social and environmental costs are low. In some cases, flooding agricultural land even suited the farmers,

creating win-win outcomes (Dutch Homeowners Move to Make Room for the River, 2013). State flood protection and prevention remained under centralised authority, but the focus shifted to a second layer of governance, a decentralised governance, where spatial planning was prevalent to adapt to anthropogenic impacts (Bergsma, 2017). More specifically, instead of increasing the dikes enclosing the rivers, spatial planning was used to allow more space for the river locally or further upstream, so the water level would decrease there where it was prone to flood. This requires communication and integration with other regional water authorities, provinces and alignment with German water authorities and was quite a shift from the traditional strategy of increasing dikes and reclaiming land with pumping stations.

The river basin approach implies that topics such as water safety, availability and quality is governed throughout the entire river basin, thereby involving several regional water authorities, provinces, municipalities, interest groups including community engagement and knowledge institutions (IRM, 2019). Strong cooperation, participation and integration enables the necessary adaptability. Anthropogenic impacts have disrupted the balance of the Dutch river basin system, and is currently experiencing the consequences, such as rising sea level, causing more water to flow into the river basin, more extreme rainfall and longer periods of heat and draught (IRM, 2019). This causes challenges with regard to safety, shipping, environment, water quality, freshwater availability, the urban environment and recreational spaces. In case of water scarcity, the distribution priority sequence applies. This sequence is divided in four categories, and once again demonstrates the integrated and multi-levelled nature of Dutch water governance. During a water crisis, top priority is given to allocating the available water for the purpose of safety and prevention of irreversible damage to the stability of the water system and the environment. The second priority is the drink water provision and energy provision. These two priorities are centralised and always occur in this order. The third priority is to distribute scarce water resources to the places where a relatively small amount of water can have relatively large benefits. For instance, in case an entire harvest can be saved by supplying a relatively small amount of water. The final category contains the secondary priority of providing drinking water and water necessary for energy provision that falls outside of category 2 and 3 and urban water quality. Governance of the third and fourth category is decentralised to the provincial level and does not follow a strict hierarchy. The provinces are free to allocate the water resources to the category as they see fit.

The literature offers three objectives for integrated river basin management. First, the main objectives of the integrated approach is to align goals (Rijke et al., 2012). This includes providing safety, transport capacity, opportunities for recreational activities, tending to the needs of the environment and economy (Saeijs, 1991). Second, an important part of the integrated approach is the alignment of spatial scales (Adger et al., 2005). This strongly relates to the multi-level interaction between levels of government, but also applies to the catchment and sub-catchment scale (Jaspers, 2003; Stubbs, 2005). In the Room for the River programme, the national government, provinces and the regional water authorities worked together as one (IRM, 2019). Last, the emphasis of the integrated approach lies on temporal scales, especially with regard to sustainability. This includes balancing short-term and long-term costs and benefits, thereby ensuring that the needs of the current generation are met without compromising the ability to meet the needs of future generations (Brundtland et al., 1987).

Integrated river basin management further enables adaptability through the established cross-sectoral network of stakeholders (Witter et al., 2006). The collaboration between water and other interest groups, such as farmers and spatial planners, can better adapt to challenges faced in sectors other than strictly the water sector. This opens up solutions that were previously harder to establish when land-use governance and water governance were separate.

According to Witter et al. (2006), the pathway towards successful river basin management was twofold. First, it was characterised by increased community awareness and knowledge of the

challenges and opportunities. The community was challenged to evaluate their individual interests and critically review the actions of the central authorities. A second important development was the consolidation of regional water authorities, from 2500 in 1946 to 129 in 1990 (OECD, 2014) to the current 21. This forced regional water authorities to align interests and set common goals.

A final characteristic of the Dutch integrated river basin management is that in principle, no water is transferred from one river basin to another (Witter et al., 2006). This leads to problem shifting from the one place to the other. Moreover, strong agreements are made about the water flow throughout the river basin, particularly about maximum water levels and discharge levels also aimed to prevent shifting problems from upstream water authorities further downstream into other water authorities. An overview of the key characteristics of the Dutch decentralised river basin approach is presented in Figure 10.

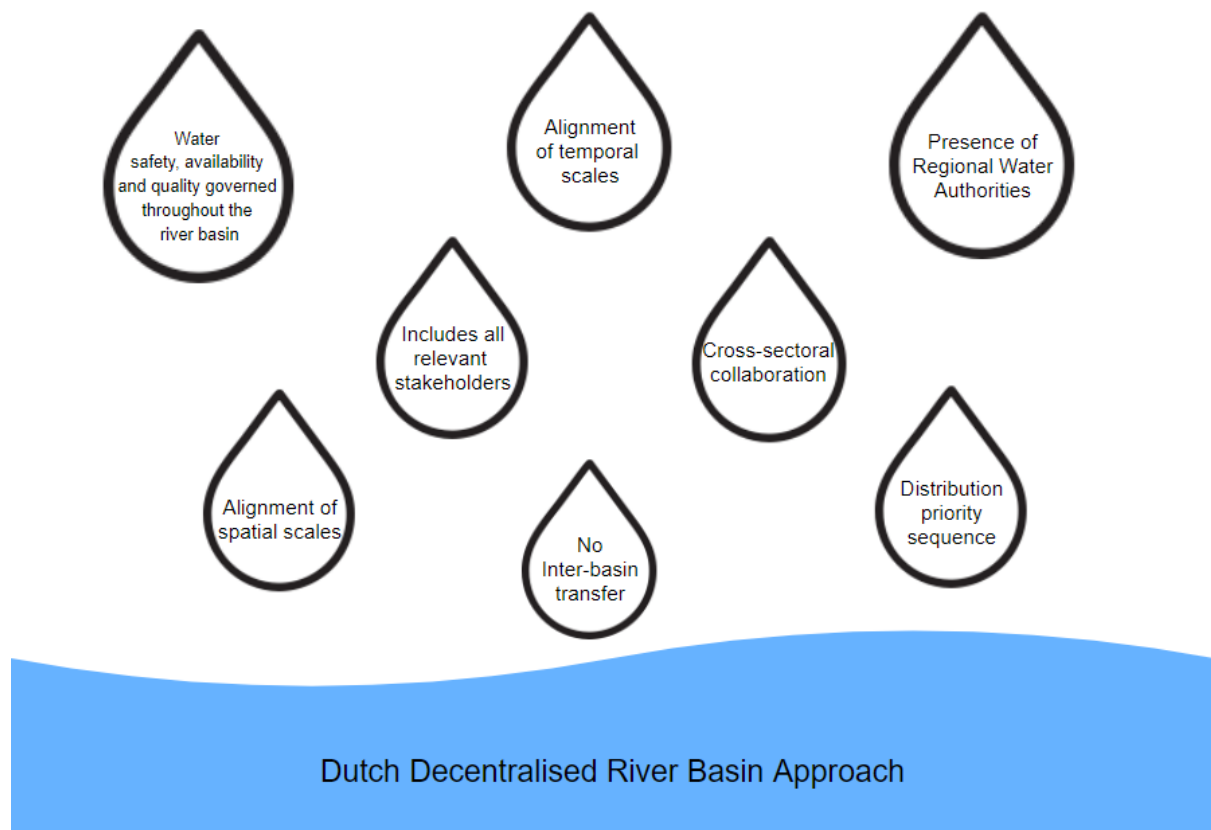


Figure 10 The key characteristics of the Dutch decentralised river basin approach

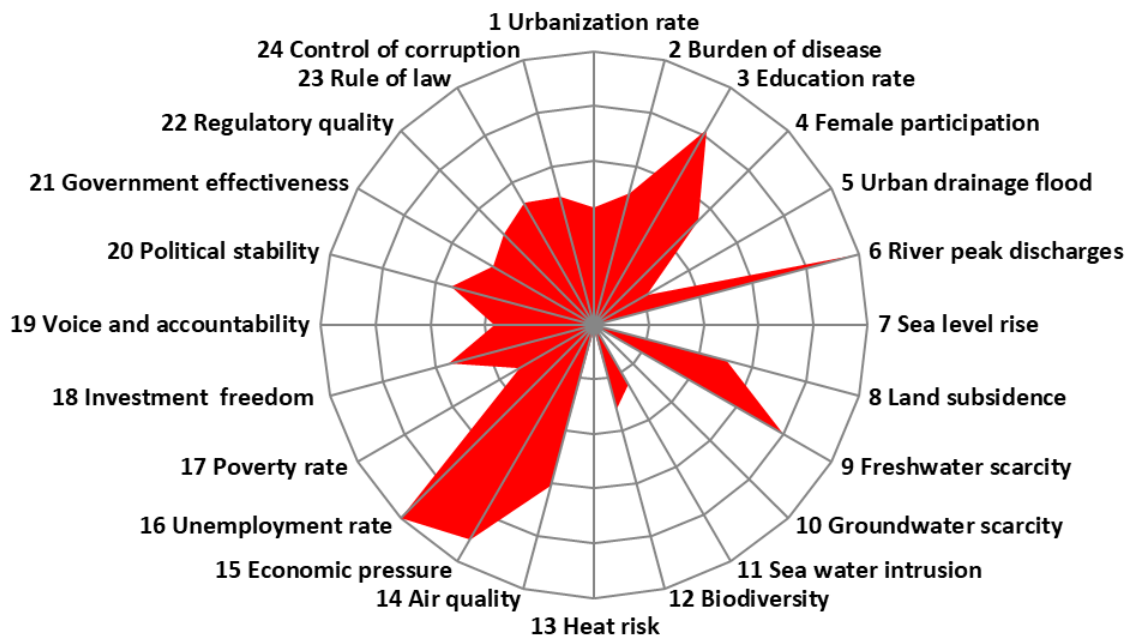
4.3. Water Governance Performance and Challenges

4.3.1. Pressures affecting water management

Table 7 presents the final scores for the TPF. The TPF is ranked from 1-10, with a higher score indicating a higher pressure that may affect local water management performances. With regard to the indicators in the social category, average scores are observed. Particular pressure is expressed in the tertiary education rate of 22.4% (World Bank, 2018). Tertiary education, whether or not to an advanced research qualification, normally requires, as a minimum condition of admission, the successful completion of education at the secondary level (UNESCO UIS, n.d.). With regard to environmental indicators, Durban has low pressure from seawater intrusion. The CSCM carefully mapped seawater intrusion risk and found that a one-metre sea level rise would affect <0.05% of the city. Pluvial flooding is a big challenge for the urban area. The municipality forecasts increased rainfall due to climate change (eThekweni Municipality GIS Website, n.d.). Flash floods, caused by heavy rain upstream and rapidly flooding smaller streams leading to raging torrents that take with them everything in their wake, are expected to increase, and have a significant impact on water quality. Poor communities are disproportionately affected by these floods, and are therefore a great concern for the city of Durban. The highest values are observed in the financial category, specifically economic pressure and unemployment rate. Gross Domestic Product (GDP) is the main variable for economic pressure and an unemployment rate of 28% in 2019 and around 30% in 2020 is concerning. The latest data on the unemployment rate is expected to be even higher due to the current COVID-19 crisis. The poverty rate, that is the percentage of people who live below the poverty line of 1.90 US dollars a day, is 18.9%, which is relatively low compared with other African nations. The full substantiation for the scores can be found in Appendix I: **Substantiation TPF**.

Table 7 Trends and Pressures Framework's results of Durban, South Africa

Category	Indicator		Indicator number	Score
I SOCIAL	Urbanization rate		1	4.3
	Burden of disease		2	5.0
	Education rate		3	8.2
	Female participation		4	5.4
II ENVIRONMENTAL	Flood risk	Urban drainage rate	5	2.2
		Sea level rise	6	0.0
		River peak discharges	7	10.0
		Land subsidence	8	5.0
	Water scarcity	Freshwater scarcity	9	8.0
		Groundwater scarcity	10	0.0
		Sea water intrusion	11	2.5
	Water quality	Biodiversity	12	3.2
	Heat risk	Heat island	13	0.2
	Air quality	PM2.5/10	14	6.1
III FINANCIAL	Economic pressure		15	9.1
	Unemployment rate		16	10.0
	Poverty rate		17	3.2
	Investment freedom		18	5.5
IV GOVERNANCE	Voice and accountability		19	3.7
	Political stability		20	5.6
	Government effectiveness		21	4.3
	Regulatory quality		22	4.7
	Rule of law		23	5.2
	Control of corruption		24	5.0


Figure 11 Trends and Pressures Framework results of Durban, South Africa. The redder the score, the higher the pressure that may affect local water management performance.

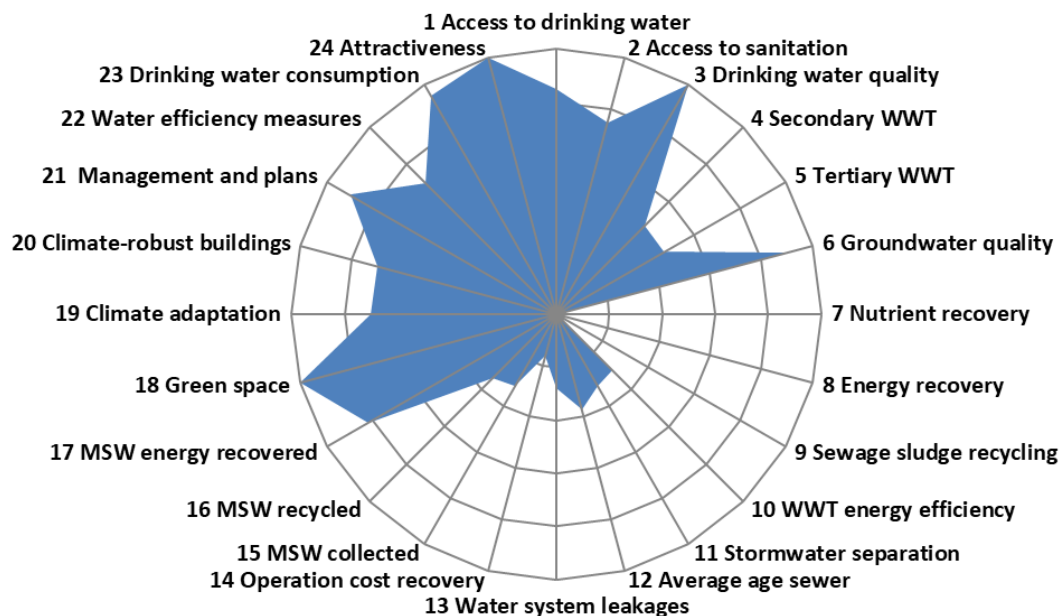
4.3.2. Water management performance of Durban

Table 8 presents the final scores for the CBF and shows the performance of the eThekwinini municipality. It scores highest on the basic water services, climate adaptation and plans and actions. Good performance for basic water services is in line with the information of the respondents for the Governance Capacity Analysis and is the most important task of the EWS. For climate adaptation, an important side note must be added to the high score for green space. Durban is awarded the greenest city in the world, with a total green space of 60% of the total surface area (Hansen, 2020; HUGSI Durban Urban Space Ranking, n.d.). Respondent 103 indicates that even though Durban has a lot of green space, the quality of the green space is questionable in terms of water consumption, for there are a lot of invasive plant species that consume a lot of water. With regard to wastewater treatment and particularly to nutrient recovery, Urine Diversion (UD) toilets are toilets that separate urine from faecal matter are installed in many of the informal settlements in the municipality. The separated urine can be converted into fertiliser. The latest information available is the pilot (2015) called the VUNA project. The project is able to process 1400L/week. Compared to the 450 million litres of wastewater per day that the municipality processes, the total litres/week of nutrient recovery is 0.0000000044, which is negligible. Yet, it is an indication that the city is developing its nutrient recovery practices. CBF scores for water infrastructure are concerning, particularly water system leakages. With regard to the average age of the sewer system, large-scale replacement projects have taken place in 2013 (RES103), where 1750 km out of the total 8105 km of sewage pipelines were replaced. These old pipelines dated back from the 1960s. With regard to solid waste management, even though the values for solid waste collection and recycling rate (8.5%) are relatively low, solid waste energy recovery scores high. This is because of an innovative programme where methane (CH_4) exerted by landfills is converted to electricity in three out of the four large landfills in the municipality, hence the CBF score of 8.2. Figure 12 presents the results in the spider web.

Overall, it is clear that scores that pertain to the current situation, particularly in wastewater treatment and water infrastructure have relatively low CBF scores and the indicators that refer to climate adaptation, plans and actions score relatively high. The eThekwinini municipality has detailed plans in place and these plans are communicated in long reports, including the annual report and the Integrated Development Plan (600 and 900 pages respectively). Respondent 103 and 104 confirmed the ambitious plans of the municipality, but were careful to fully trust that the municipality would truly follow through. The full substantiation can be found in Appendix II: **Substantiation CBF**.

Table 8 The City Blueprint Performance Framework for Durban, South Africa

Category	N°	Indicator	Score
I Basic water services	1	Access to drinking water	8.5
	2	Access to sanitation	7.5
	3	Drinking water quality	10.0
II Water Quality	4	Secondary WWT	4.7
	5	Tertiary WWT	4.7
	6	Groundwater quality	9.0
III Wastewater treatment	7	Nutrient recovery	0.0
	8	Energy recovery	1.7
	9	Sewage sludge recycling	0.0
	10	WWT energy efficiency	3.0
IV Water infrastructure	11	Stormwater separation	3.1
	12	Average age sewer	3.7
	13	Water system leakages	2.8
	14	Operation cost recovery	1.6
V Solid waste	15	Solid waste collected	3.1
	16	Solid waste recycled	3.4
	17	Solid waste energy recovered	8.2
VI Climate adaptation	18	Green space	10.0
	19	Climate adaptation	7.0
	20	Climate-robust buildings	7.0
VII Plans and actions	21	Management and action plans	9.0
	22	Water efficiency measures	7.0
	23	Drinking water consumption	9.5
	24	Attractiveness	10.0


Figure 12 The City Blueprint Performance Framework for Durban, South Africa

4.3.3. Governance Capacity Framework (GCF)

This GCF assesses the capacity to govern the challenges of providing clean and sufficient water as mentioned in the Blue Deal (2018) at two distinctive scales: the eThekweni municipality and the Pongola-Umzimkulu CMA. Clean water addresses mainly surface water quality and wastewater treatment. Sufficient water pertains to the supply and reticulation of water through rivers, the bulk water supplier, water treatment facilities and water pipes. The challenges of clean and sufficient water go hand in hand, as perhaps best explained by respondent 108:

“Polluted water is the same as having no water”

4.3.3.1. eThekweni municipality - Durban

The scope of the GCF for the eThekweni municipality in which the city of Durban lies is presented in Figure 13. The main operating entity in the eThekweni municipality that is analysed is the eThekweni Water and Sanitation unit (EWS), which is the water service authority within the municipal boundaries (Figure 13). The EWS is responsible for the reticulation of water and the water quality. The Governance Capacity Analysis (GCA) that follows refers to the ability of the EWS to address the water challenges of clean and sufficient water, either by its own account or by their ability to effectively engage stakeholders. Therefore, all of the aspects of the GCA directly refer to the ability of the EWS to provide clean and sufficient water for all citizens residing within the municipal boundaries.

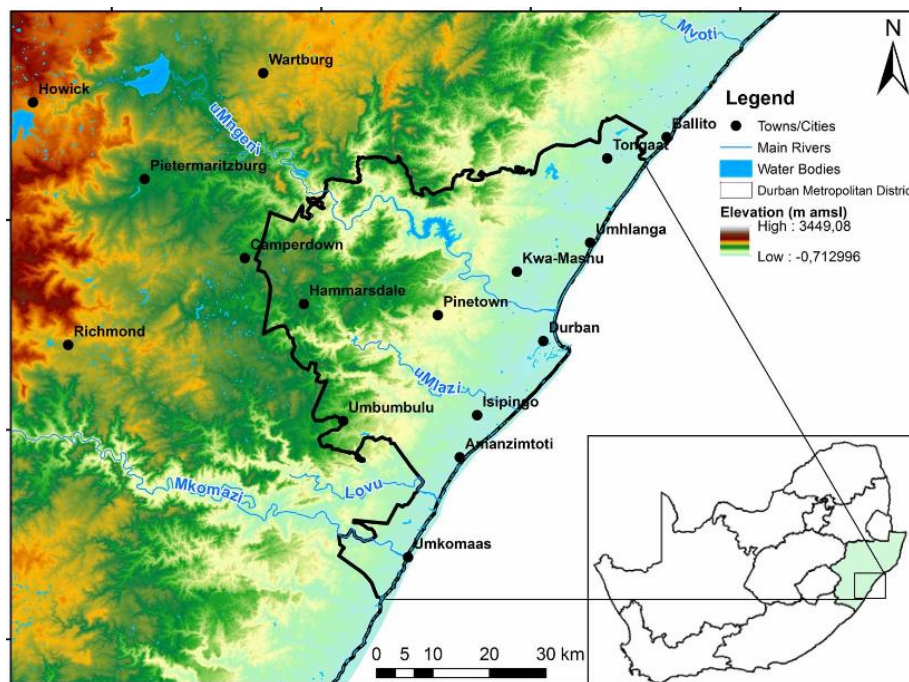


Figure 13 The municipal boundaries of the eThekweni Municipality, the operating area of the eThekweni Water and Sanitation unit.

The GCA is divided in nine conditions, each consists of three indicators. The governance capacity performance is explained according to the conditions. The GCF scores are ranked according to a Likert scale ranging from very encouraging (++) to very limiting (--) the overall capacity to govern the provision of clean and sufficient water in the eThekweni municipality, Durban. The GCA is explained as follows. Figure 14 presents the average scores for each of the nine conditions. Each condition consists of three indicators. The full substantiation can be found in Appendix III: **Substantiation GCA**. The integrated transcripts of all interviews relevant to the semi-structured questions can be found in Appendix V: **Coded transcripts interviews**.

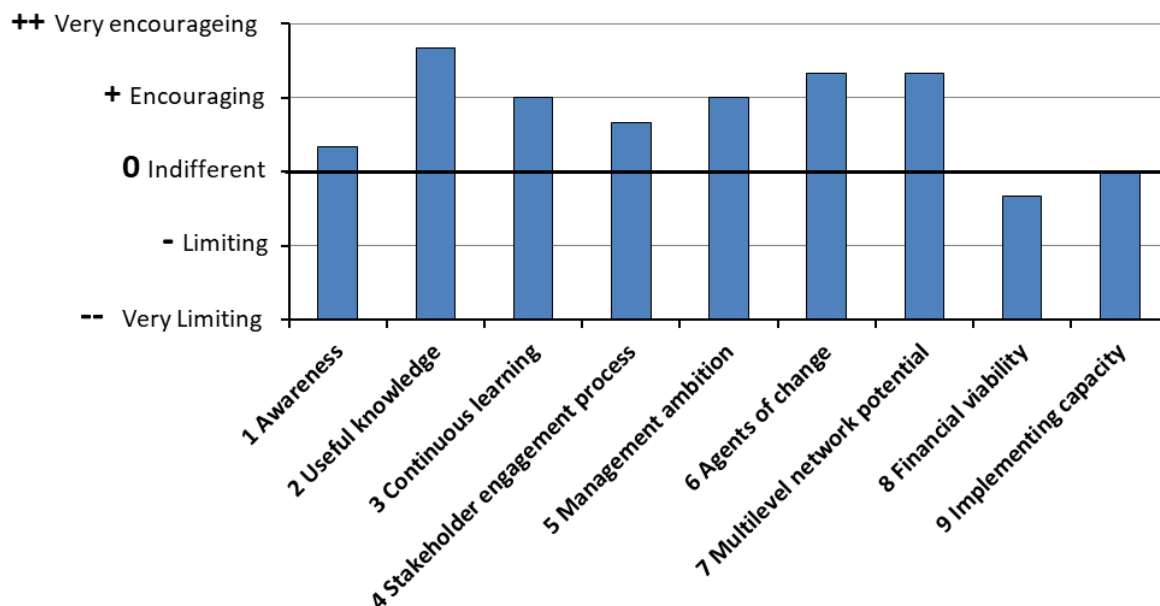


Figure 14 Average Governance Capacity Framework (GCF) value per condition for the eThekweni municipality, consists of three indicators per condition.

Condition 1: Awareness

Awareness refers to the understanding of causes, impact, scale and urgency of clean and sufficient water for all. Since South Africa is a semi-arid region (Balcerak, 2013; Dai, 2011; Gupta & van der Zaag, 2008; Mwenge Kahinda et al., 2010), general awareness about water scarcity and water quality is generally high in the urbanised area of the city (Johannessen et al., 2019). In the informal settlements, the EWS is strong on the ground in the form of education (RES100). The EWS is spreading knowledge about the current risks of water pollution due to improper sanitation. Also future risks of water scarcity caused by wasting water or not using it sparingly is accounted for (indicator 1.1: 0). Still, information spreading remains a challenge for the municipality due to fast urbanisation. This has led to the establishment of NGOs such as the Duzi-Umgweni Conservation Trust (DUCT). The DUCT was created as a support platform for communities to make the translation to policy (RES109). In general – without any incidents of serious water pollution – people in the urbanised area who had access to water still have access to water, also during a drought. People who did not have access to water still do not have access to water (RES104). The absence of natural disasters so far leads to a limited local sense of urgency among the community. Respondents 104 and 102 indicate that the awareness particularly increased among water managers responsible for the reticulation of water and that there is a governance urgency throughout the catchment (indicator 1.2: 0). A deep understanding and behavioural internalisation is however lacking. Behavioural change is mostly observed through extrinsic motivations such as water cut-offs, which leads to frustration and can actually be counterproductive (RES102; indicator 1.3: +). These water cut-offs are only effective on the short term. A major consideration for indigent households is the dichotomy of living close to the city where they can find employment and therefore settling in an area with no formal water supply, or living far away from the city which comes with long travel times (and associated costs unaffordable to most). The risks are therefore understood, but accepted nonetheless (RES106).

Condition 2: Useful knowledge

This condition describes the quality of information with which actors have to engage in decision-making. Information can easily and widely be found on the website of the municipality (indicator 2.1: ++). The EWS also does road shows where they visit the communities and make information available to people who do not have access to the internet (RES100). Moreover, multiple institutions are active

in knowledge availability, including public organisations and NGOs (RES109). They take an active approach through training, capacity building and education. The information is easy to understand for non-experts and accessible through multiple sources and methods, including physical visits, TV, online, printed media such as posters and advertisements, promoting slogans such as “if it’s yellow, let it mellow, if it’s brown, flush it down” and most importantly, radio. Radio is the best way to reach people in the rural and peri-urban areas that still fall within the municipal boundaries, who mostly do not have access to the internet or TV. The information is reliable, there is no propaganda and it is dispersed by both public and non-governmental institutions (RES109; indicator 2.2: ++). With regard to water availability and particularly to water preservation, there are clear guidelines such as water saving tips available on the website. With regard to water quality, the municipality created a hotline where citizens can tip off the municipality about water quality violations, such as chemical or plastic pollution in rivers. Knowledge cohesion is safeguarded through the use of multiple methods (programmes, training and education) to address several issues (conservation, water demand, sanitation and health and hygiene awareness) (indicator 2.3: +). Most of the information that is dispersed by the EWS was gathered through in-house research or knowledge and that of multiple external actors before it is put together in a cohesive way by the municipality. These external actors include the University of KwaZulu-Natal (UKZN), and in particular the university’s Pollution Research Group (PRG). However, also NGOs such as the DUCT or the Palmiet River watch, and commercial actors such as private consultancies or the INR are important for the influx of knowledge (RES104, RES105, RES109).

Condition 3: Continuous learning

Continuous learning and social learning is essential to make water governance more effective. The level of learning differs from refining current management (i.e. single-loop learning), critical investigation of fundamental beliefs or questioning underlying norms and values (i.e. double-loop learning; Pahl-Wostl et al., 2007). With regard to monitoring (indicator 3.1: -), the municipality reports to have a strong self-monitoring mechanism, where citizens call in to a pollution hotline (water quality) or report leaking pipes (water scarcity; RES100). There are also pollution officers throughout the catchment, but respondent 103 states that the EWS does not have the human capacity to cover the entire area. Respondents 104 and 108 indicate that a lack of hard infrastructure maintenance leads to underground leaks, which is a particular threat to water availability a leading cause for non-revenue water, since they cannot be visually detected by citizens. Respondent 104 reflects that there is a lack of metering, arguing that there are rural areas that are not metered, making it impossible to identify alarming situations such as major leaks, illegal bypassing of pipes or illegal abstraction of water. On a positive note, there is a strong trend of experimentation and learning-by-doing in the eThekweni municipality (RES103). Durban was the first to take the risk with the Free Basic Water (FBW) approach (RES105). This is a clear indication of reviewing assumptions. After the WHO had recommended 6,000 litres of free water per household per month, the EWS did its own research and came out on 9,000 litres of free water per household per month, based on the average size of the households. Continuous evaluation of household size (from 4.2 persons per household to 4) resulted in the FBW provision of 9,000 litres/household/month back to the original 6,000 litres/household/month (RES100; indicator 3.2: +). With regard to cross-stakeholder learning (indicator 3.3: ++), a major shift and convergence on water governance has taken place between the EWS, the INR and the Climate Adaptation department. Traditionally, the EWS sought technical solutions including the construction of hard infrastructure. Under strong leadership of the former head of the EWS convergence has taken place and the Umgeni Ecological Infrastructure Partnership (UEIP) was forged, indicating a shift in discourse from mostly utilising technocratic solutions to the value of ecosystem services and ecological infrastructure (RES104; RES105). This convergence was observed by academia and they were involved in designing the programme. It is a strong indication that knowledge is built up internally and created by the inclusion of multiple parties, including researchers and community

engagement (Sutherland et al., 2014). The UEIP became an umbrella framework that functions as a guideline for continuous learning (RES105).

Condition 4: Stakeholder engagement process

Stakeholder engagement is required for common problem framing, gaining access to a wide variety of resources and creating general support that is essential for effective policy implementation. Sutherland (2015) states that “*partnerships with research institutions such as the Pollution Research Group (PRG) at the University of KwaZulu-Natal (UKZN), which is partly funded by the Bill & Melinda Gates Foundation, and NGOs such as uMphilo waManzi have enabled EWS to experiment with new technologies and infrastructure for water and sanitation provision, which emerge from a platform of well-grounded scientific research, to provide basic universal services across the city.*” (Sutherland, 2015, 22). People within the area of the traditional councils are also actively involved in a system called dual governance or cooperative governance, with the EWS and the traditional councils enjoying a horizontal power structure (RES105; indicator 4.1: +). However, some stakeholders do not have the authority to have a real impact on decision-making. A discrepancy can be observed between the weight that each stakeholder brings to the table, and therefore the way these stakeholders are able to influence decision-making. Some stakeholders are more actively engaged and others are still invited, but consulted rather than empowered to have an actual impact on policy or practices. This compromises the protection of core values of the stakeholders (indicator 4.2: 0). The progress and variety of options is debated (indicator 4.3: +). Respondents 104 and 105 praise the municipality for their true collaboration in process with the recognition that clean and sufficient water is not only achieved with hard infrastructure, but that it is a combination of green and grey infrastructure. The UEIP is testimony to this process-driven approach, rather than a strong focus on end results. Moreover, respondent 105 praises the leadership of the former CEO of the EWS who changed the discourse of technocratic solutions towards the benefit of ecosystem services around 2015.

Condition 5: Management ambitions

Policy ambitions assesses if current policy is ambitious, feasible, well-embedded in local context and if it forms a cohesive set of long-term and short-term goals within and across sectors. There is a realisation that long-term goals, such as tackling water scarcity and keeping the rivers free of pollution need to be addressed at the root. The EWS therefore invests in education for children and adults to establish a long-term behavioural change (RES100). In addition, if there are short-term targets to be hit, for instance immediate stress relief on the water resources during a drought, water cut-offs are an effective, yet frustrating, way to drastically reduce water consumption and preserve water resources (RES102; indicator 5.1: +).

With regard to discourse embedding (indicator 5.2: 0), there are four dimensions along which sustainability is safeguarded. From a historical perspective, collaboration with public administration has been tense. This was, of course, applicable during the Apartheid era, but also post-1994 (RES109). Respondent 109 indicates that the relationship between the NGO, who is in close contact with the communities, especially the rural communities living in informal settlements, and the municipality, especially the EWS, has steadily improved. The main aspect that needed to change gradually was trust in the public office. Friction between the EWS and NGOs often revolves around safeguarding environmental integrity. In some occasions the EWS prioritised human settlement over environmental integrity, showcasing that there is little consensus for sustainable action.

Technical interventions, aimed at increasing water supply and improving water quality, such as desalination plants or wastewater treatment plants are constructed with a careful eye on the preserving the existing ecosystem. There is a recognition that some areas are more resilient than others (RES100). From a normative perspective, there is a difference in perspective of the natural environment. For example, people who live in the traditional council's areas have a better understanding of catchment management (RES106). The traditional knowledge on how to (sustainably) use and preserve the

(scarce) water resources is passed down generations. On the other side of the city, in the urbanised area, there is less knowledge about how to sustainably use and preserve water resources, because water stress is less of an imminent personal issue. From a cultural perspective, *“there is a culture of non-payment”* (RES103), and *“a culture that a certain non-confrontational culture exists in South Africa. This is manifested in the way that instead of holding people accountable under the present laws and governance structures, you create or set up a new policy or structure. And what’s happened over the years is that you constantly get these new policies and structures being added trying to sort out the problem and the people that are breaking the original legislation or guidelines carry on doing what they were doing and the people that are law-abiding just end up with more and more red tape.”* (RES106). Management cohesion (indicator 5.3: ++) within the EWS is strong, there is a coherent policy between the technocratically focused EWS and the environmentally focused INR, which resulted in the UEIP (RES104). Policy on water services is coherent with that of processes within the organisation (EWS), but also coherent with projects in the private development (private sector) and public housing (government infrastructure; RES100).

Condition 6: Agents of change

In order to drive change, agents of change are required to show direction, motivate others to follow and mobilise the resources that are required to follow through. Under strong leadership of the former head of the EWS convergence has taken place and the UEIP was formed, indicating a shift in discourse from mostly utilising technocratic solutions to the value of ecosystem services and ecological infrastructure (RES104 & RES105). Moreover, the Public-Private Partnership (PPP) projects are an innovative way to make long-term and high-investment projects economically viable. Durban is a pioneer in PPP projects in the water sector in South Africa. They have therefore taken the role of policy entrepreneur that can explore unconventional ways of acquiring resources (indicator 6.1: +). Collaboration with the traditional councils seems to create some friction, since the traditional councils and the people who live in the areas they have authority over do not see the municipality as the legitimate authority (RES103 & RES106). There is a level of trust between ordinary citizens and the government that was not there before (RES105 & RES109). There is active engagement with the private sector in PPP projects (RES107; indicator 6.2: +). Perhaps the best example of this is the project that was aimed at using second-grade water to supply two industrial off-takers, leveraged by a private party and owned by the municipality. This ensured a good coherence between short-term targets – the provision of industrial-grade water, thereby freeing up potable water – with long-term visions – tackling water scarcity. This vision is clearly communicated in the form of presentations to other municipalities (RES107; indicator 6.3: ++).

Condition 7: Multi-level network potential

Urban water governance involves a plethora of actors and interests from all levels of government, organisations and (private) stakeholders. For sustainable solutions, working in networks is an essential determinant for effective solutions. In 2014 the head of the EWS adopted a flexible policy framework to ensure adaptability in service provision and the room to manoeuvre (Sutherland, 2014; indicator 7.1: ++). Later, this resulted in the collaboration of multiple institutions, including the EWS, Environmental Planning and Climate Protection Department (EPCPD), CSCM and the Department of Environmental Affairs (DEA), as well as collaborations with the private sector in the UKZN and INR, leading to innovative projects such as the UEIP. (RES104 & RES105). This renders space for the creation of fit-for-purpose partnerships, for instance safeguarding water quality can go hand in hand with preserving ecological integrity. There is a clear division of responsibilities (indicator 7.2: ++). As soon as the water reaches the eThekweni municipality, the bulk water for the municipality is supplied by Umgeni Water, a parastatal, or government-owned enterprise. From that moment, the EWS, as the water service authority, are responsible for safeguarding the quality of the water and the reticulation of the water (RES102; RES104 & RES107). The provision of hard and green infrastructure (or a combination thereof) is the responsibility of the EWS. The EWS has a lot of authority in their municipality (indicator 7.3: 0). The DWS is informed, but does not have to approve on PPP projects

undertaken by the EWS (RES107). An important note is the dual governance structure that is present in eThekweni. 43% of the land in the eThekweni municipality is “owned” by the Ingonyama Trust Board, which is a traditional council (RES105). The word owned is between parenthesis because technically the land is owned by the Republic of South Africa (RSA) (RES102 & RES105). The DWS nor the EWS are perceived as the authority in this area, which creates friction and contradiction (RES106). This is showcased in that ward councillors in these areas sometimes claim authority because they have been democratically elected, whereas the Amakosi – the tribal chiefs – are perceived as the respected authority.

Condition 8: Financial viability

Sufficient financial resources are crucial for good water governance. Willingness to pay for clean and sufficient water adaptation services is important to gain access to reliable funding for long-term programmes. At the same time, water and climate adaptation services need to be affordable for everyone including poor people or people being disproportionately affected. The Free Basic Water law applies to indigent households, that is to say, everyone with a house value of under 250,000 Rand (RES105). The solidarity principle is thereby solidified in the national legislation. This has been on the political agenda for decades (RES102). Infrastructure such as ablution blocks are present in areas that do not have proper water and sanitation (informal settlements) and there is a “leave no man behind” policy, manifesting in a progressive tariff system for water services (RES100; indicator 8.1: +). There is an overall low willingness to pay (water is undervalued and under-priced) because of the strong paradigm that water is a human right and should therefore be free, or at least cheap, for everyone (indicator 8.2: -). This compromises the sustainable and efficient management of water, since it is not a financially appealing market to enter (RES104). Moreover, there are high levels of mistrust questioning whether the money is well-spent. People are frustrated with corruption in the system (RES102). This is an indication that the money goes to only a small group of people. Resources are available, but it is not organised in a way that stimulates sustainable use (RES104). Moreover, it stimulates corruption and looting (RES104). As long as water is under-priced, insufficient resources are raised to invest in the hard infrastructure or catchment management (RES104). Water provision is government-backed, so if it fails it will always be subsidised. With regard to water quality, there is insufficient human capacity to deploy sufficient pollution officers to monitor surface water quality (indicator 8.3: -).

Condition 9: Implementing capacity

Implementing capacity is about the effectiveness of policy instruments for safeguarded the provision of clean and sufficient water for all. Part of the effectiveness is also due to the level of compliance to policy and regulation and the familiarity with (calamity) action plans. Even though the EWS has the highest implementing capacity in the region, its capacity to actively pursue culprits of water pollution or illegal looting or bypassing of pipes is low (RES103). This vision is not shared by the EWS itself, who argue that the pollution chasers are active and effective (RES100). A nuanced view was shared by the academics, who acknowledge a low capacity for effectively using policy instruments to chase culprits, but a strong effort to improve this capacity (RES105; indicator 9.1: 0). In fact, the urbanised area of the municipality is fully metered. This, in combination with the progressive tariff system, is an effective instrument to monitor how much water citizens are consuming and the consequent revenue stream. A major problem is non-revenue water, which is up to 35.5% (RES104). This issue is countered by retrofitting taps and water pressure regulators (RES102 & RES100; indicator 9.2: -). With regard to preparedness (indicator 9.3: +), long-term plans have been established in preparation of the changing demographic, environmental and economic forecast for the next 25 years (RES100). These include a water security plan, 25-year water infrastructure master plan and the 25-year wastewater infrastructure plan, the reuse strategy for eThekweni and the four-year forecast, 25-year forecast growth plan and the water services development plan. The implementation of these projects will be funded through PPP projects (RES100 & RES107).

Synthesis

All 27 indicators are presented in the spider diagram in Figure 15 and ranked from very limiting (--) to very encouraging (++) based on the overall capacity to provide clean and sufficient water in the eThekweni municipality. Limiting scores are assigned to the indicators of statutory compliance, monitoring and financial viability. The main reasons for this is a lack of metering in the rural areas of the municipality and a lack of financial continuity due to the ideology that water is a human right and should be freely or cheaply available to all. This leads to a limited financial water coverage ratio which compromises the sustainable development of water services for providing clean and sufficient water. The municipality has many long-term plans for expanding water supply, including the construction of desalination plants. Yet, it is criticised that the current hard infrastructure network is degraded. Efforts and resources should be allocated to addressing the high level of non-revenue water, rather than spending resources on expensive desalination plants. The response of the EWS is that the long-term water supply projects will be funded by PPPs, meaning that the costs will be covered by private parties.

An interesting indicator with a neutral score is authority. Despite the fact the EWS is a leader in water service provision in the province of KwaZulu-Natal, the dual governance structure creates some friction. This is caused by a difference in perception on how to best manage catchments. The traditional councils, who own for 42% of the land in eThekweni, do not recognise the EWS as the legitimate authority.

Encouraging scores were assigned to affordability, evaluation and stakeholder inclusion. With regard to affordability, since the aforementioned paradigm of water as a human right is firmly institutionalised, the provision of clean and sufficient water is affordable through the Free Basic Water Act (FBW). The EWS also scores high on stakeholder inclusiveness. This aspect is also thoroughly institutionalised in the Republic of South Africa in the post-Apartheid era.

The EWS scores highest in information spreading, education, learning-by-doing, collaborating with other stakeholders (also related to stakeholder inclusiveness) and multi-level network potential. The EWS puts a lot of effort in driving long-term behavioural change and trying to educate the people through multiple methods in order to reach everybody, so too those in remote areas or informal settlements who might not have access to the "mainstream" media outlets. Within the flexible policy framework set up by the former CEO of the EWS, there is ample room to manoeuvre and for policy entrepreneurs to step up. This opportunity is mostly caused by an institutional void created by a lack of overarching framework for integrated water governance that is supposed to be provided by the Proto CMA. A separate analysis on the Proto CMA is presented in chapter 3.3.3.2. Different projects and unconventional partnerships are currently emerging from the ground up, such as the Umgeni Ecological Infrastructure Programme (UEIP) and the Transformative Riverine Management Programme (TRMP). With the EWS in the lead, a governance network and overarching strategy is forming in eThekweni that is stepping into the institutional void. This has only been possible through the inclusion and collaboration with research institutions, NGOs and other public administration departments.

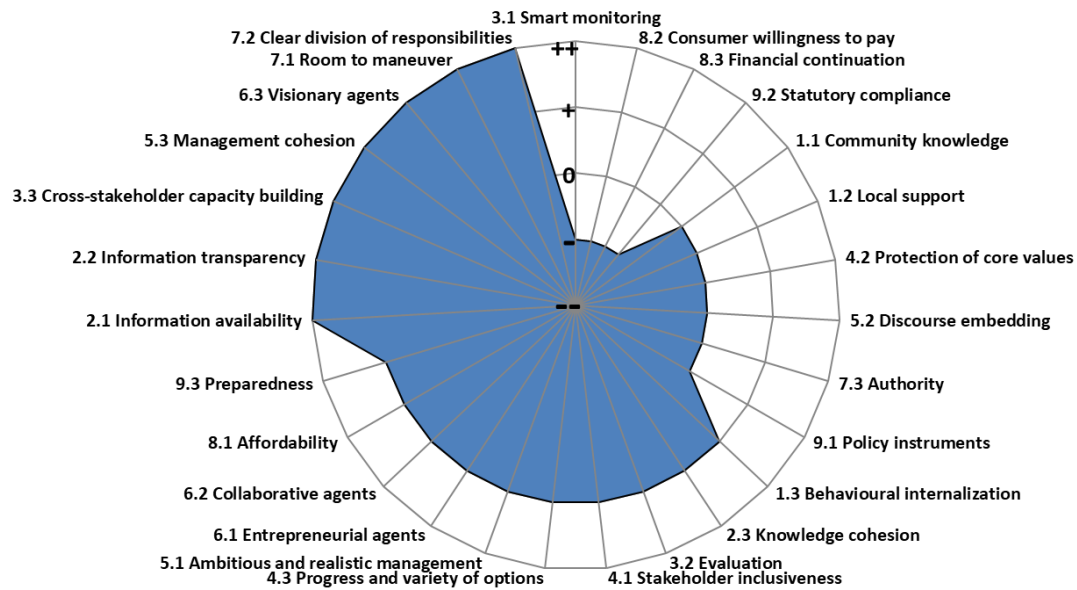


Figure 15 The Governance Capacity Analysis of Durban

4.3.3.2. Pongola-Umzimkulu Proto Catchment Management Agency (CMA)

The scope of the Governance Capacity Analysis of the Pongola-Umzimkulu Proto CMA is the area that, once it is officially established, falls under its authority. The name Proto CMA is the working term at the moment of this research, for it is not officially established yet. Assessing the governance capacity entails not only looking at the ability of the Proto CMA to address the water challenges of clean and sufficient water directly, but its ability to engage with other stakeholders and contribute to an integrated approach for addressing the water challenges of clean and sufficient water for all people residing within the Proto CMA's area of influence. It is important to note that there is currently no clarity on how many CMAs will be established on a national scale. Initially, it was 19, then it was nine (at the moment of writing this thesis), and the government is revising plans to downsize it to six. All in all, the ambition to create the Proto CMA is there in all forms, on paper in the National Water Act (NWA) and the Catchment Management Strategy (CMS), but there is a lot of uncertainty on what exactly it will look like and what its territory and authority will be. Nonetheless, this analysis is based on the current situation.

The GCA is divided in nine conditions, each consists of three indicators. The governance capacity performance is explained accordance to the conditions. The GCF scores are ranked according to a Likert scale ranging from very encouraging (++) to very limiting (--) based on the capacity of the Proto CMA to govern the provision of clean and sufficient water (Figure 16).

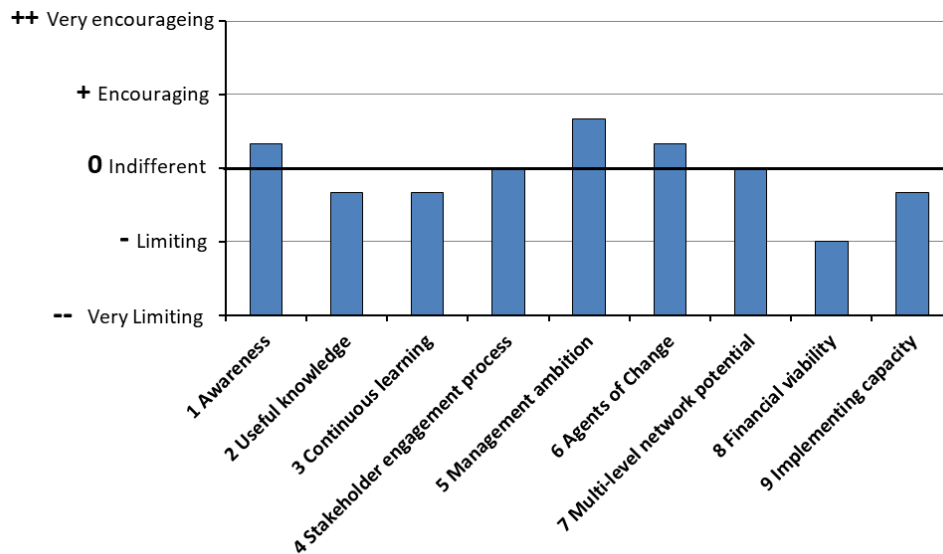


Figure 16 Average Governance Capacity Framework (GCF) value per condition for the Pongola-Umzimkulu Proto CMA, consists of three indicators per condition.

Condition 1: Awareness

Awareness refers to the understanding of causes, impact, scale and urgency of securing clean and sufficient water for all. As a semi-arid country, a basic understanding of the importance clean and sufficient water is present. A deeper understanding of the risks of water scarcity and pollution for drink water purposes and consequent health impacts is to a much lesser extent present throughout the catchment (RES102; indicator 1.1: 0). The CMS has raising awareness throughout the catchment as one of its main objectives, particularly raising awareness for the uncertainty of natural disasters, which can significantly impact water quality (CMS, 2019, 21). There is an increasing understanding of the causes, impacts, scale and urgency of the water challenge (indicator 1.2: +). The National Water Act of 1998 already stipulated that there was a need for “*the integrated management of all aspects of water resources and, where appropriate, the delegation of management functions to a regional or catchment level so as to enable everyone to participate*” (RSA, 1998, 3). Yet, this sense of urgency has not led to a consolidated and integrated implementation of addressing the future risks and uncertainties related to climate change, since the CMA is not yet officially established. The CMS is an example of mobilisation and action (indicator 1.3: 0).

Condition 2: Useful knowledge

This condition describes the qualities of information with which actors have to engage in decision-making. The CMS is currently not publicly available. This overarching strategy document will be a guiding light in managing the catchment of Pongola-Umzimkulu. When mentioned, most interviewees respond that they know of the Proto CMA and roughly what it is about (RES100, RES102, RES103 & RES105; indicator 2.1: -). The available information is not easy to understand for non-experts, because it assumes prior knowledge about, among other things, integrated water resource management. Yet, action has been taken to make knowledge more understandable. The Catchment Management Forums are the best way for non-experts to find information about the Proto CMA. These are physical meetings and therefore take effort to attend. The forums are open to all stakeholders (108; indicator 2.2: 0). The CMS clearly indicates the long-term and integrated nature of water governance with regard to clean and sufficient water (CMS, 2019, 2; indicator 2.3: 0).

Condition 3: Continuous learning

Continuous learning and social learning is essential to make water governance more effective. The level of learning differs from refining current management, critical investigation of fundamental beliefs or questioning underlying norms and values. For surface water quality, the Proto CMA has a monitoring system in place, but budget constraints compromise the regularity of the river system. Only

major rivers are monitored for quality by the Proto CMA, and not even all major rivers, with respondent 108 indicating that 16 out of 20 major rivers are monitored. Alarming situations, for example where areas are disproportionately hit by drought leading to water scarcity, or hit particularly hard by natural disaster leading to water quality degradation, are identified and reported via Catchment Management Forums (CMF), organised by the Proto CMA (indicator 3.1: -). With regard to evaluation (indicator 3.2: -), respondent 108 indicates that they do have some responsibility in water quality evaluation, but they face big challenges because they do not have the mandate to make autonomous policy decisions based on the evaluation. Decision-making is done by the DWS. One of the main roles of the Proto CMA is connecting stakeholders by combining the knowledge from regional water utilities, water user associations, the Water Research Commission and the management of the national water resource infrastructure (indicator 3.3: +).

Condition 4: Stakeholder engagement process

Stakeholder engagement is required for common problem framing, gaining access to a wide variety of resources and creating general support that is essential for effective policy implementation. All stakeholders are actively engaged through the CMFs, which are open for every stakeholder to attend and raise points of concern. Most stakeholders are informed (indicator 4.1: +). The impact of stakeholders on final decisions is low. Concerns are raised, but nothing is done with them (RES102 & RES109). This causes stakeholders to withhold from going to the meetings; some feel they are “ineffective” (RES109), they are just “talk shops” (RES103). The main reason is that the decision cannot be made locally, because the Proto CMA is currently not a statutory body (RES101 & RES108; indicator 4.2: -). The Proto CMA must be admired for continuing to travel through the 25 sub-catchments – an area of approximately 90,000 km² – four times a year to hold the forums so all stakeholders can be represented and raise concerns. Issues raised at the CMF are passed on to the DWS and decided centrally and unilaterally (RES101 & RES108; indicator 4.3: 0). This leads to limited co-creation of solutions. Respondent 101 reflects that if the stakeholder group is rather homogenous, for instance at a CMF meeting where the surrounding stakeholders are involved in the same type of activities (mostly industrial or mostly agricultural), co-creation of solutions is rather easy. However, when the stakeholder group is more diverse, different problems are discussed but agreements or commitments from stakeholders are unclear. This is mostly due to the fact that the Proto CMA does not have an official mandate and therefore stakeholders are only involved for short periods with a lack of follow-up.

Condition 5: Management ambitions

Policy ambitions assesses if current policy is ambitious, feasible, well-embedded in local context and if it forms a cohesive set of long-term and short-term goals within and across sectors. The CMS puts forward a strong vision towards sustainable IWRM and is translated into long-term goals. Its main functions are to coordinate processes and advise (RES108). Given that the Proto CMA currently lacks a mandate, it is difficult to estimate achievements and realistic targets (indicator 5.1: +). The CMS reflects a strong recognition of the importance of people, planet and profit in the Provincial Growth and Development Strategy. The Strategy aims at addressing all three topics simultaneously (CMS, 2019, 4). Historically, water governance, particularly distribution and reticulation, was strongly centralised and regulated by the Apartheid government and biased towards white agricultural and industrial business owners. The National Water Act (NWA) of 1998 specifically mentions there is a need for decentralised water governance and the CMS is a mobilisation of this policy (indicator 5.2: ++). Politically, sustainability is on the agenda of the ruling party (the African National Congress; ANC) at national and provincial level. This is encouraging with regards to policy-making and policy implementation, because there is, from an ideological perspective, little friction between the spheres of government at the national, provincial and local scale, since all spheres elected the ANC (RES105). There is a big gap between legislation and implementation. The philosophy of collaboration is present only to a limited extent (RES101 & RES105). A lot of people and agencies are doing different things.

These people step into the apparent institutional void left by the lack of overarching strategy that the Proto CMA is supposed to provide (RES103). This leads to overlap in projects, which in turn leads to inefficiencies (RES103 & RES109; indicator 5.3: -).

Condition 6: Agents of change

In order to drive change, agents of change are required to show direction, motivate others to follow and mobilise the resources required. Large agricultural businesses or industrial players with extensive capital resources have a lot of economic and political power. It is hard for smallholding farmers to compete with these large companies. Respondent 101 indicates that the CMS is aimed at supporting and educating smallholder farms in order to “level the playing field” and smooth out historical, socio-economic, political and racial differences. External agents, such as water governance consultants, have the opportunity to get involved, but have ultimately no better chance of gaining resources than the people currently running the Proto CMA, unless these resources come from foreign aid (RES101; indicator 6.1: -). Facilitators (Dutch consultants) have been administered to coordinate processes such as combining the knowledge from regional water utilities, water user associations, the Water Research Commission and the management of the national water resource infrastructure (RES101; CMS, 2019). There is good flexibility in what is needed to create the ideal collaboration composition (indicator 6.2: +). The CMS is a long-term strategy aimed at sustainable development. Vacancies for the board of the Proto CMA are currently outstanding (RES108). This allows for leaders in water governance to step up and take the reins (indicator 6.3: +).

Condition 7: Multi-level network potential

Urban water governance involves a plethora of actors and interests from all levels of government, organisations and (private) stakeholders. For sustainable solutions, working in networks is an essential determinant for effective solutions. The TRMP is a collaboration of the eThekweni, Msunduzi and Umgungundlovu municipalities in an attempt to create an umbrella framework in the absence of a (publicly accessible) integrated strategy set forth by the Proto CMA (RES105). The apparent institutional void creates opportunity for stakeholders to form coalitions from the bottom up and for “passionate individuals” to step up (RES105 & RES109). This leads to informal networks and coalitions. It must be noted that the traditional councils are not part of the water resource management (RES108). Yet, the traditional chiefs, the Amakosi, welcome interaction with higher levels of government, because it offers them an opportunity to gain access to water resources (RES108). It is expected that national government wants to control the CMA process from the top down (RES104 & RES105). Respondent 105 reflects that if the central government allows the space for agents and agencies to create bottom-up coalitions, it could work very effectively all the way up to CMA level. This is confirmed by respondent 106 who pleads for an upgrade of the current ward councillor system (indicator 7.1: +). Ward councillors are democratically elected representatives of subdivisions of municipalities. The ward councillors in a municipality account for half of seats on the municipal council. The other half is chosen from the party list of the ruling party in that municipality. Adding a level of government would mean there are also CMA representative doing work that is already partially done by the ward councillors, such as receiving complaints and giving advice. Establishing a clear division of responsibilities requires a well-defined territory for the Proto CMA to operate in and build its authority (RES101). This is currently lacking. Respondent 102 indicates that it would take years to establish the trust necessary to create authority and capacity amongst the stakeholders (indicator 7.2: -). The water challenge of sufficient water is addressed as long as the status quo is not questioned. The status quo in this case refers to the traditional councils and the way the national and provincial government is set up. The traditional councils own large parts of the province of KwaZulu-Natal, which is roughly comparable with the (provisional) territory of the Proto CMA. As long as this land and management of it remains untouched and under the authority of the traditional councils, there is space for incremental changes with regard to clean and sufficient water in these areas. Respondent 108 indicates that there is an institutional resistance against delegation and decentralisation of

responsibilities for water governance on national and provincial level. Authority in the territory of the Proto CMA is highly political (indicator 7.3: 0).

Condition 8: Financial viability

Sufficient financial resources are crucial for good water governance. Willingness to pay for clean and sufficient water adaptation services is important to gain access to reliable funding for long-term programmes. At the same time, water and climate adaptation services need to be affordable for everyone including poor people or people being disproportionately affected. The CMS currently has no strategy for the effectiveness of revenue collection (indicator 8.1: -). This indicates that there is currently no plan for independently financing the Proto CMA. With regard to the affordability to other stakeholders, the same principle on the perception of water as a human right applies as in the analysis of the EWS. Willingness to pay for the provision of clean and sufficient water varies strongly throughout the catchment. This largely fluctuates with how much money the people have (indigent households receive free basic water services) and how high the interests are for acquiring water (large agricultural businesses and industries have a high willingness to pay for the valuable resource). The progressive tariff system is therefore in place, but it has been argued that despite this, water remains under-valued and under-priced (RES104). It is argued that businesses and industries should pay a proportionately higher price for water services. This would drive more sustainable use. Yet, it is also argued that at this time – during the Coronavirus outbreak of 2020 – is it not the right time to be tampering with water tariffs for economic reasons (RES104 & RES105). As the Proto CMA is a unit to advise, strategise, coordinate and monitor, a well-funded Proto CMA indirectly leads to the better provision of clean and sufficient water. Willingness to pay for this provision therefore also depends on the crucial tasks carried out by the Proto CMA. An additional layer of taxation has been proposed to fund the Proto CMA, as indicated by respondent 106. This is not verified in the CMS, and it is expected that this would cause substantial resistance (RES106; indicator 8.2: -).

Condition 9: Implementing capacity

Implementing capacity is about the effectiveness of policy instruments for securing clean and sufficient water for all. Part of the effectiveness is also due to the level of compliance to policy and regulation and the familiarity with (calamity) action plans. There is an imbalance in the ability to take a case to court to between the prosecuting party – the Proto CMA or the negatively impacted stakeholder(s) – and the polluter, who is usually a large industrial or agricultural party. The private party often has close and direct ties to the government, and have the power to prevent cases from going to court or change legislation before the case makes it up through the administrative levels. This imbalance is heavily biased towards the polluter. With the change of national government, these inefficiencies are addressed, but this takes time (RES101; indicator 9.1: -). The responsibilities of the Proto CMA are clearly stated in the CMS, but with no legal power or authority, compliance management will be difficult at CMA level. The Proto CMA will not have the proverbial carrot and stick at its disposal. This does not necessarily have to be an issue, if the Proto CMA can support the DWS in tracking down polluters or culprits and report them to the DWS. The success of the Proto CMA in safeguarding statutory compliance for the provision of clean and sufficient water to all is heavily dependent on the ability of the Proto CMA to pull together stakeholders effectively. Currently, this is not the case (indicator 9.2: -). Respondents have indicated that the necessary trust for the Proto CMA to establish its authority could take years to forge (RES102 & RES106). The CMA has not been established yet. However, with regard to preparation to address the water challenges of clean and sufficient water, the CMS is a proactive attempt to “hit the ground running” (indicator 9.3: +; RES101; CMS, 2019). The strategy clearly indicates a long-term vision and pathway for the catchment to become more resilient against (sudden) change, including a projection on climate change and its potential impacts on catchments.

Synthesis

All 27 indicators are presented in the spider diagram in (Figure 17) and ranked from very limiting (--) to very encouraging (++) based on the overall capacity to provide clean and sufficient water in the area currently governed by the Proto CMA. Limiting scores are mostly due to the lack of financial viability of the Proto CMA at this current moment. This is alarming if the Proto CMA is to be officially institutionalised on the short term. With the establishment of the Proto CMA in 2014 and without an official mandate in 2020, the short term means within two years. As mentioned by respondent 102, the business model is insufficient. Another challenge for the Proto CMA is compliance. Since the Proto CMA is not, and most likely will not become (as indicated by respondent 108), a statutory body, it will not have the authority to make autonomous policy decisions based on monitoring and evaluation. This is partly offset by an encouraging score for cross-stakeholder capacity building, where the Proto CMA has the ability to collaborate with different departments and sectors to coordinate catchment management with regard to providing clean and sufficient water. The authority of the Proto CMA is restricted due to the large influence of the traditional councils, who do not perceive the DWS or the Proto CMA as legitimate authorities, and by the national and provincial institutional resistance against decentralisation and delegation of responsibilities. This is not to say that the relationship between the elected public officials and the traditional councils is bad. Respondent 102 indicates that the board of the Proto CMA needs to be seen as an authority throughout the catchment, which it is currently not, and reflects that it could take years for them to establish trust. Respondent 105 indicates that the informal ties between water managers is key to forge this trust. Respondent 106 indicates that instead of forming an entirely new board, the current ward councillor system could be upgraded to CMA level, meaning that these informal ties would already be present and with it, the necessary trust that respondents 102 and 105 are referring to. Alternatively, if the national government allows the space for bottom-up networks to form, such as the TRMP, IWRM could be established from the bottom up. The necessary trust relations would gradually grow, rather than an entirely new CMA board. Yet, the TRMP is not a finalised strategy yet and consists of two out of 11 district municipalities in the province of KwaZulu-Natal, which is geographically approximately as big as the Pongola-Umzimkulu Proto CMA, meaning that it is by no means a project that can be launched at CMA scale in the short term. Widespread support throughout the province would have to be developed before matching the scale of the Proto CMA region.

Management ambitions, particularly discourse embedding score highly. Sustainable development, combining the integration of water management with sustainability objectives is the main goal of the Proto CMA. In the space that the Proto CMA works, there is ample opportunity for agents of change to step up and forge informal trust networks to collaborate on strategies. This, however, is not because the Proto CMA facilitated this enabling ability, but rather because the progress of creating the official CMA and giving it the chance to enforce its mandate has been delayed for a number of years. This institutional void creates an opportunity for policy entrepreneurs to enable change. The question is whether national government, who is assumed to want to control the process of developing decentralised IWRM, will allow the space for these bottom-up initiatives to grow.

Interesting similarities and differences can be observed at the urban and river basin level. For instance, monitoring and financial continuation are challenges at both scales. With regard to implementing capacity, both institutions have a limiting or neutral score for compliance and the effective use of policy instruments, but both score high on preparedness. This could mean that even though the governance capacity may not be where it needs to be at this moment, the long-term plans at both levels are in place. Both institutions score high on collaborative agents. This means there is a possibility to build trust collaborations at multiple levels and across sectors. In most cases, the eThekweni municipality has higher governance capacity than the Proto CMA. The most noticeable capacity that the Proto CMA has is discourse embedding, scoring significantly higher than the eThekweni municipality. The long-term vision on integrated river basin management is to a larger extent present in the Proto CMA than at local level. This is not surprising, since the Proto CMA is created as a river

basin organisation. That being said, the necessary management cohesion for an effective river basin organisation is much higher at local level compared to river basin level.

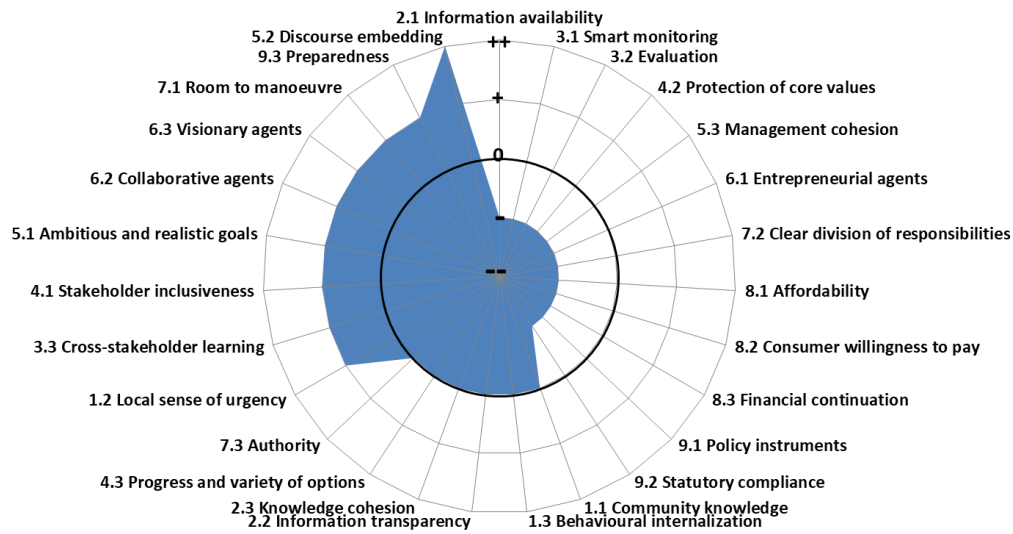


Figure 17 The Governance Capacity Analysis (GCA) of the Proto Catchment Management Agency (CMA) of Pongola-Umzimkulu

4.4. Empowering Conditions and Empirical Evidence

This final sub-chapter combines the results and compares the empowering conditions for successful translation of practices (Sub-chapter 4.1) with the results from the empirical analyses of the TPF, CBF and the GCF (Sub-chapter 4.3), to see whether a successful translation of practices is present and what points of intervention can be identified.

Harmonised policies

The areas under investigation, the eThekweni municipality and the Proto CMA are both located within the province of KwaZulu-Natal (KZN). The ruling political party, the African National Congress (ANC) rules the central government, provincial government of KZN and urban government in Durban. There is some inter-state political friction with regard to the management of clean and sufficient water, due to the dual governance structure, where large parts of the municipality and the CMA are under the unofficial authority of the Traditional Councils. This friction is caused by the fact that the Traditional Councils do not recognise the institutionalised government as legitimate (RES102). The DWS is the institutionalised custodian of water until it reaches the municipality borders. With regard to political harmonisation towards policies regarding clean and sufficient water, the incapacity of the Proto CMA to make decisions locally causes long lines of communications and violation reports against large industrial and agricultural stakeholders therefore have to go through multiple layers of government before a decision is made centrally. This increases the chance of non-compliance, according to respondent 101 and 108. A decentralisation of decision-making better harmonises policies and makes governance more efficient and would therefore be beneficial. The concept of “Hydrosolidarity” (Lundqvist, 1999) is present, since water in South Africa is considered a human right, and therefore accessible for all for free or at an affordable price.

Recognition of asymmetrical relationship

“Senders” and “recipients” (Hasan, 2020) were found to have a good relation in addressing the challenges of clean and sufficient water. On a river basin level, respondent 108 reflected that the collaboration with the Dutch consultants was pleasant and they maintained semi-formal friendships after the project ended in 2019. This is confirmed by respondent 101 and 108. On a municipal level, respondent 100 and 107 indicate to have worked and to continue to work together with Dutch commercial consultancies in improving the technical monitoring capacity for water quality (HydroNET) and large infrastructure projects for the provision of sufficient water (Deltares).

Community engagement

The strategic plan for the Blue Deal, to provide 2.5 million people in South Africa with better access to clean and sufficient water by the end of 2030, otherwise called the CMS, was drafted in collaboration with a delegation of the DWS. Respondent 101 states to have worked together closely with the local stakeholders at the DWS to translate the water governance plan to the local context, which took approximately six years. The strategy was discussed with external stakeholders including municipalities, environmental NGOs, the Department of Forestry and farmer's associations. This is in line with Latour (1968) who argues that policy translation happens because the actors have a stake in it, which puts the stakeholders at the centre of why and how policy translation happens. However, continued stakeholder inclusiveness and true impact on decision-making with regard to clean and sufficient water was found to be limited in both study areas of the eThekweni municipality and the Proto CMA. In the case of the eThekweni municipality, the EWS often comes to the table with an idea they already feel very strongly about and some stakeholders have more influence than others. In the case of the Proto CMA, the problem is that it is not a statutory body and therefore is unable to make decisions. Decisions are made centrally.

Sender-recipient mutuality

Mutuality between the Dutch consultants and the Proto CMA board is perhaps best explained by way

of example, presented by respondent 101. During the seven years of collaboration on the Kingfisher I and II projects, the Dutch consultants had been working together closely with the board of the Proto CMA, which is currently a delegation of the DWS. During one of the missions in 2015, the Dutch consultants and Proto CMA board had planned a workshop on how to structure the CMS. This workshop was focused on content and was scheduled one day after a series of intense stakeholder meetings. The day before the workshop the Dutch consultants realised that the Proto CMA board was not in the right frame of mind to do the workshop and the Dutch consultants shifted the focus of the workshop from business content to a more person-focused approach. The next day, instead of discussing structure, they discussed personal motivation, what they take pride in, what frustrates them, what the obstacles were with regard to establishing the CMA. Instead of a 'sender-recipient' type of workshop, it became a workshop of sharing personal and professional experiences (RES101). This turned out to be useful for both parties, and therefore falls in line with a professional learning benefits for both parties, where the Dutch consultants learned the *"capacity to translate your own expertise to a different context and make it applicable"* (Bontenbal, 2013, 91).

Strong transnational networks

Dutch consultancies (HydroNET and Deltares) are active in the region (RES100 & 107). The commercial relationships between Dutch and South African businesses with regard to clean and sufficient water go beyond the scope of this research. The Dutch companies help in the technical aspects of water quality monitoring. The main course of action with respect to the Blue Deal is between the UVW (elected regional water authorities) and the EWS and Proto CMA (RES101 & 108). The relationship between the UVW and the Proto CMA is particularly strong, having worked together for six years.

Informed translation

The informed translation relates to the need for the presence of sufficient knowledge of the policy that is to be translated in the area it is translated to. With regard to whether the policy translation is sufficiently informed, it is noted that there is sufficient information and expertise at hand in the 'sending' country. The Dutch consultants are engineers from the DRWAs in the Netherlands, the beating heart of Dutch river basin management. Even though the main challenge in the Netherlands is flood risk, the framework of IWRM and its principles are broad enough to be applied to other challenges, so too that of clean and sufficient water. Locally, at CMA level, there is sufficient information about IWRM and the Proto CMA board appears to be on the same line about the what the CMA is to achieve. This also applies for the EWS in eThekweni, where most managers have a good understanding of what IWRM should look like. However, "above" and "below" these levels of governance there seems to be friction. More specifically, at the regional or national level of the DWS, there seems to be a reluctance towards decentralisation, with a resistance of decentralising powers and decision-making. On a municipal level, there is some friction with the Traditional Councils, who *"are not part of the water resource management"* governance (RES108). At municipal level, a trend towards IWRM is forming in the form of the TRMP where municipalities are starting to integrate water management further upstream. This is spearheaded by the EWS, who is the leader with regard to water management in the area and has the highest implementing capacity, due to expertise and resources.

Completeness of translation

The completeness of the translation between the Dutch river basin approach and the current CMA system in South Africa is lacking. Crucial elements of what made the policy successful in the Netherlands are present only to a limited extent. South African water governance as we know it currently is strongly centralised. This is manifested in that the current CMAs have low decision-making capacity. Low decision-making capacity at local level means that it is hard to respond to or anticipate on local changes and compromises the influence of stakeholders, as they do not feel like

their voices really count in the final decision. The regional water authorities in the Netherlands have autonomous decision-making capacity and hold elections. IWRM is perhaps easier to establish when already many decentralised entities exist that gradually consolidate for mutual benefits, rather than trying to “break up” a large centralised body.

Contextual adjustments

The largest discrepancy can be observed in the appropriateness of the translation of practices. This is caused by vastly different economic, political, social, ideological contexts. In terms of politics, water management the Netherlands has experienced a trend of consolidation – 2500 in the 1940s to 21 today – whereas South Africa experienced a trend of decentralisation from the moment the CMA system was created. To be fair, the initial 19 CMAs have been consolidated into nine, and will potentially be downsized to six, but that is yet to be decided. In terms of economics, in the Netherlands there is more financial continuation through taxes. Since 1992 the Dutch citizens have been paying taxes to their regional water authorities to secure the financial continuation of the institution and sound water governance. In South Africa, since water is a human right, practitioners in the water sector argue that water is under-valued and under-priced (RES 102 & 104). This leads to limited financial continuation. Implementing taxes to fund the Pongola-Umzimkulu Proto CMA would likely cause substantial resistance (RES106). This is evidenced by the already high economic pressure of 9.1 in the Trend and Pressures framework, and low consumer willingness to pay, as evidenced in the Governance Capacity Framework. Socially and ideologically, breaking up this large centralised water governance body that is the DWS is an issue (according to respondent 108) because people do not like losing authority if their position is decentralised and instead of 20 people “under” them they now only have 10. Culturally, respondent 101 points out one of the biggest differences between the water managers in the Netherlands and South Africa. He indicates that the Dutch are engineers with a very pragmatic approach who tend to “act until they overstep the mandate”, whereas the South African culture is more mandate-driven, and tend to “act once permission is granted”. Moreover, respondent 106 indicates that the South African culture is conflict averse and rather than confronting people and holding each other accountable, new policies and structures are set up and governance becomes increasingly complicated and bureaucratic. Last, the dual governance structure in KZN is vastly different than water governance practices in the Netherlands. This jeopardises the authority and clear division of responsibilities of both the EWS and the Proto CMA in order to provide a clear pathway towards more clean and sufficient water in the respective spheres of governance, as proven in the Governance Capacity Framework.

Synthesis

In summary, most empowering conditions for successful translation of practices are present to some degree in the case of the Netherlands and South Africa. Most notably are the sender-recipient mutuality, community engagement and strong transnational networks. A bottleneck is observed in the contextual adjustments in the policy translation. The two most important differences are the lack of decision-making capacity in the Proto CMA and the difference in trends in the establishment of the DRWA and the CMAs, where a centralisation trend is observed in the Netherlands and a decentralisation trend is observed in South Africa. The vastly different economic and cultural context has proven to be an obstacle for the implementation and official establishment of the Proto CMA and the advancement of IWRM in the Pongola-Umzimkulu river basin. Yet, continued collaboration, based on sender-recipient mutuality, community engagement and strong transnational networks has led to the creation of an integrated and comprehensive strategy for the Pongola-Umzimkulu Proto CMA. This is considered a good starting point for the Proto CMA, so it can hit the ground running as soon as becomes institutionalised. It is difficult for Dutch water consultants to have an influence on the national culture of a country, nor is this desirable, for, amongst others, socio-historical reasons. An example of this is how the CMS does not include a financial analysis on allocation and funding, since it is not the task of the (foreign) water managers to allocate a budget. It is the task of the central

government together with the provincial DWS to find a way to fund the institution. Table 9 summarises the suitability of the policy translation between the Netherlands and South Africa towards a river basin approach in order to satisfy the provisions as stipulated in the Blue Deal.

Table 9 The suitability of the policy translation between the Netherlands and South Africa

Empowering condition	Score	Description
Harmonised policies	0	The political party, the African National Congress (ANC) rules at national, provincial and local level. There is some friction with the dual governance structure with regard to policies regarding clean and sufficient water.
Recognition of asymmetrical relationship	+	Collaboration was horizontal at both river basin and urban level.
Community engagement	+	Local stakeholders at the Department of Water and Sanitation (DWS), external stakeholders including municipalities, environmental NGOs, the Department of Forestry and farmer's associations were included in drafting the Catchment Management Strategy (CMS).
Sender-recipient mutuality	+	Strong recognition of the needs and adjusting the programme accordingly.
Strong transnational networks	+	Longstanding and durable collaboration between centralised and decentralised entities and between private parties and public institutions.
Informed translation	0	Sufficient local expertise at management level, complemented by knowledge from water experts from the Netherlands. Knowledge of Integrated Water Resource Management (IWRM) somewhat lacking at national scale.
Completeness of translation	-	Low decision-making capacity at decentralised level, whereas IWRM requires high decentralised decision-making capacity.
Contextual adjustments	-	Financial continuation of river basin management is a challenge, since there is no strategy for it yet. There has been a trend of consolidation in the Netherlands, whereas a decentralisation trend can be observed in South Africa.

5. Discussion

5.1. Place in the international literature

This research shows how eight empowering conditions for policy translation can enable governance capacity developments in South African river basins. The combination of the analytical framework of these eight empowering conditions and the City Blueprint Approach provides a clear overview into the suitability of the policy translation of the Dutch decentralised river basin approach in the Pongola-Umzimkulu Proto CMA. The research also has a place in the international literature on policy translation and governance capacity developments. First, it supplements the research of Stuart-Hill & Meissner (2018) who argued there is an *“urgent need to generate a set of quantifiable indicators that are able to assess the performance of a CMA. Such indicators should be given a value in order to determine whether it is a successful practice or not, as values are often the easiest to illustrate effectiveness and efficiency. Secondly, these indicators should be uniform, and have the ability to be applied to various CMAs across the globe.”* (Stuart-Hill & Meissner, 2018, 14). With the GCA on river basin scale, a start has been made to fill this gap. Since it is the first of its kind, there are no other (Proto) CMAs to compare it to. Yet, it is a crucial start in making a comparative and constructive analysis based on standardised indicators that identifies the governance challenges in establishing CMAs. At the time of writing this thesis, 19 GCAs have been conducted on urban scale (S. Koop, personal communication, 5 October, 2020). The first GCA on river basin scale opens up avenues for future research. Moreover, it is interesting to compare the analysis on the river basin level with the urban level. It shows that, in this case, the governance capacity is larger on urban level. This is not surprising, since the eThekweni municipality is 1) a leader in water governance throughout South Africa and 2) the EWS has existed for much longer than the Proto CMA has.

Meissner et al. (2017) set forth five considerations, including the challenge of navigating through a complex environment which requires balancing many interests, how excessive stakeholder inclusiveness drags out the process of establishing a CMA unnecessarily, issues related to human and financial resources, particularly on spatial scale, and the importance of good stakeholder relations. This research finds that there is merit to most of these considerations, and adds the condition of implementing capacity as identified in the GCA as a crucial element of success (Figure 16). Meissner et al. (2017) found that effective management of CMAs is achieved in the presence of good stakeholder relations, for decentralisation of the water sector cannot be adequately achieved in the absence of the collaboration between authorities and stakeholders at grassroots level. They conclude that the stakeholder relations in the two currently established CMAs are remarkably good. The results of the GCA from this research shows that at the local level, the governance capacity (which is strongly determined by stakeholder relations) is higher than at river basin (CMA) level. More specifically, the conditions that relate specifically to stakeholder relations, i.e. condition 4, 5, 6 and 7 score average or just above average. This confirms the causal loop between IWRM, CMA, governance capacity back to IWRM, as hypothesised in the conceptual model (**Figure 4 Conceptual model**Figure 4) and confirms the link between governance capacity and community engagement.

One of the key recommendations set forth by Meissner et al. (2017) is to use the capacity at DWS level. This research responds to this recommendation by arguing that, based on the empirical findings, human capacity is present to a larger extent at the local and urban level, especially in the eThekweni municipality, which is by far the most capacitated municipality in the tentative sphere of influence of the Proto CMA. The focus should therefore lie on collaboration with the local decentralised level.

The results of this research also align with those of Hasan et al. (2020), who studied the process of the Bangladesh Delta Plan (BDP) 2100, a collaboration (under a Memorandum of Understanding much like that between the Netherlands and South Africa) between the Dutch government and the

Bangladesh government with policy translation as the main theme. Hasan et al. (2020) conclude that policy translation happens because local actors have a stake in it and that the final product, the BDP 2100, underwent heavy adjustments to the original Dutch Delta Plan 2100. The Dutch consultants accepted this change in order to create agency and ownership on behalf of the Bangladeshi water managers and policy-makers. This is in line with the results from the Dutch consultants and the Proto CMA, where workshops on the structure of the future CMA were reshaped and thereby adjusted to the local demands and context, and demonstrated strong sender-recipient mutuality. Yet, where Hasan et al. (2020) base the success of policy translation of the Dutch Delta Programme in Bangladesh on the extent to which local actors have a stake in the process, the current research considers seven additional factors, presented in Table 6. This gives a more comprehensive and more widely-applicable overview of the empowering conditions for policy translation.

5.2. Methodological reflection

The analytical framework combined two methods in order to answer the research question. First, eight empowering conditions for the successful translation of policies were identified through a literature study. This included various theories and was derived from other policy translation or policy transfer frameworks. For instance, it was partially inspired by the policy transfer framework of Dolowitz & Marsh (1996). Yet, if the analysis would have been done from solely this analytical framework, the results would have been rather different. This is because the main issues are the completeness of translation and the contextual adjustments (in the policy transfer framework framed as informed and appropriate transfer). Since the policy transfer framework created by Dolowitz & Marsh (1996) consists of three elements, many other aspects that were included in the analytical framework of this research would have been omitted. Most notably, mutual learning benefits, community engagement and sender-recipient mutuality were three important empowering conditions, which lead to a more valuable and substantive relationship in the long term. Since the scope of this research is 2030, the focus is on the medium-long term, which means it is better suited for this research, which is in line with Brinkerhoff (2002) and Bontenbal (2013). Not only have the empowering conditions been operationalised in a concrete situation, the empirical analysis of the City Blueprint Approach makes the conditions for successful policy translation as concrete as possible for water managers. This brings us to the second methodological strength of this research.

The empirical analysis at two scales identified the governance challenges of providing clean and sufficient water as stated in the Blue Deal and allowed for an aspect of comparison. Using the City Blueprint Approach enabled the quantification and standardisation of the trends and pressures, how Durban manages the water cycle and identified governance capacity developments at urban and river basin scale.

The combination of the eight empowering conditions and the City Blueprint Approach allows for high reproducibility of the research. The empowering conditions are sufficiently general to be applied in other policy translation contexts relating to different water challenges. At the same time, the empowering conditions are clearly defined and embedded in international literature and the empirical analysis is robust and has shown its worth in the international literature and practice. This analytical framework could therefore be applied in other cities and river basins.

The methods used in this thesis can be improved by upscaling the CBA, particularly the CBF and the TPF to river basin scale. Currently, they are only suitable for the urban scale. A major challenge for upscaling these frameworks would be that some indicators are rather specific and finding the right data on river basin scale might be difficult, especially in the absence of a river basin organisation who is tasked with gathering this data. Yet, if the CBF and TPF would have been suited for river basin analysis, even more (quantitative) data could have been collected, giving an even sharper insight in the opportunities for capacity developments.

This research was also subject to limitations. Most notably, the COVID-19 pandemic restricted international travel, making it impossible to do field work. All 10 interviews were successfully conducted from home. In order to find the diverse group of stakeholders, much effort was put into identifying the playing field by keeping close relations with the interviewees. These close relationships enabled the freedom to ask critical questions and trigger a snowball effect. With some interviews taking over 1.5 hours, two of which even followed by a second interview, it was possible to get a comprehensive insight in the local circumstances, without the physical presence. It has to be noted that one stakeholder group has been omitted from this research. Unfortunately, after countless attempts, both directly and indirectly through already interviewed stakeholders, it was not possible to speak to a representative of the Traditional Councils, or the Department of Cooperative Governance and Traditional Affairs (COGTA). Specific reference to the Traditional Councils, who hold significant authority in the region of eThekweni and throughout KwaZulu-Natal has been made multiple times in the research, and nuance was given where necessary. The author recognises the importance of a broad and representative overview in order to make conclusions about the governance capacity.

5.3. Practical application

With the addition of the City Blueprint Approach of Durban, it can be placed in the broad international context and compared with the 125 cities worldwide with respect to the water challenges clean and sufficient water (S. Koop, personal communication, 5 October, 2020). Compared to the city of Cape Town, the EWS is a frontrunner in PPP projects and the managers are consulting other municipalities, including that of Cape Town, in how to best structure them and create win-win solutions (RES107). This research will be valuable to the managers at the EWS, who now have a broad and deep overview of the trends and pressures and governance capacity performance compared with other cities nationally and internationally. With an above-average score for stakeholder inclusiveness, it is valuable for practitioners to discover the perspectives of seven stakeholder groups presented in *Figure 7 Stakeholder map* Figure 7.

The analysis on river basin level enabled the link with the translation of practices and makes this research valuable for the delegation of the Dutch UVW who are currently involved in the Blue Deal mission. The focus lies on solving the bottlenecks in the successful translation, in particular that of the completeness of the translation and contextual adjustments (Table 6). Successful policy translation faces a number of challenges. First, and most notably, is the scale. The catchment is roughly the size of the province of KwaZulu-Natal, an area with a size of around 90,000 km², and cannot be considered as one river basin. Instead, it consists of 20 major rivers (CMS, 2019, 14). The economic and environmental circumstances throughout the catchment are vastly different. When compared with the Netherlands, even the largest DRWAs are no bigger than 6,000 km². The economic and hydrological circumstances in the Dutch DRWAs are comparable, which enables governance to be targeted and effective.

6. Conclusion

This thesis focused on the water challenges of clean and sufficient water in the Pongola-Umzimkulu Proto Catchment Management Agency (CMA) in light of the Blue Deal mission initiated by the Dutch Government, to help provide 2.5 million people in three water management areas in South Africa with better access to clean and sufficient water by the end of 2030. This study explored the governance conditions under which policy translation used in the Netherlands enables Integrated Water Resource Management (IWRM) and strong Multi-Level Governance (MLG) in order to reach the desired goal by the end of 2030 in South Africa. This study analysed the suitability of policy translation of the Dutch river basin approach in South Africa and the governance capacity at two levels. First, at urban scale. Even though the parameters for the TPF and the CBF were adjusted slightly in 2020, the core provisions remain the same (Koop & Leeuwen, 2020a, 2020b). Second, on the scale of the Pongola-Umzimkulu Proto CMA, or river basin scale. The two-scale analysis provided a comparison between the governance capacity at local level and at river basin level and showed that there are numerous governance capacity development opportunities at river basin level.

6.1. Empowering conditions

The literature proposes many propositions that could contribute towards successful policy translation. This research synthesised eight empowering conditions that are most relevant to water governance. These are the necessity to harmonise policies, recognition of the asymmetrical relationship, community engagement, sender-recipient mutuality, strong transnational networks, informed translation, completeness of translation and contextual adjustments, and are presented and summarised in Table 6.

6.2. Dutch Decentralised River Basin Approach

The Dutch decentralised river basin approach has been a continuous work in progress. The process was characterised by increasing integration and collaboration throughout the river basin, through the work of Regional Water Authorities that went beyond Dutch national borders, and between different spheres of governance, including public and private parties, including a wide array of stakeholders. It also encompasses the alignment of spatial and temporal scales and applies the distribution priority sequence. The final characteristic is that, in principle, no water is transferred between river basins. A summarised overview is presented in Figure 10.

6.3. Water Governance Performance and Challenges

The empirical evidence from the three applied methodological frameworks identified a number of governance challenges for the provision of clean and sufficient water in the Pongola-Umzimkulu Proto Catchment Management Agency (CMA), in which the eThekweni municipality lies. The first challenge relates to management cohesion and is the apparent confusion and indecision about the number of CMAs. The South African government is currently reviewing how many CMAs are actually needed. Initially, there were 19, the current number is nine and the plan is to go to six, in order to make the CMAs throughout the country more similar in size. There are some very large CMAs and some relatively small ones. This would mean that the Pongola-Umzimkulu Proto CMA would be downsized, which is a positive sign with respect to governance, for the sake of manageability. Comparing the Pongola-Umzimkulu Proto CMA with the two currently functional CMAs (Inkomati-Usuthu and Breede-Gouritz; Figure 2), multiple respondents indicated that the Inkomati-Usuthu CMA was functioning particularly well (RES105, RES106, RES102). The Inkomati-Usuthu CMA is the smallest CMA in the country and it can be argued that this is partly due to its size and therefore manageability. It could therefore be useful to increase the number of CMAs, rather than to decrease it.

The second challenge is trust and establishing authority for the Proto CMA. With the Catchment Management Strategy (CMS), the Proto CMA will become the leading actor in water governance in

the river basin. The strategy is sufficiently general for the individual municipalities to have their own input (RES101). Respondent 102 and 105 indicated that in order for this governance structure to work, it is necessary that the board of the Proto CMA consists of people who are knowledgeable, have the necessary network and are the respected authorities. They should have the informal relations with water managers throughout the entire catchment. Respondent 106 argues that instead of creating an entirely new board, it should be considered that the current ward councillor system be upgraded to CMA level.

The applied methods on two scales gave an insight in the current water governance performance. The governance capacity analysis at urban scale showed that the eThekweni is a leader in water governance in the region and is even a world leader in urban green space, but faces governance challenges with regard to monitoring, compliance and financial viability. The main reason is that water is considered a human right and should therefore always be available cheaply or freely for those who are unable to pay for it. For the eThekweni municipality, the Trends and Pressures Index (TPI) is 4.8 out of 10, with the main concerns in economic pressure and unemployment rate, freshwater scarcity and pluvial flooding. The City Blueprint Index (CBI) is 4.5 out of 10, with room for improvement in wastewater treatment, especially sludge recovery, energy recovery and nutrient recovery. For the eThekweni municipality, the Governance Capacity Index (GCI) is 1.9 out of 4, with the need for capacity developments in monitoring and compliance. For the Proto CMA, the GCI is 1.8, with the need for capacity developments in affordability, management cohesion and clear division of responsibilities.

At a river basin scale, the idea of an overarching strategy is supported by almost all respondents. All water managers and practitioners agree that the most effective approach to tackle the water challenges is through an integrated effort. In reality, the main challenges are monitoring, management cohesion, division of responsibilities and affordability and some argue that introducing a new institution would only muddy the waters. The main reasons for this are the scale, the environmental and economic diversity and the fact that there is currently no independent financial structure to fund the future CMA. There are bottom-up initiatives, especially in the more capacitated urban areas of Durban, but there is little cohesion in how these strategies and plans are integrated. The lack of direction at CMA level has created an institutional void that parties are now trying to occupy. From a decentralisation perspective, this is a positive development, since the Transformative Riverine Management Programme is spreading from the eThekweni municipality to the adjacent municipalities, much like the decentralised collaboration between Dutch Regional Water Authorities in the Netherlands, where partnerships are sought further upstream in order to create integrated solutions. The question remains whether the Department of Water and Sanitation (DWS) will allow the space for these bottom-up initiatives to form and create the necessary trust and network to establish a CMA with an overarching integrated strategy.

The following recommendations are suggested for the eThekweni municipality and the Proto CMA. In general, both institutions have high stakeholder inclusiveness. Yet, the true impact of the stakeholders varies. For the eThekweni municipality, this is mostly because the EWS often comes to the table with ideas they already feel strongly about and some stakeholders, such as knowledge institutions, have a larger influence on the final decision than other stakeholders, such as non-governmental organisations (NGOs). For the Proto CMA, it is relevant to become a statutory body. In this way, it improves in decision-making capacity. If the decision structure remains the way it is, that is from the CMA to the DWS to the central government, decentralised decision-making can never be established. More specifically, this means that stakeholder meetings at CMA level will remain a platform where stakeholders can voice concerns, but ultimately have little influence on the final decision.

With regard to preparing the eThekweni municipality for future climate change impacts, infrastructural improvements are needed, rather than on capital investments towards desalination plants and water transfer schemes. Improving the water infrastructure and tackling non-revenue water is a core

challenge and are at the root of the water scarcity problem. Desalination requires a lot of energy, which is currently mainly generated by coal-fired power stations originating from coal mines, which also require large amounts of water. This would shift the sustainability problem from the municipality to the industry, which is not considered an integrated or sustainable solution. Only if the desalination projects are funded by Public-Private Partnerships, thus not cutting into the budget available for infrastructure improvements, and if the energy required is generated from renewable sources, would this be considered a sustainable development.

With regard to the Proto CMA, the first recommendation is to enhance the manageability of the catchments, the Pongola-Umzimkulu Proto CMA is to downsize its scale. This would make the areas more homogenous, allowing the strategy to be more precise and therefore easier to govern. Moreover, stakeholder meetings of the CMA are throughout the entire catchment, and physical presence therefore takes an incredible effort, both on behalf of the board and the stakeholders. Decreasing the scale would make meetings more accessible.

Second, instead of assigning an entirely new board for the CMA before it is officially commissioned, upgrading the already existing governance structures, such as that of the ward councillors, should be considered as an alternative option. These structures are already in place and have the necessary authority over their ward. Most importantly, these structures are already funded and no or only minimal additional investments would be necessary to upgrade this system. This approach could be perceived as more democratic and empowering for water managers for its bottom-up approach and for the fact that ward councillors are democratically elected, much like the board members of the DRWAs in the Netherlands.

6.4. Empowering Conditions and Empirical Evidence

From the eight empowering conditions identified in Chapter 4.1, four are thoroughly present in the case of the Pongola-Umzimkulu Proto CMA. There is a recognition of the asymmetrical relationship between the 'senders' and 'recipients' of policy, which is manifested in the Memorandum of Understanding of 2013 between the Dutch and South African government and in the Blue Deal 2030. Acknowledging this relationship is the first step. The second step is ensuring that it guarantees a horizontal collaboration. The results show that there were good relations with semi-formal friendships also after the termination of the project to construct a CMS. The CMS was a collaboration project between the Dutch consultants from the Union of Regional Water Authorities (Unie van Waterschappen) and the board of the Proto CMA, which are, at the current moment a delegation of the DWS. The CMS has been discussed with external stakeholders including municipalities, environmental NGOs, the Department of Forestry and farmer's associations. This is in line with Latour (1968) who argues that policy translation happens because the actors have a stake in it, which puts the stakeholders at the centre of why and how policy translation happens. Strong sender-recipient mutuality and transnational networks were also present. Both parties experienced learning benefits from the collaboration, further strengthening the formal and informal relationships. The results show neutral scores for harmonised policies, mostly because of the friction in the dual governance structure with regard to the authority of the Traditional Councils and the governmental bodies. The most notable bottlenecks for the successful translation were found in the completeness of translation and contextual adjustments, where the low decision-making capacity at decentralised level compromises the effectiveness of Integrated Water Resource Management, and the difference in trends between the Netherlands, who experienced a trend of consolidation of water governance bodies and South Africa, who experience a trend of decentralisation.

The avenue for future research serves a comparative purpose. The main recommendation for future research is the Governance Capacity Analysis of other CMAs in South Africa. The GCA could serve as a valuable tool for comparison between CMAs and would stimulate learning benefits on a river basin level and could enable basin-to-basin learning. Since there are only two functional CMAs in the



country at the moment, it could be a way to speed up the establishment of all subsequent CMAs in South Africa.

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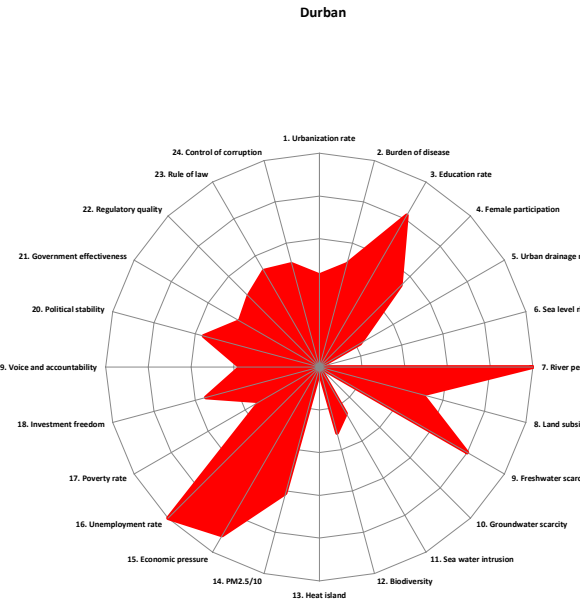
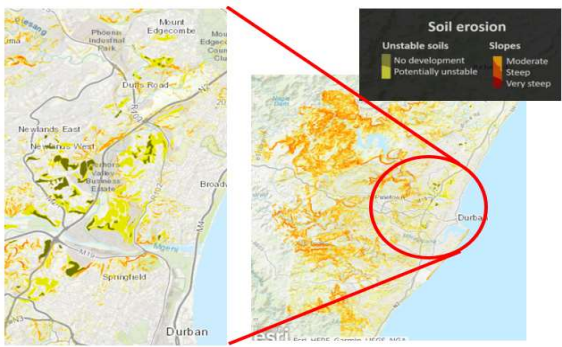
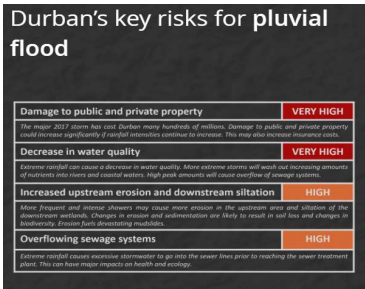
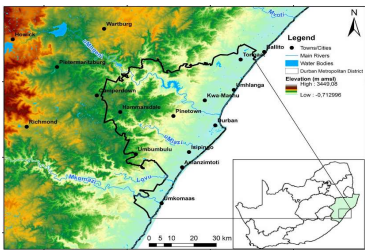
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Appendix I: Substantiation TPF

The excel sheet below shows the calculation method, X value, calculation, TPF score and source for each indicator of the TPF.

Indicator number	Category	Calculation method	X value	Calculation	TPF score 0-10	Source																																	
1	Urbanisation rate	$[(X - 0.0) / (4.6 - 0.0)] * 10$ <table><tr><th>Rate of urban population</th><th>Score</th><th>Level of concern</th></tr><tr><td>0.00 - 10.00</td><td>1</td><td>No concern</td></tr><tr><td>10.00 - 24.00</td><td>2</td><td></td></tr><tr><td>24.00 - 30.00</td><td>3</td><td>Little concern</td></tr><tr><td>30.00 - 40.00</td><td>4</td><td></td></tr><tr><td>40.00 - 48.00</td><td>5</td><td>Medium concern</td></tr><tr><td>48.00 - 64.00</td><td>6</td><td></td></tr><tr><td>64.00 - 72.00</td><td>7</td><td>Concern</td></tr><tr><td>72.00 - 80.00</td><td>8</td><td></td></tr><tr><td>80.00 - 85.00</td><td>9</td><td>Great concern</td></tr><tr><td>> 85.00</td><td>10</td><td></td></tr></table>	Rate of urban population	Score	Level of concern	0.00 - 10.00	1	No concern	10.00 - 24.00	2		24.00 - 30.00	3	Little concern	30.00 - 40.00	4		40.00 - 48.00	5	Medium concern	48.00 - 64.00	6		64.00 - 72.00	7	Concern	72.00 - 80.00	8		80.00 - 85.00	9	Great concern	> 85.00	10		X = 1.13 (DIP, 2017)	4.282908696	4.3	https://www.cia.gov/library/publications/the-world-factbook/geos/uf.html http://web.a.ebscohost.com.proxy.library.uu.nl/ehost/pdfviewer/pdfviewer?vid=18&id=06239f4d-2f47-4b0c-563c-1ab480cd40dc-v-sessmgr02
Rate of urban population	Score	Level of concern																																					
0.00 - 10.00	1	No concern																																					
10.00 - 24.00	2																																						
24.00 - 30.00	3	Little concern																																					
30.00 - 40.00	4																																						
40.00 - 48.00	5	Medium concern																																					
48.00 - 64.00	6																																						
64.00 - 72.00	7	Concern																																					
72.00 - 80.00	8																																						
80.00 - 85.00	9	Great concern																																					
> 85.00	10																																						
2	Burden of disease	Upgraded (pad) version of Flash reported. Found source (in notes) that gives this data: 46,237.	X= 22.4	46,237 is between 40,000 and 48,000, so score is 5.	5.0	https://www.who.int/hqinfo/qoqbal_burden_disease/estimates_country/en/																																	
3	Education Rate	TPF Score = $[(X - \min) / (\max - \min)] * 10$ X = World Bank value Min = 6.4% (average of the lowest 10% of the countries) Max = 98.6 % (average of the highest 10% of the countries) NB All values of x > 98.6% score 0. All values < 6.4 % score 10	X= 54.1	X = 54.1 (2019) 54.1/10= 5.4	5.4	http://wti.worldbank.org/table/2.8																																	
4	Female participation	Sources say that Durban is the greenest city in the world.	If green space is 60%, soil cover is 40%.		5.4	https://database.worldbank.org/indicator/ST.TF.ACT1.FE.ZS?locations=SD&report_name=Gender_Indicators_Report&populaterpercentage=100 https://www.hugobgreen.org/duurban https://northalennews.co.za/178783/durban-city-green-urban-spaces/																																	
5	Urban drainage rate	$\frac{X - 31.7}{69.6 - 31.7} * 10$ <table><tr><th>Urban area affected (%)</th><th>Score</th><th>Level of concern</th></tr><tr><td>0 - 5</td><td>0</td><td>No concern</td></tr><tr><td>6 - 10</td><td>2.5</td><td>Little concern</td></tr><tr><td>11 - 20</td><td>5</td><td>Medium concern</td></tr><tr><td>21 - 40</td><td>7.5</td><td>Concern</td></tr><tr><td>40 - 100</td><td>10</td><td>Great concern</td></tr></table>	Urban area affected (%)	Score	Level of concern	0 - 5	0	No concern	6 - 10	2.5	Little concern	11 - 20	5	Medium concern	21 - 40	7.5	Concern	40 - 100	10	Great concern	Based on the table on the right, retrieved from the GIS municipality website, the risk is very high and projections are of great concern. X=10	2.189973615	2.2																
Urban area affected (%)	Score	Level of concern																																					
0 - 5	0	No concern																																					
6 - 10	2.5	Little concern																																					
11 - 20	5	Medium concern																																					
21 - 40	7.5	Concern																																					
40 - 100	10	Great concern																																					
6	River peak discharges	<table><tr><th>Urban area affected (%)</th><th>Score</th><th>Level of concern</th></tr><tr><td>0 - 5</td><td>0</td><td>No Concern</td></tr><tr><td>6 - 10</td><td>2.5</td><td>Little concern</td></tr><tr><td>10 - 20</td><td>5</td><td>Medium concern</td></tr><tr><td>20 - 40</td><td>7.5</td><td>Concern</td></tr><tr><td>40 - 100</td><td>10</td><td>Great concern</td></tr></table>	Urban area affected (%)	Score	Level of concern	0 - 5	0	No Concern	6 - 10	2.5	Little concern	10 - 20	5	Medium concern	20 - 40	7.5	Concern	40 - 100	10	Great concern	X < 0.05		10	10.0 https://ethelwinimaps.arcgis.com/apps/MapSeries/index.html?appid=4c59620219d3431aec468b873aa0ffc5 Contact respondent 106, dataset received from referral https://www.tandfonline.com.proxy.library.uu.nl/doi/abs/10.2989/AIMS.2009.31.2.1.875															
Urban area affected (%)	Score	Level of concern																																					
0 - 5	0	No Concern																																					
6 - 10	2.5	Little concern																																					
10 - 20	5	Medium concern																																					
20 - 40	7.5	Concern																																					
40 - 100	10	Great concern																																					
7	Sea level rise	Contacted respondent 106 who referred me to another person at the CSM department at the eThekweni municipality. He gave me a KML data set for Google Earth that showed flood lines at various SLR scenarios. The 1M SLR scenario showed that around <100% of the city would flood with a 1M SLR. The Durban metro is 2500km2 and there are no parts below sea level, according to the source.			0	0.0																																	
8	Land subsidence	<table><tr><th>Score</th><th>Description</th></tr><tr><td>0</td><td>No infrastructure damage, no flood risk</td></tr><tr><td>2.5</td><td>Low/medium infrastructure damage expected, no major increase in flood risk expected</td></tr><tr><td>5</td><td>Experienced infrastructure damage and medium infrastructure damage expected or <10cm subsidence by 2100 in a substantial area of the city</td></tr><tr><td>7.5</td><td>Serious experienced infrastructural damage or < 1m subsidence by 2100 in a substantial area of the city</td></tr><tr><td>10</td><td>Serious experienced infrastructure damage, imminent flooding/ < 2m subsidence by 2100 in a substantial area of the city</td></tr></table>	Score	Description	0	No infrastructure damage, no flood risk	2.5	Low/medium infrastructure damage expected, no major increase in flood risk expected	5	Experienced infrastructure damage and medium infrastructure damage expected or <10cm subsidence by 2100 in a substantial area of the city	7.5	Serious experienced infrastructural damage or < 1m subsidence by 2100 in a substantial area of the city	10	Serious experienced infrastructure damage, imminent flooding/ < 2m subsidence by 2100 in a substantial area of the city	Municipality GIS website indicates there are some areas with potential risk due to erosion. Moreover, areas with steep slopes are at increased risk. It must be added that not all steep slopes are at risk, this depends on location, soil type and available vegetation.																								
Score	Description																																						
0	No infrastructure damage, no flood risk																																						
2.5	Low/medium infrastructure damage expected, no major increase in flood risk expected																																						
5	Experienced infrastructure damage and medium infrastructure damage expected or <10cm subsidence by 2100 in a substantial area of the city																																						
7.5	Serious experienced infrastructural damage or < 1m subsidence by 2100 in a substantial area of the city																																						
10	Serious experienced infrastructure damage, imminent flooding/ < 2m subsidence by 2100 in a substantial area of the city																																						
9	Freshwater scarcity	<table><tr><th>% of renewable resource decreased</th><th>Score</th><th>Level of concern</th></tr><tr><td>0 - 2</td><td>0</td><td>No concern</td></tr><tr><td>2 - 20</td><td>2.5</td><td>Little concern</td></tr><tr><td>20 - 50</td><td>5</td><td>Medium concern</td></tr><tr><td>50 - 100</td><td>7.5</td><td>Concern</td></tr><tr><td>>100</td><td>10</td><td>Great concern</td></tr></table>	% of renewable resource decreased	Score	Level of concern	0 - 2	0	No concern	2 - 20	2.5	Little concern	20 - 50	5	Medium concern	50 - 100	7.5	Concern	>100	10	Great concern	X = 37.34 This falls within 35-38 Data from 2017	5	5.0	https://ethelwinimaps.arcgis.com/apps/MapSeries/index.html?appid=4c59620219d3431aec468b873aa0ffc5															
% of renewable resource decreased	Score	Level of concern																																					
0 - 2	0	No concern																																					
2 - 20	2.5	Little concern																																					
20 - 50	5	Medium concern																																					
50 - 100	7.5	Concern																																					
>100	10	Great concern																																					
10	Water scarcity	<table><tr><th>% abstracted of annual recharge</th><th>Score</th><th>Level of concern</th></tr><tr><td>0 - 2</td><td>0</td><td>No concern</td></tr><tr><td>2 - 20</td><td>2.5</td><td>Little concern</td></tr><tr><td>20 - 50</td><td>5</td><td>Medium concern</td></tr><tr><td>50 - 100</td><td>7.5</td><td>Concern</td></tr><tr><td>>100</td><td>10</td><td>Great concern</td></tr></table> <p>Respondent 104 indicates less than 1% of groundwater is abstracted. This is in line with the literature, indicating that there is little to no data on this because it is such a small fraction of total water consumption.</p>	% abstracted of annual recharge	Score	Level of concern	0 - 2	0	No concern	2 - 20	2.5	Little concern	20 - 50	5	Medium concern	50 - 100	7.5	Concern	>100	10	Great concern	X < 1		8	8.0 http://www.fao.org/nr/water/aquastat/data/query/results.html Respondent 104 indicates little to no data is available = because it is such a small fraction of the total water consumption. http://www.fao.org/nr/water/aquastat/data/query/results.html															
% abstracted of annual recharge	Score	Level of concern																																					
0 - 2	0	No concern																																					
2 - 20	2.5	Little concern																																					
20 - 50	5	Medium concern																																					
50 - 100	7.5	Concern																																					
>100	10	Great concern																																					
11	sewewater intrusion	<table><tr><th>Indicator 21 value (out of 100)</th><th>Level of concern</th></tr><tr><td><20</td><td>No concern</td></tr><tr><td>20 to 30%</td><td>Little concern</td></tr><tr><td>30 to 50%</td><td>Medium concern</td></tr><tr><td>50 to 70%</td><td>Concern</td></tr><tr><td>> 70%</td><td>Great concern</td></tr></table>	Indicator 21 value (out of 100)	Level of concern	<20	No concern	20 to 30%	Little concern	30 to 50%	Medium concern	50 to 70%	Concern	> 70%	Great concern	X = 2.5	2.5	2.5	<p>April 2019: coastal flood and mudslides kill 60 people in Durban, famously called the Easter Floods. Seawater intrusion is a major risk</p> https://www.bbc.com/news/world-africa-48016242 https://www.mdpi.com/2072-4441/4/1/237/html https://ethelwinimaps.arcgis.com/apps/MapSeries/index.html?appid=4c59620219d3431aec468b873aa0ffc5																					
Indicator 21 value (out of 100)	Level of concern																																						
<20	No concern																																						
20 to 30%	Little concern																																						
30 to 50%	Medium concern																																						
50 to 70%	Concern																																						
> 70%	Great concern																																						
12	Water quality	<table><tr><th>% of waters with less than good ecological status or potential</th><th>Indicator 21 value (out of 100)</th><th>Level of concern</th></tr><tr><td><20</td><td>0</td><td>No concern</td></tr><tr><td>20 to 30%</td><td>2.5</td><td>Little concern</td></tr><tr><td>30 to 50%</td><td>5</td><td>Medium concern</td></tr><tr><td>50 to 70%</td><td>7.5</td><td>Concern</td></tr><tr><td>> 70%</td><td>10</td><td>Great concern</td></tr></table> <p>100 - Water (impact on ecosystems) = score factor out of 100.</p>	% of waters with less than good ecological status or potential	Indicator 21 value (out of 100)	Level of concern	<20	0	No concern	20 to 30%	2.5	Little concern	30 to 50%	5	Medium concern	50 to 70%	7.5	Concern	> 70%	10	Great concern	X = 68.1	3.19	3.2	http://www.ciesin.columbia.edu/repository/epi/data/2010EPI_country_profiles.pdf															
% of waters with less than good ecological status or potential	Indicator 21 value (out of 100)	Level of concern																																					
<20	0	No concern																																					
20 to 30%	2.5	Little concern																																					
30 to 50%	5	Medium concern																																					
50 to 70%	7.5	Concern																																					
> 70%	10	Great concern																																					
13	Heat risk	[Number of combined tropical nights and hot days / 50] * 10 10 - [(% green and blue area - 16) / (48 - 16) * 10]	Tropical days/nights X = 2 2/50*10= 0.4 Green/blue area Green area = 60% > max value of 48, therefore score = 0	0.2	0.2	<p>This data is derived from looking up the climate classification for Durban, humid subtropical climate, or Köppen climate classification Cfa. European cities with climate classification Cfa were identified (Milan, Turin, Bologna, Verona, North Italy) and via the source below the data was collected from these cities.</p> http://www.arcgis.com/home/webmap/viewer.html?webmap=d4124af68914c4bd82b88b815ae81d76 Green/blue area: Durban has 60% green space, which already exceeds the max of 48, so score is 0.																																	
14	Air quality	$\left[\frac{X_1 - 5.1}{62.6 - 5.1} \right] * 5 + \left[\frac{X_2 - 9.5}{118.9 - 9.5} \right] * 5$	X1 = 53.2 X2 = 28.2		0.2	https://www.who.int/aqpollution/data/cities/en/ Unable to find data for Durban, but averaged the 2 SPm and 10PM of the given 22 locations in SA.																																	
15	Economic pressure	TPF score = $10 - [(X - \min) / (\max - \min) * 10]$ where: X = GDP per capita per year (US\$) min = 583 US\$/cap (average of lowest 10% of the values) max = 61327 US\$/cap. (average of highest 10% of the values)	X = 6001.4	6.085470985	6.1																																		
16	Unemployment rate	TPF Score = $[(X - \min) / (\max - \min)] * 10$ X = Unemployment rate (%) min = 1.4% (average of lowest 10% of the values) max = 18.2% (average of highest 10% of the values) NB All values of x > 18.2% score 10. All values < 1.4 % score 0	X = between 28.2% (2019 pre-crisis) and 30.1% (2020, during current crisis).	9.107994205	9.1	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=ZA https://data.worldbank.org/indicator/SL.UHML.TD17.ZC?locations=ZA http://www.statista.gov.za/?page_id=993&id=ethelwinimunicipality https://tradingeconomics.com/south-africa/unemployment-rate?tm=tests&lookback=20&forward=3&c=30&w=520&estimate=20&nemployment_according=20&c=30&u=20&economic=30&nodes=0																																	
17	Poverty rate	TPF Score = $[(X - \min) / (\max - \min)] * 10$ X = Poverty rate (%) min = 0 % (average of lowest 10% of the values) max = 59.9 % (average of highest 10% of the values) NB All values of x > 59.9% score 10.	X = 18.9		10	10.0																																	
18	Investment freedom	TPF Index score = $(100 - X) / 10$	X = 45	3.155268765	3.2	http://wti.worldbank.org/table/2.1.2																																	
19	Voice and accountability	$\frac{\text{indicator} - \text{minimum value}}{\text{maximum value} - \text{minimum value}} * 10$ = World Bank Score on a scale of 0-10.		5.5	5.5	https://www.theglobalindex.com/rankings/en/Investment_Freedom%20of%20the%20top%200?www.heritage.org/index/rankings?version=439																																	
20	Political stability	$\frac{\text{indicator} - \text{minimum value}}{\text{maximum value} - \text{minimum value}} * 10$ = World Bank Score on a scale of 0-10.		6.31	3.7	https://info.worldbank.org/governance/wgi/																																	
21	Government effectiveness	$\frac{\text{indicator} - \text{minimum value}}{\text{maximum value} - \text{minimum value}} * 10$ = World Bank Score on a scale of 0-10.		4.45	5.6	https://info.worldbank.org/governance/wgi/																																	
22	Regulatory quality	$\frac{\text{indicator} - \text{minimum value}}{\text{maximum value} - \text{minimum value}} * 10$ = World Bank Score on a scale of 0-10.		5.68	4.3	https://info.worldbank.org/governance/wgi/																																	
23	Rule of law	$\frac{\text{indicator} - \text{minimum value}}{\text{maximum value} - \text{minimum value}} * 10$ = World Bank Score on a scale of 0-10.		5.34	4.7	https://info.worldbank.org/governance/wgi/																																	
24	Control of corruption	$\frac{\text{indicator} - \text{minimum value}}{\text{maximum value} - \text{minimum value}} * 10$ = World Bank Score on a scale of 0-10.		4.80	5.2	https://info.worldbank.org/governance/wgi/																																	
				4.96	5.0	https://info.worldbank.org/governance/wgi/																																	



Appendix II: Substantiation CBF

The table below indicates the CBF score and substantiation including the calculation method.

Indicator	CBF score	Substantiation
1. Access to drinking water	8.5	<p>Despite the Green City Index (2007) statistic of 98%, I opt to use the eThekweni Annual Report 2018/2019. This is because it explicitly mentions that the household count has increased: "The 2011 count was 945,910 households and has now been changed to 1,125,767 households as approved by Municipal Council. This has impacted on all indicators which are based on household counts, thereby resulting in a year on year decrease. With the increase in the total household count, the delivery targets have reduced from the previous year." (Annual Report eThekweni Municipality, 2019, 82).</p> <p>Calculation method:</p> $\frac{X}{10}$ <p>Calculation: $84.6/10 = 8.5$</p> <p>Source: www.durban.gov.za/City_Government/Administration/city_manager/performance_management_unit/reports/Annual%20Reports/2018-2019%20Annual%20Report%20Final.pdf</p>
2. Access to sanitation	7.5	<p>The latest statistics are from the Annual Report eThekweni Municipality 2018/2019. This source is most reliable.</p> <p>Calculation method:</p> $\frac{X}{10}$ <p>Calculation: $75/10 = 7.5$</p> <p>Source: www.durban.gov.za/City_Government/Administration/city_manager/performance_management_unit/reports/Annual%20Reports/2018-2019%20Annual%20Report%20Final.pdf</p>
3. Drinking water quality	10	<p>IB.net source indicates 99.54% of the test samples passed the test for chlorine residual. It should be noted that there are no statistics for drinking water quality that include chemicals other than chlorine. Other common pollutants in wastewater are bacteria and viruses and lead (Turner, 2018, 8).</p> <p>Source: https://mountainscholar.org/bitstream/handle/10217/193085/Turner_colostate_0053N_15065.pdf?sequence=1</p>

4. Secondary WWT	4.7	<p>IB.net source indicates 47.24%. This means more than 50% of the wastewater in eThekwin is not treated at all and is disposed of in different ways.</p> <p>Source: https://database.ib-net.org/utility_profile?uid=176</p>
5. Tertiary WWT	4.7	There is no data on tertiary WWT for residential use (potable water).
6. Groundwater quality	9	<p>No data is available on the samples of groundwater quality, because groundwater is hardly exploited in eThekwin (<1%). Bell & Maud (2000) find that groundwater quality in general is good, and saline or nitrite intrusion are not a problem. Some saline examples exceeded the 2000 mg threshold (page 936).</p> <p>X = 9</p> <p>Source: https://link-springer-com.proxy.library.uu.nl/content/pdf/10.1007%2Fs002549900076.pdf </p>
7. Nutrient recovery	0	<p>There is a pilot (2015) to recover urine and make fertiliser, the VUNA project. Currently they are able to process 1400L/week. Compared to the 450 million litres of wastewater per day that the municipality processes, this figure is 4.4E-8, which is negligible. The calculation is $1400 \times 52 / 1000 = 72.8 \text{ m}^3/\text{y}$</p> <p>$72.8 / 450 \text{ million} \times 100 = 4.4\text{E}-8 \rightarrow$ indicator score is therefore 0</p> <p>Source: https://www.eawag.ch/fileadmin/Domain1/Abteilungen/eng/projekte/vuna/doc/VUNA_Final_Report_2015.pdf </p>
8. Energy recovery	1.7	<p>As part of the sewerage infrastructure, the Unit operates 28 wastewater treatment works (WWTW) which treat over 460 ML/day of sewage, producing the equivalent of 100 tons of sludge per day. A common way of treating this sludge is anaerobic digestion, a by-product of which is the generation of methane gas (biogas). Of the 28 WWTWs, 10 operate anaerobic digesters and it is the aim of the EWS to convert the methane produced at the larger of these WWTWs into electricity. Approximately 50% of the power used by the works can be supplied by the methane, and it is a renewable source of energy that is available as long as the WWTW is operational.</p> <p>Source: page http://prg.ukzn.ac.za/docs/default-source/ews/nexus-booklet-final.pdf?sfvrsn=2</p> <p>From this, I understand that in 10/28 WWTWs energy recovery happens (generating electricity from methane). Total amount of water entering the 28 WWTWs combined is 460 megalitres, so $10/28 \times 460$ is approximately the amount that is treated with energy recovery. The stats for the secondary WWT coverage was 100%.</p>

		<p>It should be noted that it is assumed that the 28 WWTWs are similar in size and WWT capacity.</p> <p>So the calculation is:</p> <p>10/28 (number of treatment plants using energy recovery) 460 megalitres (entering the 28 WWTWs per day), so 460x365/1000 is the m3/year.</p> <p>$((10/28 \times 460 \text{ MI} \times 365 / 1000) / (460 \text{ MI} \times 365 / 1000)) \times (47.24/100) \times 10 = 1.7$</p>																								
9. Sewage sludge recycling	0	I contacted a firm (Veiola) who does sludge recycling, no public data available. Reply was that no information could be disclosed on this topic. Checked with respondent 107 and indicated there was no sewage sludge recycling.																								
10. WWT energy efficiency	3	<p>The topic is addressed in a chapter in a national document. The Annual Report of the municipality, the IDP of 2019 and the climate adaptation lookout all indicate plans for wastewater treatment. Especially energy and nutrient recovery are prevalent, but are still only feasibility studies. No budget or long-term planning is attached to these initiatives, most probably because of resource constraints.</p> <p>Calculation method:</p> <table border="1"> <thead> <tr> <th>Indicator score</th> <th>Assessment</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>no information is available on this subject</td> </tr> <tr> <td>1</td> <td>limited information is available in a national document</td> </tr> <tr> <td>2</td> <td>limited information is available in national and local documents</td> </tr> <tr> <td>3</td> <td>the topic is addressed in a chapter in a national document</td> </tr> <tr> <td>4</td> <td>the topic is addressed in a chapter at the national and local level</td> </tr> <tr> <td>5</td> <td>a local policy plan is provided in a publicly available document</td> </tr> <tr> <td>6</td> <td>as 5 and the topic is also addressed at the local website</td> </tr> <tr> <td>7</td> <td>plans are implemented and clearly communicated to the public</td> </tr> <tr> <td>8</td> <td>as 7 plus subsidies are made available to implement the plans</td> </tr> <tr> <td>9</td> <td>as 8 plus annual reports are provided on the progress of the implementation and/or any other activity indicating that this is a very high priority implemented at the level of the local</td> </tr> <tr> <td>10</td> <td>as 9 and the activity is in place for = 3 years</td> </tr> </tbody> </table> <p>Source: http://www.durban.gov.za/City_Government/City_Vision/IDP/Documents/IDP2019_2020.pdf</p>	Indicator score	Assessment	0	no information is available on this subject	1	limited information is available in a national document	2	limited information is available in national and local documents	3	the topic is addressed in a chapter in a national document	4	the topic is addressed in a chapter at the national and local level	5	a local policy plan is provided in a publicly available document	6	as 5 and the topic is also addressed at the local website	7	plans are implemented and clearly communicated to the public	8	as 7 plus subsidies are made available to implement the plans	9	as 8 plus annual reports are provided on the progress of the implementation and/or any other activity indicating that this is a very high priority implemented at the level of the local	10	as 9 and the activity is in place for = 3 years
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11. Stormwater separation	3.1	<p>There is no data on the combined sewer system in eThekweni. The other two are available: total length of sanitation sewers (8105 km) and stormwater sewers (3700 km). I calculated the stormwater sewers as a fraction of the total amount of sewers (8105 + 3700). According to respondent 107 there are no combined sewers in Durban.</p> <p>Calculation method:</p>																								

		<p>How to calculate</p> <p>A. Total length of combined sewers managed by the utility (km) B. Total length of stormwater sewers managed by the utility (km) C. Total length of sanitary sewers managed by the utility (km)</p> <p>Indicator 11 = $\frac{B+C}{A+B+C} \times 10$</p> <p>Sources: https://oss.deltares.nl/c/document_library/get_file?uuid=607d42cd-6a09-4139-97a4-78df63ec1aae&groupId=145641</p>
12. Average age sewer	3.7	<p>Large-scale replacement projects have taken place in 2013. 1750 km of pipe was replaced. As a fraction of the total of 8105 km of sewer pipe in the municipality, the average age sewer is $(1750/8105) \times 0 + ((8105-1750)/8105) \times 53 = 41.56$ years</p> <p>Calculation method:</p> <p>X = Average age sewer</p> <p>$\frac{60-X}{60-10} \times 10$</p> <p>PDF source provided by respondent 103: "Municipalities lagging behind". Water and Wastewater. Page 23. Can be found through this hyperlink.</p>
13. Water system leakages	3.6	<p>36%</p> <p>Source: http://www.nipefagio.co.tz/publications/2d4fb-african-gci-report-e.pdf</p>
14. Operation cost recovery	1.6	<p>IB.net source Source: https://database.ib-net.org/utility_profile?uid=176</p> <p>Calculation method:</p> <p>$\frac{X - 0.33}{2.34 - 0.33} \times 10$</p> <p>X = 0.66</p>
15. MSW collected	3.1	<p>MSW produced is 519 kg/cap/year.</p> <p>Source: http://www.nipefagio.co.tz/publications/2d4fb-african-gci-report-e.pdf</p> <p>Calculation method:</p> <p>$[1 - \frac{X-136.4}{689.2-136.4}] \times 10$</p>

16. MSW recycled	3.4	<p>Total MSW per annum = 1,400,000 ton Total MSW recyclables collected (2019) = 119,588 ton That is 8.5% There are 4 landfills in eThekwin, 3 out of which are used for energy recovery (CH₄ to electricity). This is approximately 75% (some landfills are bigger than others but exact data is missing). Calculation is therefore $8.5/(100-75)*10 = 3.4$</p> <p>Calculation method:</p> $\frac{\% \text{ recycled or composted}}{100 - \% \text{ used for incineration with energy recovery}} \times 10$ <p>Sources: http://www.durban.gov.za/City_Government/Administration/city_manager/performance_management_unit/reports/layouts/download.aspx?SourceUrl= http://www.durban.gov.za/City_Government/Administration/city_manager/performance_management_unit/reports/Annual%20Reports/2018-2019%20Annual%20Report%20Final.pdf http://cityenergy.org.za/uploads/resource_169.pdf</p>
17. MSW energy recovered	8.2	<p>The % incinerated with energy recovery (CH₄ to electricity) is 75% The % recycled or composted is 8.5 Calculation is therefore $75/(100-8.5)*10 = 8.2$</p> <p>Calculation method:</p> $\frac{\% \text{ incinerated with energy recovery}}{100 - \% \text{ recycled or composted}} \times 10$
18. Green space	10	<p>Durban has been awarded the Greenest City in the world (source in excel file) with 60%. 60 exceeds the maximum value of 48, so CBF score = 10. Sources: https://www.hugsi.green/city/?Durban https://northglennews.co.za/178783/durban-city-green-urban-spaces/</p>
19. Climate adaptation	7	<p>X = 7 Source indicates a clear climate change adaptation strategy with forecasts for more than 3 years. More, respondent 100 indicates to have developed a 25-year mitigation strategy, 25-year water infrastructure master plan, 25-year wastewater infrastructure plan, 4-year water reuse plan, 25-year growth plan etc. Score is not 10 because multiple respondents who have reviewed the number (103, 104) indicate that from experience, they know that the plans are too ambitious and they paint a better picture than what is really happening.</p> <p>Calculation method:</p>

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20. Climate-robust buildings	7	<p>X = 7</p> <p>Projects in eThekweni Municipality include energy efficiency measures and campaigns, solar water heaters, and the installation of PV solar panels on municipal buildings. Projects to reduce GHG emissions in the transport sector include promotion of cycling and attractive public transport systems.</p> <p>Source: www.durban.gov.za/City_Services/development_planning_management/environmental_planning_climate_protection/Projects/Documents/DurbanClimateChangeBrochureEnglish.pdf</p>																								
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23. Drinking water consumption	9.5	<p>Total drinking water consumption is 157.55 as indicated on the IB.net source (2017).</p> <p>Calculation method:</p> $X = m^3/\text{person}/\text{year drinking water consumption}$ $\left[1 - \frac{X-45.2}{266-45.2} \right] * 10$ <p>Source: https://database.ib-net.org/country_profile?ctry=24&years=2019,2018,2017,2016,2015&type=report&ent=country&mult=true&table=true&chart=false&chartType=column&lang=en&exch=1</p>																								
24. Attractiveness	10	<p>X = 10</p> <p>Water is life (slogan DWS). Water availability and quality are crucial in the sentiment of the community/well-being. Especially in the rural areas where water is scarce. More, the tourist website state 4/12 attraction directly or indirectly related to surface water (beach, Umgeni river bird park, botanical gardens, marine world).</p> <p>Calculation method:</p>																								

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Source: <https://www.planetware.com/tourist-attractions-/durban-saf-kz-durb.htm>

Appendix III: Substantiation GCA Durban

The GCA was conducted at two levels. First, at urban scale in the eThekweni municipality (Durban). The substantiation for the urban analysis is presented below.

Indicator 1.1 Community knowledge

Final score: 0

The eThekweni Water and Sanitation Unit (EWS) is strong on the ground in the form of education. The EWS is spreading knowledge about the current risks – water pollution through improper sanitation – and future risks – water scarcity caused by wasting water or not using it sparingly. In terms of water quality, immediate impacts are *“polluted water is the same as having no water”* (108), indicating that water quality and water quantity go hand in hand. Future impacts for water quality also include upstream-downstream conflict, especially in informal settlements and communities that live upstream of wastewater treatment works (WWTW). The EWS educates communities by doing road shows, and this is necessary, for there is a only basic level of understanding about these risks and impacts (109). The EWS is a leader with regard to education and has the capacity to do so, in contrast to neighbouring municipalities (109). Co-development of solutions is not directly evident, since the community has little to no influence on when the water tanks arrive or when and where the ablution blocks are installed. This refers to the informal settlements. In an urban setting, there is better awareness. The slogan *“if it’s yellow, let it mellow, if it’s brown, flush it down”* is an example of how awareness is raised among the urban population. Future uncertainties about water resources, including the impacts of climate change in the long term are also discussed in workshops and road shows by the EWS.

Respondent 104 is more critical and mentions that the awareness is not necessarily higher as water resources get more scarce, nor that it is higher in times of drought, because people who already had water, still have water, and people who did not have water, still don’t have water. This leads to only a basic level of understanding.

The level of community knowledge with regards to the risks differs throughout the municipality. Communities that are settled outside of the urbanised area are aware of the risks of building in areas without formal water connections, but face the dichotomy of living close to the city where they can find employment and therefore settling in an area with no formal water supply, or living far away from the city which comes with long travel times (and associated costs unaffordable to most). The risks are therefore understood, but accepted nonetheless (106). The impact this may have (water scarcity) is the responsibility of the EWS to provide sufficient and clean water, also to the informal settlements.

Indicator 1.2 Local sense of urgency

Final score: 0

Growing awareness that has led to the establishment of NGOs such as the Duzi-Umgeni Conservation Trust (DUCT) and the Palmiet River Watch (Johannessen et al., 2019). The DUCT was created as a support platform for community to make the translation to policy (109). Local policies are often supported in the informal settlements and in the traditional council areas, because the presence of the eThekweni Water and Sanitation unit (EWS) often means that one of the main water issues (usually water availability) will be addressed (108). However, these changes, for instance the placement of ablution blocks or the fixing of leaking water pipes, are incremental changes rather

than long-term behavioural changes. In the urban setting, the impacts are less well known because the urgency is low, since the drought has not to a serious extent hit Durban (104).

In general – without any incidents of serious water pollution, people who had access to water still had/have access to water, also during a drought. People who did not have access to water still do not have access to water (104). The local sense of urgency is low, because the urbanised area is connected to the water system, therefore these people have and continue to have access to water. Respondent 102 indicates that the urgency predominantly comes from extrinsic motivations, for instance water cut-offs or the pricing mechanism for using water, in times of water scarcity. Respondents 104 and 102 indicate that the awareness particularly increased among water managers responsible for the reticulation of water and that there is a governance urgency throughout the catchment, rather than a particular sense of urgency among the residents.

Respondent 104 indicates that the big problem is non-revenue water, which is partly caused by poor hard infrastructure (obsolete and leaking pipes) and by people not paying their water bills. The population growth throughout the Umgeni catchment has led to increased awareness in the city, since the pressure on water has increased. The drought has further increased this urgency (105).

Indicator 1.3 Behavioural internalisation

Final score: +

Slogans such as “if it’s yellow, let it mellow, if it’s brown, flush it down” are an attempt to change behaviour. Respondents 100 and 105 indicate that awareness has led to mobilisation and action in the form of self-reporting of water leaks (addressing the challenge of water scarcity) and water pollution in the form of industrial pollution (foam in the river) or residential pollution (waste). The links below refer to projects encouraged by the eThekweni Water and Sanitation unit (EWS) and carried out by communities through NGOs including a citizen report card, where citizens report water pollution, such as in the Palmiet River or water pipe leakages. The municipality’s response system is quick and efficient.

A deep understanding and behavioural internalisation is however lacking. Behavioural change is mostly observed through extrinsic motivations such as water cut-offs, which lead to frustration and can actually be counterproductive, as indicated by respondent 102. These water cut-offs are only effective on the short term. Respondent 104 reflects that even during the drought, the people in the urban settings still had access to water. There is no clear overarching strategy, practice or policy.

http://www.durban.gov.za/City_Services/water_sanitation/Water_Violation/Pages/default.aspx

<https://www.duct.org.za/duzi-paddlers-information.html>

<https://palmietvalley.co.za/blog-2/>

Indicator 2.1 Information availability

Final score: ++

Information can easily and widely be found on the website of the municipality. The eThekweni Water and Sanitation unit (EWS) also does road shows where they go into the communities and make information available to people who do not have access to internet (100). Moreover, multiple institutions are active in knowledge availability, including public organisations and NGOs (109). They take an active approach through training, capacity building and education. The information is easy to

understand for non-experts and accessible through multiple sources and methods, including physical visits, TV, online, printed media and advertisements, promoting slogans such as “if it’s yellow, let it mellow, if it’s brown, flush it down” and most importantly, radio. Respondent 109 indicates that radio is the most effective way to reach remote communities within the municipality boundaries. The link below refers to such posters. The NGOs also have a verifying role that leads to a checks and balances mechanism for the municipality (109). Even though the NGOs have no legal authority, they act as a supporter but also a watchdog. This increases the reliability of the information coming from the EWS, because the information is verified by the NGOs. Respondent 109 reports that the EWS disperses no propaganda.

http://www.durban.gov.za/City_Services/water_sanitation/Education_Library/Sewage_Disposal_Education/Pages/Stormwater,-Sewage-and-Sewerage-Diagrams.aspx

Indicator 2.2 Information transparency

Final score: ++

Information is available through various sources, most importantly radio, a medium that also poor communities have access to (109). The information is reliable, there is no propaganda and is dispersed by both public and non-governmental institutions. Multiple sources and methods are used to disperse information. The main source of information is the eThekweni Water and Sanitation unit (EWS). Potential gaps, particularly critical views, are picked up by the NGOs, in particular the Duzi-Umgweni Conservation Trust (DUCT) and the Palmier River Watch. Multiple methods include physical visits, TV advertisement, online and printed posters, and radio. Moreover, the information is easy to understand for non-experts, as illustrated by the poster in the link below. With regard to water availability and particularly to water preservation, there are clear guidelines such as water saving tips available on the website, illustrated in the second link below. With regard to water quality, the municipality created a hotline where citizens can tip off the municipality about water quality violations, such as chemical or plastic pollution in rivers.

http://www.durban.gov.za/City_Services/water_sanitation/Education_Library/Sewage_Disposal_Education/Pages/Stormwater,-Sewage-and-Sewerage-Diagrams.aspx

http://www.durban.gov.za/City_Services/water_sanitation/Water_Violation/Pages/default.aspx

Indicator 2.3 Knowledge cohesion

Final score: +

Knowledge cohesion is safeguarded through the use of multiple methods (programmes, training and education) to address several issues (conservation, water demand, sanitation and health and hygiene awareness). The industry, municipality and private sector work together rather coherently. For example, most of the information that is dispersed by the eThekweni Water and Sanitation unit (EWS) was gathered through in-house research or knowledge and that of multiple external actors before it is put together in a cohesive way by the municipality. These external actors include the University of Kwa-Zulu Natal (UKZN), and in particular Pollution Research Group (PRG) of the UKZN, but also NGOs such as the Duzi-Umgweni Conservancy Trust (DUCT) or the Palmiet River watch, and commercial actors such as private consultancies or the Institute of Natural Resources (INR). (104, 105, 109).

Reference for further information:

http://www.durban.gov.za/City_Services/water_sanitation/Education_Library/Pages/default.aspx

On a critical note, information cohesion is more complex in the territory of the traditional councils. Respondent 106 indicates that the traditional authorities often have a better grasp of the value of looking after catchments and wetlands and watersheds than our ward councillors do. This creates friction.

Indicator 3.1 Smart monitoring

Final score: -

Johannessen et al. (2019) report a strong self-monitoring mechanism among the local community. Reporting of leaking pipes (water scarcity) or waste or foam in rivers or lakes (water pollution). This is confirmed by respondent 100, and adds that if water pollution is not detected by the community, it is detected at the treatment facility.

On a critical note, respondents 104 and 108 indicate that a lack of hard infrastructure maintenance leads to leaks underground, which is a particular threat to water scarcity, since they cannot be visually detected by citizens. Respondent 104 reflects that there is a lack of metering, arguing that some areas are not metered, making it impossible to identify alarming situations such as leaks, illegal bypassing of pipes or illegal abstraction of water. With regard to water quality, respondent 103 states that the quality control officers of the eThekweni Water and Sanitation unit (EWS) are present, but simply do not have the human capacity to cover the entire area.

Indicator 3.2 Evaluation

Final score: +

There is a strong trend of experimentation and learning-by-doing in the eThekweni municipality (103). Durban was the first to take the risk with the Free Basic Water (FBW) approach (105). This is a clear indication of reviewing assumptions. After the WHO had recommended 6,000 litres of free water per household per month, the eThekweni Water and Sanitation unit (EWS) did its own research and came out on 9,000 litres of free water per household per month, based on the average size of the households. Continuous evaluation of household size (from 4.2 persons per household to 4) resulted in the FBW provision of 9,000 L/household/month back to the original 6,000 L/household/month (100).

Indicator 3.3 Cross-stakeholder learning

Final score: ++

A major shift and convergence on water governance has taken place between the EWS, the Institute of Natural Resources (INR) and the Climate Adaptation department. Traditionally, the EWS sought technical solutions including the construction of hard infrastructure. Under strong leadership of the former head of the EWS convergence has taken place and the Umgeni Ecological Infrastructure Partnership (UEIP) was formed, indicating a shift in discourse from mostly utilising technocratic solutions to the value of ecosystem services and ecological infrastructure (104; 105). This convergence was observed by academia and they were involved in forging the programme. It is a strong indication that knowledge is built up internally and created by the inclusion of multiple

parties, including researchers and community engagement (Sutherland, 2014). The UEIP became an umbrella framework that functions as a guideline for continuous learning (105).

On a critical note, on the ground there is quite some competition going on since *“everyone wants to be the person who finds the solution to these wicked problems”* (103), referring to the complex environment of water governance to tackle water scarcity and pollution. Academics realise that synergy is necessary to streamline these projects in order to come to a solution, rather than competition (103; 105).

Indicator 4.1 Stakeholder inclusiveness

Final score: +

The eThekweni municipality website clearly states the existence of Focus Groups which *“aim at ensuring that there is an ongoing dialogue and interaction with our communities, guaranteeing that there is better understanding of our customers, soliciting feedback with a view to changing behaviour both internally and externally in terms of roles and responsibilities.”* Source: eThekweni municipality website

http://www.durban.gov.za/City_Services/water_sanitation/Service_Level_Standards/Pages/default.aspx

In addition, Sutherland (2015) states that the EWS actively engages with multiple actors to “develop its policies and practices for water governance, and thus its network is wide. Partnerships with research institutions such as the Pollution Research Group (PRG) at the University of KwaZulu-Natal (UKZN), which is partly funded by the Bill & Melinda Gates Foundation, and NGOs such as uMphilo waManzi have enabled EWS to experiment with new technologies and infrastructure for water and sanitation provision, which emerge from a platform of well-grounded scientific research, to provide basic universal services across the city.” (Sutherland, 2015, 22). People within the area of the traditional councils were also actively involved in a system called dual governance or cooperative governance. They are considered horizontal with regard to power relations (105). They are represented through the department of Cooperative Governance and Traditional Affairs (COGTA). Moreover, respondent 109, a representative from an NGO indicated to have a hand-in-hand relationship with the municipality, and that the NGO was able to serve as mouth piece for the community. Stakeholders are well able to speak on behalf the group that they represent. For example, different NGOs such as the Duzi-Umgweni Conservation Trust (DUCT) often represent various local communities, each with their specific interests, ranging from water scarcity issues due to leaking pipes or lack of hard infrastructure or due to polluted rivers from which they derive water, as well as upstream-downstream conflicts with regard to plastic and rubber pollution in rivers. The “rules of the game” are made very clear by the eThekweni Water and Sanitation unit (EWS).

However, some attendants (stakeholders) do not have the mandate to have a real impact on decision making. A discrepancy can be observed between the weight that each stakeholder brings to the table, and therefore the way these stakeholders are able to influence decision making. Some stakeholders are more actively engaged and others are still invited, but consulted rather than empowered to have an actual impact on policy or practices.

Indicator 4.2 Protection of core values

Final score: 0

The protection of core values ranged from good to bad. Most respondents indicated that even though access to the decision-making table was free and open to all, the actual influence on the decision was limited. For instance, the NGOs indicated to have relatively low influence on the final decision, and that stakeholder inclusiveness was more of a formality rather than a true cooperative process (109). The municipality comes to the table with a ready-made plan which they feel very strong about and only if there is a lot of resistance, they go back to the drawing board and *"cater to what we [NGO] want to hear"* (109). This means that some stakeholders consulted.

In contrast, researchers at the UKZN and the INR indicated that decisions made by the EWS were heavily influenced by research output, cooperative governance and true stakeholder engagement and that the trust collaboration was built over a long period of time (100; 104; 105). Plans such as the Umgeni Ecological Infrastructure Partnership (UEIP) are testimony to this truly symbiotic relationship. Truly gauging the process-driven motives is therefore difficult, since not all stakeholders are engaged in the same way. With large and discourse-changing projects such as the UIEP, stakeholders, including UKZN, the Pollution Research Group (PRG) and the INR are asked to commit to early outcomes in the process. With smaller projects, such as individual river rehabilitation projects, the parties are not asked to commit to early outcomes, since these projects are mainly spearheaded by NGOs themselves, and therefore take that responsibility and initiative.

Indicator 4.3 Progress and variety of options

Final score: +

The progress and variety of options is debated. On the one hand, respondents 104 and 105 praise the municipality for their true collaboration in process with the recognition that clean and sufficient water is not only achieved with hard infrastructure, but that it is a combination of green and grey infrastructure. The Umgeni Ecological Infrastructure Programme (UEIP) is testimony to this process-driven approach, rather than a strong focus on end results (point 1). Moreover, respondent 105 praises the leadership of the former CEO of the eThekweni Water and Sanitation unit (EWS) who changed the discourse of technocratic solutions towards the benefit of ecosystem services around 2015. The most relevant stakeholders, including the University of Kwa-Zulu Natal, particularly the Pollution Research Group (PRG) of the UKZN and the Institute of Natural Resources (INR) have ample opportunity to engage (point 2). Since they are asked to commit to early outcomes, the process is continuous and the exit procedures are clear, because stakeholders are engaged in a long-term collaboration that neither party can easily, nor wants to, get out of. They know what to expect from each other (point 3).

For more short-term projects, such as river clean-ups and other *"end-of-pipe"* solutions (103), there is less commitment from the EWS, and respondent 109 reflects that the municipality usually comes to the table with a plan they already feel strongly about. Some stakeholders are more actively engaged than others and have a bigger influence on the final decision than others (109, 103).

Indicator 5.1 Ambitious and realistic management

Final score: +

The eThekweni municipality website, and in particular the Department of Water and Sanitation (DWS) website clearly indicate the visions of *"water is life"* and *"sanitation is dignity"* (eThekweni municipality website; 101). It indicates key priorities (eradicating the backlog of water and sanitation

services) and the core values of customer focus, cost consciousness and a concern for the well-being of its staff. There is a realisation that long-term goals, such as tackling water scarcity and keeping the rivers free of pollution need to be addressed at the root. The eThekweni Water and Sanitation unit (EWS) therefore invests in education for children and adults to establish a long-term behavioural change. In addition, if there are short-term targets to be hit, for instance immediate stress relief on the water resources during a drought, water cut-offs are an effective, yet frustrating, according to respondent 102, way to drastically reduce water consumption and preserve water resources. There is a strong increasing trend in collecting data, especially by the University of Kwa-Zulu Natal (UKZN) and the Pollution Research Group (PRG). This data is, however not always publicly available and goes through rather heavy administrative barriers if it is to be acquired from the EWS, including meter data. Respondents report differently on the level of metering within the municipality. Moreover, the EWS created long-term plans (25 years, more information in indicator 9.3) that safeguard sustainability. This shows that the EWS has a solid foundation with a wide array of tools to tackle short-term, medium-term and long-term objectives.

Indicator 5.2 Discourse embedding

Final score: 0

From a historical perspective, collaboration with public administration has been tense. This was, of course, applicable during the Apartheid era, but also post-1994 (109). Respondent 109 indicates that the relationship between NGO, who are in close contact with the communities, especially the rural communities living in informal settlements, and the municipality, especially the eThekweni Water and Sanitation unit (EWS) has steadily improved. The main aspect that needed to change gradually was trust in the public office. Friction between the EWS and NGOs often revolves around safeguarding environmental integrity. In some occasions the EWS prioritised human settlement over environmental integrity, showcasing that there is little consensus for sustainable action.

Politically, the EWS tends to pursue technocratic solutions. Trust relations with new unconventional partners, who stand for sustainable Integrated Water Resource Management (IWRM), such as the Catchment Management Agency (CMA), need to be established. Technical interventions, aimed at increasing water supply and improving water quality, such as desalination plants or wastewater treatment plants are constructed with a careful eye on the preserving the existing ecosystem. There is a recognition that some areas are more resilient than others (100). Environmental Impact Assessments (EIA) and CWDP certificate are required to undertake water transfer schemes, called inter-basin transfers (IBT). The long-term impacts of these technical solutions are addressed in 25-year plans created by the managers at the EWS, as indicated in 9.3. The stakeholder inclusiveness in indicator 4.1 indicates that public actors, non-governmental actors and even philanthropic actors (the Bill & Melinda Gates Foundation) are involved and that the policy discourse informed on well-grounded scientific research (Sutherland, 2015).

From a normative perspective, there is a difference in perspective of the natural environment. For example, people who live in traditional council areas have a better understanding of catchment management (106). The traditional knowledge on how to (sustainably) use and preserve the (scarce) water resources is passed down generations. On the other side of the city, in the urbanised area, there is less knowledge about how to sustainably use and preserve water resources, because water stress is less of an issue. People in the city turn on the tap and there is water, regardless of drought (104, 106). These people are extrinsically motivated to preserve water resources, for instance through water cut-offs (103). People in urban settings have a more transactional relationship with

the municipality and the services it is supposed to provide; the citizen pays taxes, the public office provides water and sanitation.

From a cultural perspective, *“there is a culture of non-payment”* (103), and *“a culture that a certain non-confrontational culture exists in South Africa. This is manifested in the way that instead of holding people accountable under the present laws and governance structures, you create or set up a new policy or structure. And what’s happened over the years is that you constantly get these new policies and structures being added trying to sort out the problem and the people that are breaking the original legislation or guidelines carry on doing what they were doing and the people that are law-abiding just end up with more and more red tape.”* (106).

Indicator 5.3 Management cohesion

Final score: ++

Policy on water services is coherent with that of processes within the organisation (EWS), but also coherent with projects in the private development (private sector) and public housing (government infrastructure) (100). There is a coherent policy between the technocratically focused EWS and the environmentally focused Institute of Natural Resources (INR), resulting in the Umgeni Ecological Infrastructure Programme (UEIP) (104). Convergence has also taken place between the eThekweni Water and Sanitation unit (EWS) and the Climate Adaptation department, after recognition of mutual benefits in 2015 (105). Examples of this convergence are the Sihlenzimvelo and WizeWays projects, established from the bottom up, which addresses multiple issues at the same time and integrates water security, water quality, job security, poverty, climate governance. There is a thematic approach, so rather than focusing on separate issues, it included both hard infrastructure and ecological infrastructure, all in the absence of an overarching framework the Catchment Management Agency (CMA) was supposed to provide. In time this is supposed to create political clout (105).

Indicator 6.1 Entrepreneurial agents

Final score: +

Under strong leadership of the former head of the EWS convergence has taken place and the Umgeni Ecological Infrastructure Partnership (UEIP) was formed, indicating a shift in discourse from mostly utilising technocratic solutions to the value of ecosystem services and ecological infrastructure (104; 105).

The change of discourse in 2014/2015 from the EWS to considering more ecologically beneficial solutions for tackling water supply in the upper catchment, resulting in the UEIP is testimony to the influence that policy entrepreneurs have in the process and final decision (105). This innovative approach was mostly recognised by the former CEO of the EWS, who led the convergence between the hard infrastructure discourse towards the green infrastructure approach led by academics and the INR. The experimental and learning-by-doing approach further drives innovation for new solutions to complex water issues (103). Moreover, the PPP projects are an innovative way to make long-term and high-investment projects economically viable. Durban is a pioneer in PPP projects. They have therefore taken the role of entrepreneur that can explore unconventional ways of acquiring resources. PPP projects are long-term (20 years) and ensure create win-win-win situations (win for the municipality who owns the plant after 20 years and there is now more potable water available, win for the private party for a 20-year concession contract, win for the off-taker for long-term security of second-grade industrial water) (107).

Another example of an innovative approach was exploratory research that was conducted to find out how much support there was for using recycled water as potable water, which led to quite some resistance from the public (105).

Indicator 6.2 Collaborative agents

Final score: +

Collaboration with the traditional councils seems to create some friction, since the traditional councils and the people who live in the areas they have authority over do not see the municipality as the legitimate authority (103; 106).

Widespread collaborations have formed in the absence of an overarching strategy for Integrated Water Resource Management (IWRM) including the municipality (eThekweni Water and Sanitation Unit, Environmental Planning and Climate Protection Department, Coastal, Stormwater and Catchment Management Department), NGO (Palmiet River Watch), academia (UKZN), commercial stakeholders (business consultancy). There has also been a convergence with the Climate Adaptation department and the EWS (103, 105; 106). These informal networks are important to build trust between the municipal government and the public, especially in South African (historical) context (103; 109). One project was deliberately slowed down to see what people's relationship with the river was (103). This indicates that the emphasis lies on collaboration and giving the stakeholders the opportunity to investigate the environment before making decisions. There is a level of trust between ordinary citizens and the government that was not there before (105; 109). There is active engagement with the private sector in PPP projects (107).

Indicator 6.3 Visionary agents

Final score: ++

Perhaps the best example is the PPP project, which was aimed at using second-grade water to supply two industrial off-takers, leveraged by a private party and owned by the municipality. This ensured a good coherence between short-term targets – the provision of industrial-grade water, thereby sparing potable water – with long-term visions – tackling water scarcity. This vision is clearly communicated in the form of presentations to other municipalities (107). Moreover, there are multiple long-term plans by the EWS to construct more desalination plants. One will be a plant that can produce 65 megalitres of potable water from a mix of seawater and reused water, a first of its kind (100).

Indicator 7.1 Room to manoeuvre

Final score: ++

In 2014 the head of the eThekweni Water and Sanitation unit (EWS) adopted a flexible policy framework to ensure adaptability in service provision and the room to manoeuvre (Sutherland, 2014). Later, this resulted in the collaboration of multiple institutions, including the EWS, Environmental Planning and Climate Protection Department (EPCPD), Coastal, Stormwater and Catchment Management Department (CSCM) and the Department of Environmental Affairs (DEA), as well as collaborations with the private sector in the University of Kwa-Zulu Natal (UKZN) and Institute of Natural Resources (INR), leading to innovative projects such as the Umgeni Ecological Infrastructure Program (UEIP). (104; 105). This renders space for the creation of fit-for-purpose partnerships, for instance safeguarding water quality can go hand in hand with preserving ecological

integrity. The unconventional partnership between the technocratically oriented EWS and the naturally oriented INR is testimony for the learning-by-doing character of the EWS within the overall framework of catchment management, that is increasingly becoming more integrated. Clean and sufficient water for everybody is a goal that all stakeholders can get behind, and it is evident that approach on how to achieve this objective differs.

Indicator 7.2 Clear division of responsibilities

Final score: ++

There is a clear division of responsibilities. As long as the water runs freely, the DWS is the custodian. This means that the provincial DWS (Kwa-Zulu Natal) is responsible for the water quality. The ideology is to transition to a decentralised catchment management system, for which 9 Catchment Management Agencies (CMA) have been created, who will be tasked with managing the issues of water quantity and water quality throughout the entire catchment, while still allowing the room to manoeuvre for municipalities to create fit-for-purpose solutions. A separate Governance Capacity Analysis was conducted only on the CMA of Pongola-Umzimkulu (the relevant study area in which Durban lies) and is included in this research.

As soon as the water reaches the eThekweni municipality, the bulk water for the municipality is supplied by Umgeni Water, a parastatal. From that moment, the eThekweni Water and Sanitation unit (EWS), as the water service authority, are responsible for safeguarding the quality of the water and the reticulation of the water (102; 104; 107). The provision of hard and green infrastructure (or a combination in case of the Umgeni Ecological Infrastructure Program) is the responsibility of the EWS.

On the eThekweni municipality website there is a clear flowchart that shows who is responsible for what part both for water supply (water scarcity) and water treatment (water quality). Synergetic cooperation is evident.

On a critical note, the fit-for-purpose solutions are implemented but do raise quite some resistance, for instance if the EWS cuts off the water supply to save water. This does not lead to behavioural change but instead to frustration (102).

Perhaps the best example is the PPP project, which was aimed at using second-grade water to supply two industrial off-takers, leveraged by a private party and owned by the municipality. This ensured a good coherence between short-term targets – the provision of industrial-grade water, thereby sparing potable water – with long-term visions – tackling water scarcity. This vision is clearly communicated in the form of presentations to other municipalities (107).

Indicator 7.3 Authority

Final score: 0

The eThekweni Water and Sanitation unit (EWS) has a lot of authority in their municipality. The Department of Water and Sanitation (DWS) is informed, but does not have to approve on PPP projects undertaken by the EWS (107). The DWS, who is technically the next level “up” in terms of governance, is often bypassed, since the EWS has the power to address national government directly or other departments such as the Department of Environmental Affairs (DEA). (106). The municipality has its own executive committee (107). EWS receives much support from almost all stakeholders who acknowledge it as legitimate. Only one respondent (from the DWS) was critical, which is in line with the narrative of the ongoing struggle between the EWS and the DWS. The EWS has authority locally over their municipality, but also plays a leading exemplary role in adjacent municipalities, as

reflected by respondent 109, nationally, as indicated by respondent 107 (PPP manager) and internationally (Sutherland, 2014).

An important note is the dual governance structure that is present in eThekweni. 43% of the land in the eThekweni municipality is “owned” by the Ingonyama Trust Board, which is a traditional council (105). The word owned is between parenthesis because technically the land is owned by the Republic of South Africa (RSA) (102; 105). The DWS nor the EWS are perceived as the authority in this area, which creates friction and contradiction (106). This is showcased in that ward councillors in these areas sometimes claim authority because they have been democratically elected, whereas the Amakosi – the tribal chiefs – are seen as the true authority by their followers.

Another example of friction is that people are now “buying” property in Ingonyama Trust land. They are allocated a plot by the Amakosi and build houses on that land. The result is the construction of 10-12 million Rand (approximately €500,000.00) houses that are not connected to the main water supply (106).

Another example of friction is where people acquire land in Amakosi territory that is receiving FBW and building residences on that land. This way, people who do not need FBW have access to 6 kL of free water per month, while being able to pay for it. The municipality countered this by making FBW available only for households whose property is worth less than R250,000 (approximately €12,000.00) (105).

Since the EWS is the water service authority, they are tasked with providing water to all citizens in the municipality, so too the people living in the traditional council areas, however the land or property has been acquired. The EWS does not have jurisdiction on land rights and use. It shows that the water challenge is addressed as long as the status quo – the dual governance structure – is not questioned. The friction between the traditional councils and the EWS makes it difficult to make truly integrated and long-term plans for the municipality as an entity. The fragmented structure, where the power relations between the traditional councils and the EWS are equal on paper, but discrepancies in democratic legitimacy and public perception exist, allows for only incremental and technical interventions.

Indicator 8.1 Affordability

Final score: +

Free Basic Water (law) for indigent households, that is everyone with a house value of under 250,000 Rand (105). The solidarity principle is thereby solidified in the national legislation. This has been on the political agenda for decades (102). Infrastructure such as ablution blocks are present in areas that do not have proper water and sanitation (informal settlements) and there is a “leave no man behind” policy, manifesting in a progressive tariff system for water services (100). Indigent households receive 6 kL per month free water. They are also provided with sanitation through these ablution blocks.

Even though FBW is accessible to poor people, wealthy people found a loop hole by “buying” land in the traditional authority area and thereby have access to FBW. Adaptive governance is displayed by a policy change where the determining factor for FBW was no longer geographical area but rather property value. Only properties with a value of below R250,000 are eligible for FBW.

Indicator 8.2 Consumer willingness to pay

Final score: -

There is an overall low willingness to pay (water is undervalued and under-priced) because of the strong paradigm that water is a human right and should therefore be free, or at least cheap, for

everyone. This compromises the sustainable and efficient management of water, since it is not a financially appealing industry to enter (104). Moreover, there are high levels of mistrust that the money is well-spent. People are frustrated with the system that is corrupt (102). This is an indication that the money goes to only a small group of people. Expenditure with regard to the water challenges of clean and sufficient water are often based on end-of-pipe solutions, so providing ablution blocks or providing water through water tanks, rather than trying to fix the reticulation infrastructure. It is incredibly hard to estimate to what extent money is spent on end-of-pipe solutions rather than point-source solutions (100; 102; 103).

Indicator 8.3 Financial continuation

Final score: -

Resources are available, but it is not organised in a way that stimulates sustainable use (104). Moreover, it stimulates corruption and looting (104). As long as water is under-priced, insufficient resources are raised to invest in the hard infrastructure or catchment management (104). Water provision is government-backed, so if it fails it will always be subsidised.

With regard to water quality, there is insufficient human capacity to deploy sufficient pollution officers to monitor surface water quality. Despite the apparent success of self-reporting of water pollution, due to a consolidated effort by the eThekweni Water and Sanitation unit (EWS) to raise awareness and empower citizens to take ownership of their water resources, the lack of human capacity for pollution officers is a result of insufficient funds and financial continuation. More information on the water coverage ratio is provided in the City Blueprint Performance Framework in this thesis.

Indicator 9.1 Policy instruments

Final score: 0

Even though the eThekweni Water and Sanitation unit (EWS) has the highest implementing capacity in the region, its capacity to actively pursue culprits of water pollution or illegal looting or bypassing of pipes is low (103). This vision is not shared by the EWS itself, who argue that the pollution chasers are active and effective (100). A nuanced view was shared by the academics, who acknowledge a low capacity for effectively chasing using policy instruments to chase culprits, but a strong effort to improve this capacity (105).

In fact, the urbanised area of the municipality is fully metered. This, in combination with the progressive tariff system, is an effective instrument to monitor how much water citizens are consuming and the consequent revenue stream. During a drought or periods of water scarcity, the EWS has the option to cut off the water supply in order to reduce consumption.

With regard to water quality, quality monitoring is done through pollution officers and self-reporting. If pollution (particularly chemical pollution) is not detected in the stream, it is detected in the water treatment facility (100).

Indicator 9.2 Statutory compliance

Final score: -

Statutory compliance in the eThekweni municipality is limited due to a lack of (human) capacity to actively enforce its mandate and chase culprits, and if they get fined, it is not very much (103; 105). A major problem is non-revenue water, which is up to 35.5% in a water-scarce country (104). This issue is countered by retrofitting taps and water pressure regulators (Lifeline) (102; 100). The city indicates that if people are unable to pay their water bills, a payment package is created together

with the user to repay the debt. This applies to people living in the city who pay for their water bill on a monthly basis, and also for the indigent households in the informal settlements who use more than the free 6kL of water per month. It is possible, for instance, that these households have so-called “back-yard dwellers”, who also make use of the free water provision, increasing the household from the average four persons up to seven or eight. Water that is consumed above the free 6kL per month needs to be paid for in the same progressive tariff-based system.

Respondent 106 indicates that a certain non-confrontational culture exists in South Africa. This is manifested in the way that instead of holding people accountable under the present laws and governance structures, you create or set up a new policy or structure. And what's happened over the years is that you constantly get these new policies and structures being added trying to sort out the problem and the people that are breaking the original legislation or guidelines carry on doing what they were doing and the people that are law-abiding just end up with more and more red tape.

Indicator 9.3 Preparedness

Final score: +

Long-term plans have been established in preparation of the changing demographic, environmental and economic forecast for the next 25 years (100). These include a water security plan, 25-year water infrastructure master plan and the 25-year wastewater infrastructure plan, the reuse strategy for eThekweni and the 4 year forecast, 25 year forecast growth plan, the water services development plan. The implementation of these projects will be funded with PPP projects (100; 107). The EWS has constructed a 65- megalitre blend of desalination and reuse water, first of its blend in the world, we are now looking at upgrading that to 100 megalitres per day. There is a recycling plant providing industry-grade water. The EWS is also looking into IBT (inter-basin transfer) in the south together with Umgeni water that will assist, especially when water becomes critical.

Strong criticism is voiced by the Department of Water and Sanitation (DWS), arguing that the eThekweni municipality has a lot of dilapidated hard infrastructure and criticises the municipality for inadequate planning of how many people would have to use this infrastructure (108). It is argued that instead of focusing on the long-term future, the current situation must be addressed first.

Appendix IV: Substantiation GCA Pongola-Umzimkulu Proto CMA

Indicator 1.1 Community knowledge

Final score: 0

It is assumed (and confirmed by interviewees 101 and 104) that South Africa is a water-scarce country. A basic understanding of clean and sufficient water is therefore present. A deeper understanding of the risks of water scarcity and pollution for drink water purposes and consequent health impacts is to a much lesser extent present throughout the catchment. The Catchment Management Strategy (CMS) has raising awareness throughout the catchment as one of its main objectives, particularly raising awareness for the uncertainty of natural disasters, which can significantly impact water resources (CMS, 2019, 21). Not much data on the impacts of water scarcity on the entire catchment as an entity is publicly available, which makes it difficult to map how well the future uncertainties are understood. This is acknowledged in the CMS and pointed out as one of the main action points (CMS, 2019, 22). Awareness is raised in pockets of the Catchment Management Agency (CMA), such as the eThekweni municipality, where the people have quite high awareness of clean and sufficient water.

The fact that the Catchment Management Agency of Pongola-Umzimkulu is not yet officially established, makes it difficult for stakeholders to fully commit to the ideology of Integrated Water Resource Management (IWRM). The CMA makes a tremendous effort to include stakeholders (Condition 4) and raise awareness throughout the catchment that an integrated governance approach can effectively address water quantity and quality.

Indicator 1.2 Local sense of urgency

Final score: +

There is a general sense of urgency throughout the catchment, especially in areas where water is scarcer, or there where water is on high demand, such as the urban, industrialised or agricultural-intensive areas (102).

There is an increasing understanding of the causes, impacts, scale and urgency of the water challenge. The National Water Act of 1998 already stipulated that there was a need for *“the integrated management of all aspects of water resources and, where appropriate, the delegation of management functions to a regional or catchment level so as to enable everyone to participate”* (RSA, 1998, 3). This was followed by the creation of the Proto Catchment Management Agency (CMA) of Pongola-Umzimkulu, one of 9 CMAs in the country, in 2014. With increasing and prolonged periods of drought and water scarcity in an already semi-arid country, the urgency to transition to an integrated and decentralised form of water governance through CMAs is increasing.

Yet, this sense of urgency has not lead to a consolidated an integrated successful implementation of addressing the future risks and uncertainties related to climate change, since the CMA is not yet officially established. Resources are an issue, because a new entity requires funding. More on funding in condition 8.

Source: RSA, Pub. L. No. 36, National Water Act (1998).

Indicator 1.3 Behavioural internalisation

Final score: 0

The Catchment Management Strategy (CMS, 2019) is an example of mobilisation and action. One interviewee who has been heavily involved in the creation of the CMS (101) states that a priority is that illiterate farmers are educated. The CMS is currently a 90% draft dating from 2019, so the strategy is almost in place, it has not been put into national policy yet, so it has not yet been internalised (101).

Indicator 2.1 Information availability

Final score: -

The Catchment Management Strategy (CMS) is currently not publicly available. This overarching strategy document will be a guiding element managing the catchment of Pongola-Umzimkulu. Additional information about the Catchment Management Agency (CMA) is also hard to find. When mentioned, most interviewees respond that they know of the CMA, but that is mostly it (100, 102, 103, 105). As soon as the CMA is officially established, one of its main objectives will be dispersing information about Integrated Water Resource Management, something that is already clearly mentioned in the CMS (CMS, 2019, 32).

The information that is currently available is from public sources. There is no mention of the CMA on the website of its biggest and more important municipality; the eThekweni municipality, where its biggest city – Durban – is located. The CMS has been created by representatives from the Provincial Department of Water and Sanitation and a combination of (Dutch) public water governance officials and local private consultants. Some studies on the CMAs have been published, including Stuart-Hill (2018), Meissner (2017) and Bourblanc & Blanchon (2014). These studies review the discourse of decentralised catchment management from a South African perspective. No studies exist specifically on exploring the opportunities for tackling clean and sufficient water on catchment level for the CMA of Pongola-Umzimkulu.

Indicator 2.2 Information transparency

Final score: 0

Since the CMA has not been established, it is not that easy to find information on how they address the water challenges of clean and sufficient water. The available information comes from the government in the form of a news article published by the government of South Africa (source: https://www.gov.za/minister-establishes-nine-catchment-management-agencies?gclid=CjwKCAjwyo36BRAXEiwA24CwGWLTE8ya07Cuv56I7ns95twpNQr9t4sBnmy09TAeRPnh02s6wnn9QRoCq14QAvD_BwE) and from papers in academic articles. This information is not easy to understand for non-experts, because it assumes prior knowledge about, among other things, integrated water resource management. Yet, action has been taken to make knowledge more understandable: the Catchment Management Forums are the best way for non-experts to find information about the CMA. These are physical meetings and therefore take effort to attend. The forums are open to all stakeholders (108).

Indicator 2.3 Information cohesion

Final score: 0

The Catchment Management Strategy (CMS) clearly indicates the long-term and integrated nature of water governance with regard to clean and sufficient water (CMS, 2019, 2). Plans are tailored to specific local contexts. External experts such as HydroNET are working together with the Catchment Management Agency to coherently collect data and make it more transparent (108).

On a critical note, there is friction in the stakeholder collaboration between the traditional councils and the municipal/provincial government, because the people in the tribal areas do not recognise the Department of Water and Sanitation (DWS) as the authority. They follow the Amakosi, who are the local chiefs. Indigenous knowledge is argued to be an important source of information and is understood to have *"a better grasp of the value of looking after catchments, wetlands and watersheds than the ward councillors do."* The CMS mentions the importance of increased collaboration and integration of the traditional authorities once (106; CMS, 2019, 31).

Indicator 3.1 Smart monitoring

Final score: -

For groundwater quantity the Catchment Management Agency (CMA) has no monitoring system in place. For surface water quality, the CMA has a monitoring system in place, but budget constraints compromise the regularity of the river system. Only major rivers are monitored for quality by the CMA. On a positive note, the Catchment Management Strategy (CMS) mentions the search term "monitor" 59 times, indicating that monitoring is of high importance. It is mentioned in the context of monitoring the role players (p.17), increasing the quantity of monitoring sites (p.18) addressing both water quality and water quantity. (108; CMS, 2019).

Alarming situations, for example where areas are disproportionately hit by drought leading to water scarcity, or hit particularly hard by floods leading to water quality degradation, are identified and reported via Catchment Management Forums (CMF), organised by the Proto CMA. There are 4 meetings per year in the 25 sub-catchments in the catchment of Pongola-Umzimkulu that are open to all stakeholders to raise these alarms. Due to fragmented policy and the fact that the CMA of Pongola-Umzimkulu is not yet officially commissioned, there is no coherence in measurements, nor a central data base administered by the CMA. Measuring and data analysis is currently done by the municipalities. There is currently an advertisement out for the recruitment of competent staff. This means there is, at the time of this thesis, a lack of competent staff available to officially kick off the CMA.

Indicator 3.2 Evaluation

Final score: -

This score is based on the fact that there is an intention to collaborate with different institutions in the Catchment Management Strategy. Respondent 108 indicates that they do have some responsibility in water quality monitoring, but the evaluation of the monitoring mechanism faces big challenges because they do not have a stick behind the door. They do not have the mandate to make autonomous policy decisions based on the evaluation, this still goes through the Department of Water and Sanitation.

Indicator 3.3 Cross-stakeholder learning

Final score: +

With the official introduction of the nine Catchment Management Agencies (CMA) in 2012 (source: <https://www.gov.za/minister-establishes-nine-catchment-management->

[agencies?gclid=CjwKCAjwyo36BRAXEiwA24CwGWLTE8ya07Cuv56l7ns95twpNQr9t4sBnmy09TAeRPnh02s6wnn9QRoCq14QAvD_BwE](https://www.google.com/search?gclid=CjwKCAjwyo36BRAXEiwA24CwGWLTE8ya07Cuv56l7ns95twpNQr9t4sBnmy09TAeRPnh02s6wnn9QRoCq14QAvD_BwE)) one of its main roles is the facilitation of stakeholder input to create cross-stakeholder learning, by combining the knowledge from regional water utilities, water user associations, Water Research Commission and the management of the national water resource infrastructure.

As a side note, from the stakeholder engagement procedure of the CMA it can be assumed that cross-stakeholder learning will be integral in the success of the CMA (CMS, 2019).

Indicator 4.1 Stakeholder inclusiveness

Final score: +

All stakeholders are actively engaged through the Catchment Management Forums (CMF), which are open for every stakeholder to attend and raise points of concern. Stakeholders have the opportunity to speak on behalf of who they represent. Whether that is the Water Users Association (WUA), industry or agriculture depends on in what area the CMF is held. Most stakeholders are informed. With the low capacity at departmental level (Department of Water and Sanitation), arrangements and collaborations are sometimes struck with other departments, for instance the Department of Environmental Affairs (DEA) (106). This leads to inefficiencies, since the DEA is now doing what the DWS is supposed to be doing. The terms of engagement (Catchment Management Forum) are clear (everybody is invited; 100, 101, 104, 105, 108, 109).

Indicator score 4.2 Protection of core values

Final score: -

Most stakeholders have low influence on the final decision. Concerns are raised, but nothing is done with them (109). This causes stakeholders to withhold from going to the meetings; some feel they are "ineffective" (109), they are just "talk shops" (103). The main reason for this is that the decision cannot be made locally, because the CMA is currently not a statutory body (101, 108). Decisions are taken up by the DWS and finally decided centrally (101). This does not mean that the CMA is "going through the motions" (101), but rather that they do not have the mandate (yet) to make decentralised decisions. The Catchment Management Strategy and the National Water Act both clearly reflect the vision of decentralisation for water governance.

Indicator 4.3 Process and variety of options

Final score: 0

Rather unilateral decision-making leads to low co-creation of solutions. Respondent 101 reflects that if the stakeholder group is rather homogenous, for instance at a Catchment Management Forum meeting where the surrounding area is involved in the same type of activities (industrial, agricultural), co-creation of solutions is rather easy. However, when the stakeholder group was more diverse, different problems were discussed but agreements are unclear. This is mostly due to the fact that the Proto Catchment Management Agency does not have an official mandate and therefore stakeholders are only involved for short periods with a lack of follow-up. Issues raised at the CMF are passed on to the Department of Water and Sanitation (DWS) and decided centrally and unilaterally (101, 108).

Indicator 5.1 Realistic and ambitious management

Final score: +

The Catchment Management Strategy (CMS) puts forward a strong vision towards sustainable IWRM as is translated into long-term goals. Its main functions are to coordinate and advise (108). Given that the Catchment Management Agency (CMA) currently lacks a mandate, it is hard to estimate achievements and realistic targets. Respondents indicate that even though a functional CMA is desirable, its effectiveness can be compromised due to scale, lack of compliance (105), lack of expertise at senior management level (102; 104), composition of the catchment in terms of complexity and diverse ecological environment and economic activity (105) and overlapping institutions (106).

Moreover, there is no clarity on how many CMAs will be established. Initially, it would be 19, then it was 9 (at the time of this thesis), now the government is discussing new plans to make it 6. All in all, the ambition to create the CMA is there in all forms, on paper in the National Water Act and CMS, but there is a lot of uncertainty about what exactly it will look like and what its territory and authority will be (101). There is low support from the stakeholders in the urban environment.

Indicator 5.2 Discourse embedding

Final score: ++

The Catchment Management Strategy (CMS) reflects a strong recognition of the importance of people, planet and prosperity in the Provincial Growth and Development Strategy. The Strategy aims at addressing all three topics simultaneously (CMS, 2019, 4).

Historically, water governance, particularly distribution and reticulation, was strongly centralised and regulated by the Apartheid government and biased towards white agricultural business owners. The National Water Act (NWA) of 1998 specifically mentions there is a need for *“the integrated management of all aspects of water resources and, where appropriate, the delegation of management functions to a regional or catchment level so as to enable everyone to participate”* (RSA, 1998, 3). The CMS is clearly an extension and a mobilisation of this policy towards implementation of decentralised water governance.

Culturally, respondents indicate *“there is a culture of non-payment”* (103), and *“a culture that a certain non-confrontational culture exists in South Africa. This is manifested in the way that instead of holding people accountable under the present laws and governance structures, you create or set up a new policy or structure. And what’s happened over the years is that you constantly get these new policies and structures being added trying to sort out the problem and the people that are breaking the original legislation or guidelines carry on doing what they were doing and the people that are law-abiding just end up with more and more red tape.”* (106).

Politically, sustainability is on the agenda of the ruling party at national and provincial level (ANC). This is encouraging with regards to policy making and policy implementation, because there is, from an ideological perspective, little friction between the spheres of government – national, provincial, local (105). There is an attempt to combine development goals of eradicating hunger and poverty together with stimulating sustainable consumption and production (CMS, 2019, 15). In reality, sometimes human settlement is prioritised over ecological integrity, as respondent 109 indicates.

From a normative perspective, there is a difference in perspective of the natural environment. For example, people who live in traditional council areas have a better understanding of catchment management (106). The traditional knowledge on how to (sustainably) use and preserve the (scarce)

water resources is passed down generations. On the other side of the city, in the urbanised area, there is less knowledge about how to sustainably use and preserve water resources, because water stress is less of an issue. People in the city turn on the tap and there is water, regardless of drought (104, 106). These people are extrinsically motivated to preserve water resources, for instance through water cut-offs (103). People in urban settings have a more transactional relationship with the municipality and the services it is supposed to provide; the citizen pays taxes, the public office provides water and sanitation.

Source: RSA, Pub. L. No. 36, National Water Act (1998).

Indicator 5.3 Management cohesion

Final score: -

There is a big gap between legislation and implementation. The philosophy of collaboration is present only in limited amounts (101; 105). A lot of people and agencies are doing different things. These people step into the apparent institutional void (103). This void is caused by a lack of coordination, integration and an overarching strategy or institution. This leads to overlap in projects, which in turn leads to inefficiencies (103; 109). Respondents reflected that while these projects are happening from the bottom up, such as the Transformative Riverine Management Programme (TRMP), it is not likely that the central government will legitimise the actions of these actors, because it is likely that they want to control the process of the Catchment Management Agency (CMA) (105). It is therefore unlikely that unconventional coalitions will get the chance to be formed. Moreover, it is difficult to gauge the intent and the policies of the traditional authorities. They see themselves as a separate entity not bound by municipal rules and regulations (102). This shows high levels of incompatibility and fragmentation. This fragmentation is seen throughout the catchment, where silo thinking and not-in-my-backyard thinking prevails (109).

Having said that, the strategy clearly states that collaboration with local actors is crucial. Cross-boundary collaboration is already present, since the CMA currently falls under the Department of Water and Sanitation (DWS), meaning that agents have double roles, such as respondent 108. This leads to integration between policy spheres, which leads to greater cohesion.

However, since the CMA has not been officially established yet, it remains to be seen whether true integration and collaboration can be realised. This will be dependent on who is elected by the Minister to sit on the board. Respondent 102 indicates that this board needs to be seen as an authority, which it is currently not, and reflects that it could take years for them to establish trust throughout the catchment. Respondent 105 indicates that the informal ties between water managers is key to forge this trust. Respondent 106 indicates that instead of forming an entirely new board, the current ward councillor system could be upgraded to CMA level, meaning that these informal ties would already be present and with it, the necessary trust that respondent 102 and 105 are referring to.

Indicator 6.1 Entrepreneurial agents

Final score: -

Agents of change struggle to gain access to resources at the geographical scale of the Catchment Management Agency (CMA), roughly the size of the province of KwaZulu-Natal. Large agricultural

businesses or industrial players with extensive capital resources have a lot of political power. It is hard for smallholding farmers to compete among these large companies. Respondent 101 indicates that the Catchment Management Strategy (CMS) is aimed at supporting and educating smallholder farms in order to “level the playing field” and smooth out historical, socio-economic, political and racial differences. The Catchment Management Strategy (CMS) currently has no strategy for gaining the monetary resources necessary to carry out its monitoring and advisory tasks (CMS, 2019, 37). Agents employed at CMA level currently have official positions within the Department of Water and Sanitation (DWS). At present, the CMA does not have a functional business model (102). External agents, such as water governance consultants, have the opportunity to get involved, but have ultimately no better chance of gaining resources than the people currently running the Proto CMA, unless these resources come from foreign aid (101).

Indicator score 6.2 Collaborative agents

Final score: +

Facilitators (Dutch consultants) have been administered to coordinate processes (101; CMS, 2019). There is good flexibility in what is needed to create the ideal collaboration composition. Moreover, the Transformative Riverine Management Programme (TRMP) is an attempt for an umbrella framework in the absence of a strong Catchment Management Agency (CMA) (105). The apparent institutional void creates opportunity for stakeholders to form coalitions from the bottom up and for “passionate individuals” to step up (105; 109). This causes informal networks and coalitions to be forged. It must be noted that the traditional councils are not part of the water resource management (108). Yet, the traditional chiefs, the Amakosi, welcome interaction with higher levels of government, because it offers them an opportunity to gain access to water resources (108).

Indicator score 6.3 Visionary agents

Final score: +

The Catchment Management Strategy (CMS) is a long-term strategy aimed at sustainable development. There is discrepancy between short-term targets (the creation of the CMA) and the implementation (of decentralised IWRM). The effect and impact of the envisioned strategies is poor because the Catchment Management Agency (CMA) is not established yet and is not a statutory body (108). In addition, vacancies for the board of the CMA are currently outstanding (108). This allows for leaders in water governance to step up and take the reins.

Indicator 7.1 Room to manoeuvre

Final score: +

Actors, especially those who have

The Transformative Riverine Management Programme (TRMP) is a collaboration of the eThekweni, Msunduzi and Umgungundlovo municipalities in an attempt to create an umbrella framework in the absence of an integrated strategy set forth by the Catchment Management Agency (CMA) (105). The apparent institutional void creates opportunity for stakeholders to form coalitions from the bottom up and for “passionate individuals” to step up (105; 109). This causes informal networks and coalitions to be forged. It must be noted that the traditional councils are not part of the water resource management (108). Yet, the traditional chiefs, the Amakosi, welcome interaction with higher levels of government, because it offers them an opportunity to gain access to water resources (108). It is expected that national government wants to control the CMA process from the top down (104, 105). Respondent 105 reflects that if the central government allows the space for agents and agencies to create bottom-up coalitions, it could work very effectively all the way up to CMA level. This is confirmed by respondent 106 who pleads for an upgrade of the current ward system.

Indicator 7.2 Clear division of responsibilities

Final score: -

Establishing a clear division of responsibilities requires a well-defined territory for the Catchment Management Agency (CMA) to operate in and build its authority in (101). This is currently lacking. Respondent 102 indicates that it would take years to establish the trust necessary to create authority and capacity amongst the stakeholders. In addition, the current CMA board does not have statutory powers, meaning that they are not able to make decisions. This also compromises their authority. The current authority, the Department of Water and Sanitation (DWS), does not lack interest, but rather lacks capacity. This leads them to be “fairly thin on the ground” (106).

A concrete example is where the CMA currently has the responsibility to trace water polluters, they do not have the mandate to enforce compliance. Official enforcement goes through the DWS, which leads to inefficiencies, since the problems cannot be solved locally. The final decision is made by the DWS centrally. In the future, respondent 108 indicates the CMA will probably not become a statutory body. This means that the collaboration will have to be smooth and communication lines short, like they seem to be now (as the CMA is currently a subdivision of the DWS). The success of the CMA depends on how they establish themselves as an authority in water governance, how good the ties are with the existing governance structures and how well the mandate – the CMS – aligns with the already existing water governance agenda. The CMA as non-statutory body does not have to be inherently negative, it means the collaboration and the division of responsibilities needs to be clearly defined.

It is also unclear what exactly the CMA would do in the space, especially when there is already a ward councillor system in place (102, 106). Ward councillors are democratically elected representatives of subdivisions of municipalities. The ward councillors in a municipality account for half of seats on the municipal council. The other half is chosen from the party list of the ruling party in that municipality. Adding a level of government would mean there are also CMA representative doing work that is already partially done by the ward councillors, such as receiving complaints and giving advice.

Yet, there is a recognition by the national government in the NWA that water governance is best arranged in a decentralised manner (NWA, 1998). Moreover, throughout the catchment there is a rather clear picture of who is the custodian of the water while it runs freely (DWS), the bulk water

supplier (Umgeni Water) and the water service authority (the municipalities, such as the eThekweni Water and Sanitation Unit (EWS)) (104). There is a realisation that the knowledge is scattered throughout the entire CMA, and in establishing the new management board of the CMA adverts have been dispersed to reach these experts (108).

Source: Source: RSA, Pub. L. No. 36, National Water Act (1998).

Indicator 7.3 Authority

Final score: 0

The water challenge is addressed as long as the status quo is not questioned. The status quo in this case refers to the traditional councils. The traditional councils own large parts of the province of KwaZulu-Natal, which is roughly comparable with the (provisional) territory of the Catchment Management Agency (CMA). As long as this land and management of it remains untouched and under the authority of the traditional councils, there is space for incremental changes with regard to clean and sufficient water. Authority in the territory of the CMA is highly political. The land is not officially owned by the Amakosi, but it is perceived as such by the traditional councils (102, 106). Officially the land belongs to the Republic of South Africa (RSA), and allocation in terms of renting or buying land therefore officially falls under the authority of the RSA. This creates friction with regard to scarce resources such as water and particularly water allocation. As the water runs freely throughout the catchment(s), the custodian is the Department of Water and Sanitation (DWS). If the CMA would be officially established, it would remain a non-statutory body, which means decisions will continue to go through the DWS and through the centralised channels (108). This compromises the much-needed (perception of) authority as indicated by respondent 102, 105 and 106, of the CMA.

In addition, respondent 108 indicates that people in power have a problem with decentralising or separating responsibilities. If a water manager at provincial level has 25 staff under him or her, a decentralisation of water governance or a redistribution of responsibilities towards a CMA structure could mean that manager is left with "only" 10 people under his or her responsibility. The resistance to this type of change causes a delay in the decentralisation process.

On the other hand, at this point it is about establishing the CMA as a first step. The Catchment Management Strategy (CMS) is already there, giving it a head start and so they can 'hit the ground running'. Statutory status is something that is a worry for the future. Establishment is a priority (101).

Respondent 102 indicates that the board of the CMA needs to be seen as an authority, which it is currently not, and reflects that it could take years for them to establish trust throughout the catchment. Respondent 105 indicates that the informal ties between water managers is key to forge this trust. Respondent 106 indicates that instead of forming an entirely new board, the current ward councillor system could be upgraded to CMA level, meaning that these informal ties would already be present and with it, the necessary trust that respondent 102 and 105 are referring to.

Indicator 8.1 Affordability

Final score: -

With regard to affordability, the Catchment Management Strategy (CMS) currently has no strategy for the effectiveness of revenue collection. This indicates that there is currently no plan for independently financing the actual Catchment Management Agency (CMA). The CMA is currently financed by the Department of Water and Sanitation (DWS), which is struggling with capacity and finances by its own account. Moreover, there is currently no strategy to effectively and efficiently arrange expenditure mentioned in the CMS (CMS, 2019, 37). This does not necessarily have to be a

problem, if the CMA can effectively work together with public stakeholders and continue to be funded by the DWS. The fact that there is no strategy in place in the CMS is alarming.

Indicator 8.2 Consumer willingness to pay

Final score: -

Willingness to pay for the provision of clean and sufficient water varies strongly throughout the catchment. There is a strong sense that indigent households should have access to a certain amount of free water. This has been taken up in the Free Basic Water Act (FBW). People who can pay for water, should pay for water according to the current tiered tariff system (102, 104, 105).

Indirectly, as the Catchment Management Agency (CMA) is a unit to advise, strategize, coordinate and monitor, a well-funded CMA indirectly leads to the better provision of clean and sufficient water. Willingness to pay for this provision therefore also depends on the crucial tasks carried out by the CMA. An additional layer of taxation has been proposed to fund the CMA, as indicated by respondent 106. This is not verified in the Catchment Management Strategy (CMS), since there is no clarity on affordability or willingness to pay in the CMS. There is a strong resistance to paying an extra layer of tax, especially when there is already a ward counsellor system in place for which the cost is already integrated. The importance is therefore viewed differently by different stakeholders, such as respondent 106.

Indicator 8.3 Financial continuation

Final score: -

Potential resources are available to perform the basic management tasks to address the adequate provision of clean and sufficient water. These resources are currently owned by the Department of Water and Sanitation (DWS). As long as the water flows through the province of KwaZulu-Natal, the DWS is the custodian of that water and is therefore responsible for providing sufficient and clean surface water. The financial continuation and/or coverage ratio of the DWS is beyond the scope of this research, but the philosophy of the government, as stipulated in the National Water Act of 1998, is to decentralise water governance catchment management level. It is therefore assumed that some of the responsibilities, and with it, finances will be deferred to the Catchment Management Agencies (CMA).

The current managers of the Proto CMA have a double role at the Proto CMA and the DWS. Hence expenses are currently "funded" by the DWS. No clear criteria can be found on the resource allocation. No formal payment structure has been established in the Catchment Management Strategy (CMS).

Indicator 9.1 Policy instruments

Final score: -

The set of policy instruments, i.e. the ability to take a case to court leads to imbalance between the prosecuting party (Catchment Management Agency or the negatively impacted stakeholder(s)) and the polluter, who is usually a large industrial or agricultural party, with close and direct ties to the government, who have the power to prevent cases to go to court before the lawsuit even reaches the national level. This imbalance is heavily biased towards the polluter. With the change of national government, these inefficiencies are addressed, but this takes time. This also refers to the (lack of) authority that the Proto CMA currently has (101).

Indicator 9.2 Statutory compliance

Final score: -

The responsibilities of the Proto Catchment Management Agency (CMA) are clearly stated in the Catchment Management Strategy (CMS), but with no legal power or authority, compliance management will be difficult at CMA level. The CMA will not have the proverbial carrot and stick at its disposal. This does not necessarily have to be an issue, if the CMA can support the Department of Water and Sanitation in tracking down polluters or culprits and report them to the DWS. Smooth collaboration and short communication lines are necessary for this to be effective. The success of the CMA in safeguarding statutory compliance for the provision of clean and sufficient water to all is heavily dependent on the ability of the CMA to pull together stakeholders effectively. Currently, this is not the case. Respondents have indicated that the necessary trust for the CMA to establish its authority could take years to forge. Culprits, especially those with direct and close ties with national government, have the power to change legislation before the prosecutor can report the misconduct (101). With the change of government, the discourse is changing.

Indicator 9.3 Preparedness

Final score: +

The Proto Catchment Management Agency (CMA) has not been established yet. However, with regard to preparation to address the water challenges of clean and sufficient water, the Proto Catchment Management Strategy (CMS) is a proactive attempt to “hit the ground running”. The strategy clearly indicates a long-term vision and pathway for the catchment to become more resilient against (sudden) change, including a projection on climate change and its potential impacts on catchments. Since it is aimed to be an overarching framework, it does not specify risks and uncertainties per individual catchment (101). The plan is to make customised implementation and preparation plans for each catchment as soon as the CMA has been established and the CMS is completed (108).

Appendix V: Coded transcripts interviews

Working document GCA

Condition 1: Awareness

Indicator 1.1: Community knowledge

To what extent is knowledge regarding the current and future risks, impacts, and uncertainties of the water challenge [clean and sufficient water] dispersed throughout the community and local stakeholders which may results in their involvement in decision-making and implementation?

100: There are road shows and they have the mission to pass on the message. They usually take place on the weekends during sports events or other social gatherings.

104: The point I wanted to get back to is that the average person, like me, if I weren't in the system, would probably have, because of the length of the supply chain, have very **little knowledge or interest of what is going on in the system**. As a final point, despite the fact that we had a drought and we had some level of conservation, restriction, **did really not materially influence us** in this area very much. Those people who got regular water supply continued to get regular water supply. Those who had erratic supply, it got a little more erratic and those who received no supply just got no supply anyway. So that's how it works

109: it [awareness about the importance of water quality] **ranges** across communities, because your more **urbanised** settings especially even in the more urbanised settings, more middle income to higher income and socio-economic status, they are **more in tune** with **awareness**, which is also due to **easy access to information** which is slowly but surely also getting to the, what you would call the disadvantaged or the previously disadvantaged communities. Not at the quick pace as we'd like to but there is an **understanding** in the **change of the situation** for the worst, or not, things changing and reflecting especially in terms of in this context around the catchment mostly around water quantity issues. So even as we speak the province has been in what we call a green drought, whereby water is available but in terms of the actual state of the availability in water reservoirs and water levels it paints actually a different picture.

Excerpt from the CMS:

"To create awareness of natural disaster that may have impact on water". This is one of the main objectives of the strategic theme of water availability. The word "create" indicates there is low awareness currently.

Indicator 1.2: Local sense of urgency

To what extent do actors have a sense of urgency, resulting in widely supported awareness, actions, and policies that address the water challenge?

*"In Cebu, Durban, and Gorakhpur, increasing risk awareness [...] was associated with growing concerns regarding the **state of water resources and the effects on living conditions** in peri-urban areas. The principal concerns included recognizing the importance of water and sanitation*

infrastructure and its maintenance, and the health risks of open defecation.” (Johannessen et al., 2019)

“It had led to outcomes such as [...] upgrading urban water services in Durban” (Johannessen et al., 2019)

“In Durban, the degradation of catchments catalysed individuals to create non-profit organizations, such as the Duzi-uMngeni Conservation Trust and the Palmiet River Watch, focused on pollution monitoring.” (Johannessen et al., 2019).

102: It depends on where you are in the catchment. In the South of Durban there are quite some water scarcity issues, so the urgency is high there. Also up by Richard's bay there is a fast-industrialising area where water resources clash with the agricultural sector, so urgency is quite high there. Otherwise, **there is a governance urgency throughout the catchment**, but compliance is the issue. You have to consider the entire catchment.

104: So my opinion is that for the most part if we take the average individual in KZN and particularly in the Durban area, the **range** of awareness and urgency would range from **absolutely urgent to complete lack of urgency** and so let me explain the details. If we have an individual living in low-cost housing or informal settlement in Durban, the availability of clean fresh water does really absolutely to no extent got anything to do with the seasons and everything to do with the **hard infrastructure supply system**. Whether water comes out of the tap is dictated by a whole bunch of infrastructure and governance failures or if it's working it all works. At that level, if you're a poor white South African there is **no relationship** between **rainfall** and the **availability of water** except when you're in a rural area and your rely on rivers, springs and streams as your source of water, obviously that is different. I'm talking in an urban context. As you move from the, and to a large extent that is the same for even more affluent resident, because whether water comes out of their taps at their home is a function of whether there is a broken pipe down the road or not rather than whether there is rainfall in the catchment, so that's what drives people. When you get to the water supply side and the people whose responsibility it is to supply the water I noticed a **growing level of urgency** amongst **managers, practitioners** who have to deliver water who understand that for many reasons the resource that is available has got to be spread further as population, economy develops and society develops.

So me, who receives water as part of a system is fairly distantly removed in the process because of the number of steps in the chain. So if we take, and I am going to take us from the top of the catchment down and then link it to governance systems. So you have your water running down your river which will inevitably go into a dam or a reservoir. While its running the **custodian** is obviously the **DWS**, while its running free. The moment it is abstracted from a dam or even from a river for residential and commercial and industrial use it is effectively taken up by a waterboard or **water utility**. In our instance that is **Umgeni water**. The bulk water supplier purifies the water and supplies it on to what we call service authorities. Water service authority eThekweni is a water service authority. Its job is the reticulation to users and there are three or four within the Umgeni catchment all supplied by Umgeni water. The bulk water utility is owned by the state, it falls within to a large extent the DWS, it's an agent of the DWS, a parastatal. The shareholder is the SA government through the DWS. So when I buy water, I buy it from our local municipality which is a water service authority (WSA). It receives the water and reticulates it to me effectively, I pay for the water, as a proportion of the payment I pay a sanitation charge. The point I wanted to get back to is that the average person, like me, if I weren't in the system, would probably have, because of the length of the

supply chain, have very little knowledge or interest of what is going on in the system. As a final point, despite the fact that we had a drought and we had some level of conservation, restriction, did really not materially influence us in this area very much. Those people who got regular water supply continued to get regular water supply. Those who had erratic supply, it got a little more erratic and those who received no supply just got no supply anyway. So that's how it works.

Do you understand the term non-revenue water? That is the total amount of water that is either not paid for or leaks out or lost in some way. Okay so Durban **non-revenue** is well above **30% closer to 40%** so it's using, and the other water service authorities that are less sophisticated than Durban are losing even more. So when you ask the question about the urgency and the enthusiasm for clean and sufficient water, you have to ask the question well, if that is the level of loss, how much do they actually care? So even amongst the officials, the level of commitment, so where was it, [inaudible] had a non-revenue water of under 10% in a developing country. That tells you that over **30% is crazy**, especially for a country that has **water scarcity**. I wanted to point out that that's the level of urgency.

First let me agree with you because we are moving into the conceptual and intellectual realm of polycentric governance, we don't have one single overriding authority, we have a whole bunch of smaller coalitions working together to make things work and as Ostrom and others have demonstrated that can work extremely well. But there is a certain assumption that these coalition are quite well capacitated to do what they are supposed to do and I think we sit in my view with 2 things. We sit with a **fundamental lack of capacity and capability at a senior management level** and in fact at other levels as well and we have a recent history of what I think is a **lack of political will** to get things done. We don't just see that in the water sector, we see it in terms of service delivery too. I agree with you that this is not necessarily bad and that its small governance, big governance, overall governance that is the issue. I think the issue is governance failures it relates to lack of capacity and lack of political will and direction so that's my opinionated view of how it works.

105: importantly in terms of the **growth** of the whole Umgeni catchment and the provision of water even with the new Springfield Dam if you look at those projections there is a famous graph which is also in the WRC report, I'll send it. But there are pretty famous graphs and they [Umgeni water] show that even with the Springfield dam coming online that the whole catchment and particularly eThekweni which draws most of the water was already at the limit. There was very **strong awareness** of the **water scarcity** in the **city** and then when you have a drought that makes it even worse.

Indicator 1.3: Behavioural internalization

To what extent do local communities and stakeholders try to understand, react, anticipate and change their behaviour in order to contribute to solutions regarding the water challenge?

“Changing behaviour in the communities and increasing community accountability. Changing behaviour of institutions and increasing integrated actions for a common purpose.” (Johannessen et al., 2019)

100: Then there is engagement with the liaison department, continuous engagement with people who experience lack of service or breakdown of services and how to best resolve it and they act like a bridge between the community and the unit (EWS); the councillor and the unit (EWS). There is a whole lot of interaction that takes place. **Part of its mandate is to address queries**, like power outages, some pump stations have broken down. How the water tankers are managed, what their response is, how the response of the community is towards receiving is, how many people are being serviced. On that on the ground and between the ground and us (EWS) as well as then it comes to policy. If there are **stakeholder meetings** which happens mostly on the weekend – we tell them what our policy is, how we function, tell them about our service charter, which spells out turnaround times for when the pipe is broken how long does it take. And the larger jobs for instance pumping breakdown after power outage etc. etc. There is a whole lot communication that happens.

The communication is a little more sophisticated than that [just reporting a breakdown]. If there is a breakdown of the pipe and we work on a crisis management type of communication where the **community calls in** to say they have no water. That request goes to the process centre who sends it to the control centre, who dispatches one of the assistants to go and have a look before sending an expert team to fix the problem.

102: No not really. 94/95 there was a severe drought, there was a big change in behaviour, severe water restrictions, at the scale that CT had recently. The way it was managed this time is that there were **restrictions** but it was based on a **percentage reduction basis**. And eventually the way that Umgeni water and the municipalities managed is was to **shut off water supply** to certain areas at certain times. That **just frustrated people** and didn't lead to any behavioural change. It **might have raised the awareness** of water a little bit.

Well I don't know, in 94/95 they certainly worked and persisted for many many years after that drought. But then they made the responsibility for reduced water use at the household level. And of course it was a very different SA then. The most recent drought, the **municipality was responsible** and that **was directed from the national minister**. So basically, the national minister told Umgeni water they had to reduce water use by a certain % and Umgeni water passed that on to the municipalities and they didn't really pass that on to the businesses and the households. They just **cut off water** at various times. I mean they did a **fair amount of retrofitting and low pressure systems** and things like that but they tended to **go for more technical solutions** rather than **behavioural change solutions**.

101: De strategie (CMS) gaat niet over geld. Zeker niet over subsidies. Het gaat wel om te zeggen we moeten een level playing field creëren. Dat betekent niet dat we de slimme witte boeren dommer gaan maken want dat lukt toch niet, dat betekent dat iedereen op datzelfde niveau kan komen. Het is een strategie, er staan geen maatregelen in om hoe dat moet. We hebben wel de discussie gehad dat je in de CMS bepaalde mensen “voortrekt”, er staat in de CMS dat er extra aandacht besteed zal worden aan zorgen dat mensen op datzelfde niveau kunnen komen, dat hebben we moeten

schrappen want dat gaf de indruk dat je mensen ging voortrekken, maar iedereen was het er wel mee eens dat er een level playing field was en dat de illiterate onderwezen moesten worden daarin, ondersteund en geholpen worden. Maar het mocht niet zijn dat dat positieve discriminatie werd.

105: And then in 2014, so the first phase of that was around recycling water, dry sanitation, trying to stop water leaks, etc. And I think that has improved, I've noticed people are much **quicker to phone into report water leaks**, they [EWS] have got a **very quick response system**. They have built up that **public capacity** to try to address water leaks.

109: That also is what poor communities, or underdeveloped setting whereby they do realise there is a **change** within the current situation. Their processes had to change drastically in terms of **usage, the way they manage their activities**. It's been **gradual**, but the **gap** lies in their being **experiences** and seeing this but not necessary answers as to **why**. There are gaps in communication and that sense of awareness. They see that there is a change, they've tried to make their adaptation the best that they can but the gap lies in the bettering of them **understanding** the situation and being able to combat or remain resilient to that change. So all around, in terms of information and understanding there is **an awareness but in terms of there being an understanding behind that awareness it is lacking**.

Condition: 2 Useful knowledge

This condition describes the qualities of information with which actors have to engage in decision-making.

Indicator 2.1: Information availability

To what extent is information on the water challenge available, reliable, and based on multiple sources and methods, in order to meet current and future demands so as to reveal information gaps and enhance well-informed decision-making?

109: in terms of that information sharing, dispersal, I'd say it's **very quick** and **easy to be able to access even in the peri-urban and rural areas** in terms of that understanding. With those areas, institutions such as the **municipality** which is a metropolitan it goes in terms of **resources and capacity** as well. As you eluded to they have the officials to be able to do the **road shows**, they have the **people on the ground**. A couple of kilometres from there, as you cross into a neighbouring municipality which is the mKhambathini municipality which is a different picture whereby it's a local municipality in most cases it oversees largely rural population and it's understaffed, in most cases does not have enough resources to carry out the basic service delivery things that need to be done in terms of sanitation and water provision. And they don't can't prioritise roadshows and information sessions. So yes it varies.

We actually find ourselves playing both of those [providing information and **filling the gaps** that the municipalities cannot take] whereby we have that **understanding of the situation**, because as an organisation one of the reasons it was formed was to do exactly that. We were moving from a space from us, and when I say us I mean the community, sitting back and folding our hands and waiting for things to be done for us. So with the formation of DUCT we took a **more proactive approach** whereby we gained an understanding of the situation that our local authorities were facing, we took that into the full picture of things. Then we took an approach whereby we looked at how we can play a supporting role to the municipalities. We offer support in various ways whereby, for instance in **training, capacity building, information sharing**, where we come into that space, we find out what the situation is, we find where the needs lie. And we work together with finding solutions. That moves into us not doing the job but being able to assist the job that have the leverage to actually make the change. It is with that hope that with their limited capacity, funding and resources we can provide them with backing in terms of when budgets are reviewed or policies are amended that these matters are raised that these issues are raised at the top of the table. We do understand how important those matters are. It is a full **symbiotic relationship** where we try to achieve our objectives and at the same time assist them in terms of achieving there.

From the eThekweni municipality website, both challenges are clearly mentioned and have their own pages. Source:

http://www.durban.gov.za/City_Services/water_sanitation/Service_Level_Standards/Pages/default.aspx

4. LEVELS OF SERVICE AVAILABLE	
Water	Sanitation
<p>In order to make water available to customers at an affordable cost, various levels of service are offered to domestic customers:</p> <ul style="list-style-type: none"> ➤ Full pressure water supply fed directly to the household from the City's supply network. ➤ Semi pressure supply received by the household via a roof-tank. ➤ 200 litres of water per household per day available via an individual household supply or metered flow Limiter connected to a yard tap). ➤ Standpipes/water dispensers that are provided to supply informal communities as an interim measure. ➤ Water sachets or tankered water in the case of prolonged service interruptions. ➤ Water boreholes where there is no water reticulation 	<p>The accepted levels for sanitation are:</p> <ul style="list-style-type: none"> ➤ Conventional waterborne sanitation – Connection to sewerage infrastructure. ➤ Waterborne sanitation with on-site disposal – septic tank and associated soak-away. ➤ Waterborne sanitation with on-site collection and off-site disposal e.g. conservancy tanks with emptying and disposal by tanker. ➤ Urine Diversion toilet with double vaults (dry sanitation)

"The eThekweni Water and Sanitation Unit has effectively used the various media ranging from print to electronic with the purpose of providing eThekweni s with information to enable easy access to our water and sanitation services." -eThekweni Municipality website

"There is another initiative, the Citizen Report Cards, which we will be facilitating in due course with a view to identifying gaps in service delivery and also creating consciousness on the side of the members of the public so that we can improve continuously our measures of trust, overall satisfaction, transparency, accountability, environmental health, efficiency and effectiveness." → No records yet, perhaps ask Speedy.

*"We intend ensuring that ultimately our measure of success with regards to the above initiatives shall be determined by the extent to which our customers and members of the **public are fully able to influence our decision-making** processes."* – eThekweni Municipality website

Information availability for the CMA: Since the CMA currently does not exist, it is quite hard to find information about how the CMA plans to address water challenges. However, national legislation such as the NWA and the NWSA do clearly state the necessity of decentralised water governance in the form of Catchment Management Agencies. Its most prominent piece of documentation, the CMS, is not open to the public.

To what extent is information on the water challenge accessible and understandable for experts and non-experts, including decision-makers?

The information provided on the website of the eThekweni municipality is very clear, concise and easy to understand. The reports, including the service level standards and customer service charts are all only a few pages long.

108: Thanks Melvin, in terms of **communication dissemination** from us as a Proto CMA we established the **Catchment Management Forum** which **includes all stakeholders**. We have more than 26 CMF throughout the catchment. They are responsible for engaging stakeholders in various water resource issues which specifically include the **municipalities** in terms of **wastewater treatment** works, that's where we get our challenges from is the **sewer infrastructure** which goes into our resources and how we together as stakeholders.

109: I'd say yes, in terms of **reliability**, across the board, whether it comes from private or public institutions it is very reliable. There is **no propaganda or misinformation** in terms of that. But in terms of it coming through from the various sectors, I'd say **government takes a very much leading role** in producing that **content** and also in terms of **distributing that information** through various sorts of media. I think the most powerful source of media that we have especially in the rural areas is the **radio**, it plays a **powerful role** in sending out the message in a quick way and **everyone can gain access to**.

Indicator 2.3: Knowledge cohesion

To what extent is information cohesive in terms of using, producing and sharing different kinds of information, usage of different methods and integration of short-term targets and long-term goals amongst different policy fields and stakeholders in order to deal with the water challenge?

Education: on the website of the eThekweni municipality it is mentioned that there is an education programme to educate school children about water and sanitation through a structured and sustainable education programme. This is a strong indication of long-term sustainable change and the targeting of different groups.

"Besides visibility in national conservation efforts such as National Water Conservation Program and National Water Week, eThekweni Water Services is also deeply involved in a wide range of educational programmes which focus on promoting water conservation, water demand management, sanitation and health and hygiene awareness among learners and adult members of the community. These programmes take the form of trained consumer service agents visiting consumers that are in arrears to assist them with different payment options and levels of service that are suitable to meet their needs, organize site visits, visits to schools, TV, radio, printed media and advertising."

Source:

http://www.durban.gov.za/City_Services/water_sanitation/Education_Library/Pages/default.aspx

106: Yes so it's more they are **not seen as the authority**. So in the **tribal areas**. So in the tribal areas the **Amakosi** is seen by the local people as the authority. And it's quite interesting because we have dealt with a lot of them and a lot of them have the **indigenous knowledge** they have has been

passed down, they have a much **better grasp of the value** of looking after catchments and wetlands and watersheds than our ward councillors do. So that also **creates friction**.

108: That's why in the CMS we have a **key strategic point** that talks about **monitoring and information management**, where we talk about introducing the **Hydronet** from the Netherlands, the Hydronet will **feed information** from different stakeholders into the system and [inaudible] in the river of the Pietermaritzburg while you are in Durban, not because for now there is that gap that is supposed to be closed by the CMA at the local level to be a custodian, to be an **information hub** when you want anything they will be in a better position to say, oh you are asking about that catchment in the Berg, this is the situation there, because our CMS will comprise the development of the CM plan in each catchment, not just an overall, but each catchment, since we have 25 catchments, each catchment will **have its own plan** that **identifies its own challenges** in that catchment which means that all the stress of that catchment will be known by everyone in that particular catchment and the information will be available for each and every one and everyone knows what particular activities are taking place in that particular catchment will be well known by all stakeholders involved and the CMA will hold all this information.

Condition 3: Continuous learning

Continuous learning and social learning is essential to make water governance more effective. The level of learning differs from refining current management, critical investigation of fundamental beliefs or questioning underlying norms and values.

Indicator 3.1: Smart monitoring

To what extent is the monitoring of process, progress, and policies able to improve the level of learning (i.e., to enable rapid recognition of alarming situations, identification or clarification of underlying trends)? Or can it even have predictive value?

100: For water pollution: Imagine there has been a **spill of industry** into the estuary or the stream etc. then we expect the same sort of crisis management where someone calls in or if one of our officials are out there, then there have to be **test done to identify the culprit**, we have a database to narrow down the industries in the area [that may have been the cause of the pollution] and then there is **penalties** in place to put them back in gear.

A process like that if the pollution is not detected in the stream, when it gets down to the treatment plant where it is **detected in the form of a spike in [pollutants]**. This is relayed to the contact centre to get a reference number and pass it on the **pollution officials** and they will go out to see exactly where the point source pollution is exactly and who is the culprit. **So there is a standard procedure for this process.**

104: it's a combination of **infrastructure, lack of infrastructure maintenance** and also **non-metering** and in many areas the water use is simply not metered and in other areas it is **stolen**, so it's a combination of factors but the contribution of poor infrastructure resulting in leaks is a big part of the problem.

"In Durban, microresilience [providing an organizational and communication structure in the community] planning brought together residents and actors in monitoring river quality and improved accountability, awareness, and compliance. Each time there was a pollution incident, local individuals contacted the authorities on behalf of the community. Consequently, authorities realized there was a gap in governance and that they needed to work more with the community. This improved the working relationship between the community, officials, and external institutions, who stated their commitment to respond to water issues as they arose." (Johannessen et al., 2019)

108: In terms of monitoring part of our **resources** for now we are **relying on the department** to do the monitoring **particularly for groundwater** because those functions are not with the Proto CMA as we speak, they are still performed under the main account which **falls within the DWS**. But for water **quality monitoring we do perform them**, but because of budget constraints we sometimes prioritise the major rivers, not for every catchment. There are 16 [rivers] in total. Those are the 16 we focus on for now because of the budget constraints.

Indicator 3.2: Evaluation

To what extent are current policy and implementation continuously assessed and improved, based on the quality of evaluation methods, the frequency of their application, and the level of learning?

105: The biggest one around **experimenting** was the provision of **free basic water** because Durban experimented with that and then it got taken up at national level. Durban actually experimented and took the risk of starting a FBS approach which has then taken off. It started with 6000 litres a month based on what the WHO recommended to Neil, but they got it wrong because they didn't calculate it for humid climates and the way the EWS worked, they had stakeholder **workshops and dialogs** and it came back to that and **upped it to 9000** litres a month.

Sufficient water: Durban used to provide 9000 litres per household per month of free water for the indigent households. The national amount is set to 6000 L/indigent household/month.

100: It was 9000 it is now 6000 and it is only for the indigent [households]. Any other water users pay according to the [name progressive water payment scheme]. We [EWS] felt that 9000 was adequate but we done some **studies** which showed that there were an average of 4 people in per dwelling and we found that **people moving from rural** [informal settings] areas to **urban** areas, the per capita use in the rural dwelling reduced. **Studies show** that the average persons per dwelling is 4.2, **our studies show** 4, so that is 150 litres per person per day, **which is adequate**. It was reduced about a year and a bit ago.

103: That's a difficult question. If you just look at Durban's environmental and climate governance, one of the words that is thrown around a lot is **learning by doing, experimentation**. That type of philosophy is quite prominent in our environmental governance space. So there is **always people willing to try to do different projects**. Resourcing is obviously a problem. For instance our research team is fairly small and we would only work in a certain space.

Excerpt from CMS on monitoring:

- Collaborate with DWS, DEA, DEAT local communities and other institutions/ organisations to set up a water quality, quantity and ecosystems health monitoring network at various levels as required by the RDM outcomes and existing requirements.

108: In terms of monitoring part of our resources for now we are relying on the department to do the monitoring particularly for groundwater because those functions are not with the Proto CMA as we speak, they are still performed under the main account which falls within the DWS. But for water quality monitoring we do perform them, but because of budget constraints we sometimes prioritise the major rivers, not for every catchment. There are 16 [rivers] in total. Those are the 16 we focus on for now because of the budget constraints

Indicator 3.3: Cross-stakeholder learning

To what extent are stakeholders open to and have the opportunity to interact with other stakeholders and deliberately choose to learn from each other?

"This organizational culture develops confidence among EWS officials at all levels to open up the space to discuss, among different actors, what is and is not working in water and sanitation provision and how research or community engagement might improve the policy and practices of the state."
(Sutherland et al., 2014)

Example: *"Incremental learning thus forms a core part of the business of EWS. This learning results from engagement with research and civil society organizations and communities. The state has adopted a diversity of approaches to secure access to water and sanitation for the poor, experimenting with technologies that are both affordable and environmentally sustainable, albeit socially challenging. For instance, EWS has recently been engaged in research to ascertain the viability of re-using grey water for potable water in the city, which has proved to be a controversial but nonetheless very real option in the face of water scarcity. The knowledge base underpinning these experiments is built up internally and through engagement with other actors."* (Sutherland et al., 2014).

Another example: *"The Raising the Citizen's Voice project, user platforms and focus groups as well as research in communities have created platforms that enable interactions between the local state and its citizens. An outcome of this interaction has been the increase by EWS in the basic supply of free water from 6,000 litres per household per month to 9,000 litres, based on community concerns that 6,000 litres was not sufficient for larger households."* (Sutherland et al., 2014).

103: The conservancies are very based in a certain space and also what has emerged to me is that they are very **competitive** with one another. But if you look at the Ecochamp model, that was **imported** from another project by Pietermaritzburg. That kind of model has been **imported** into this space. For instance with the Palmiet project that knowledge was produced there was developed from that particular space and area, so it **wasn't been imported**. The Wiseways model, the consultants or the middle men they were also influenced by the GroundTruth consultants so you can see the kind of activities they do are more in terms of civic science so you can see that different people and different models and going into different spaces and what not and there's always people that are starting new projects. For example there is Durban Green Corridors and I know they are also doing river projects.

Everyone wants to be the person who find the solution to these wicked problems. There is **competitiveness** but maybe people needs to take a step back and look how different projects can create a **synergy** with one another. That's more the **academic** side of things yes.

104: So when I started engaging in the freshwater side it became apparent not just to me but to a large number of individuals and groups that very **little attention** was paid to the contribution that **nature, ecological infrastructure** could play in contributing to the **supply of water**. So we are the INR, we're not an engineering organisation, we focus on the **natural side**. There is a project, send me a note after this, there was funding for the Green Fund, we are looking for the contribution that nature can make to water security conceptually and within the context of the Umgeni river basin. So in simple terms, how catchment management, restoration and conservation can contribute to the supply of freshwater. So that really and it surprised me that it wasn't part of the norm. For me it has been my life I thought everyone understood this stuff and then you engage in the engineering side and there is very little understanding of the role of nature and so what we have done a large collective is really been promoting this whole concept. In fact, there is a project you will hear about, EIWS (Ecological Infrastructure for Water Security). This is the now of how this thing is involving. So there was some initial work done through the Green Fund, it has now been taken forward as the Jeff6 for ecological infrastructure, and that is leading straight into the policy domain. As a result of that there is a clear influence and prioritisation of improved catchment management as a policy response.

105: So what's important is that once we got this **convergence** between people who were worried about **water security** aligned with people who were concerned with **climate governance** in **eThekwini** which was then expanded to the **broader Umgeni catchment**. And so they established the **UEIP**. And that became an **umbrella framework**.

106: Yes, the **challenge is politics**. Even our province, my experience with province is **fairly weak**, so we often find that we **bypass the province** and we go **to national** because we are a strong municipality. So it's quite interesting when you start engaging with these **different levels of government**, the more levels of government you have the **more egos** you have. The more egos you have the more likelihood you have of people **complaining** about you playing in their sand basket and standing on someone's toes.

Excerpt from CMS, as part of the strategic goal of stakeholder engagement:

"Learning from each other through resources, experience and expertise;"

"Encompass learning by doing and other appropriate learning style;"

Condition 4: Stakeholder engagement process

Stakeholder engagement is required for common problem framing, gaining access to a wide variety of resources and creating general support that is essential for effective policy implementation.

Indicator 4.1: Stakeholder inclusiveness

To what extent are stakeholders interacting in the decision-making process interaction (i.e., are merely informed, are consulted or are actively involved)? Are their engagement processes clear and transparent? Are stakeholders able to speak on behalf of a group and decide on that group's behalf?

The eThekwini Water and Sanitation Unit (EWS) is praised for its stakeholder inclusiveness:

"Amongst some of the initiatives has been the establishment of Focus Groups which aim at ensuring that there is an ongoing dialogue and interaction with our communities, guaranteeing that there is better understanding of our customers, soliciting feedback with a view to changing behaviour both internally and externally in terms of roles and responsibilities." – eThekwini Municipality website.

Source:

http://www.durban.gov.za/City_Services/water_sanitation/Service_Level_Standards/Pages/default.aspx

"Part of the power and success of EWS is that it engages with multiple actors to develop its policies and practices for water governance, and thus its network is wide. Partnerships with research institutions such as the Pollution Research Group (PRG) at the University of KwaZulu-Natal (UKZN), which is partly funded by the Bill & Melinda Gates Foundation, and NGOs such as uMphilo waManzi have enabled EWS to experiment with new technologies and infrastructure for water and sanitation

provision, which emerge from a platform of well-grounded scientific research, to provide basic universal services across the city." (Sutherland et al., 2015).

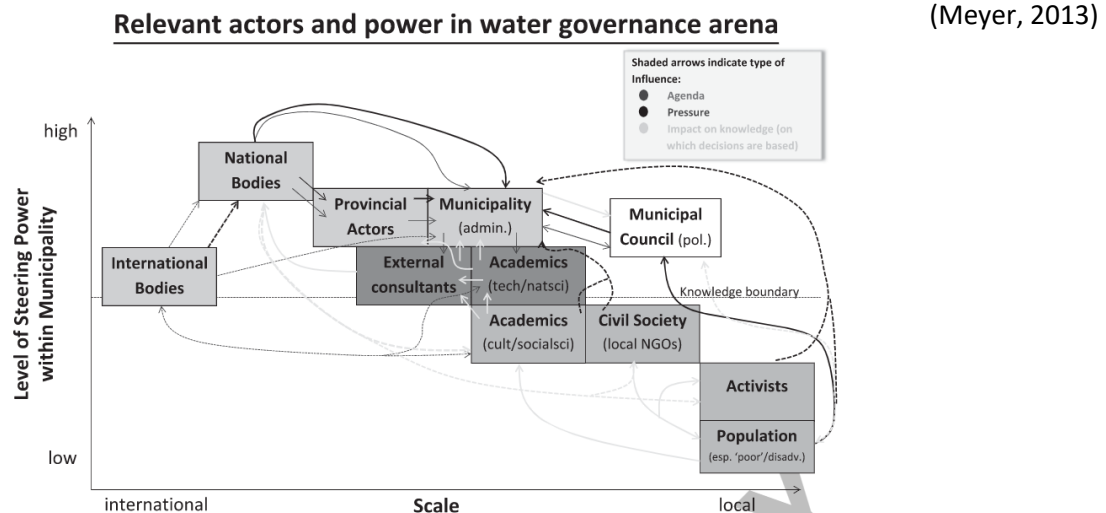


Figure 2: Relevant actors and power in the water governance area.
Source: Meyer, 2013.

100: There are catchment management forums, there are quarterly CMA meetings, I've been to one set at the Belhum-tongaat catchment. There is presentation, stakeholders, concerns. DWS is dominant, they run and chair the meetings. Sometimes you have Umgeni Water which is the water board and they are reliant for their water resources. Some local forums attend, for instance KZN wildlife society, mixed breed of stakeholders. 20/30 stakeholders were present, including DWS, EWS, Agribusiness, NGOs, councillors.

101: Natuurlijk is het ook zo dat het en dat zit in het stakeholder engagement, als 60% van het water gaat naar landbouw, 95% daarvan gaat naar de grote (blanke) boeren grote corporaties. Het is ontzettend moeilijk voor zwarte kleine boeren om daar tussen te komen. Het gaat om het empoweren van de mensen en het gelijktrekken van die grote verschillen in kennis en kunde om op te komen voor je belangen.

104: Their decisions of the water utility are made on the basis of projected demand for water. Hypothetically speaking, they will say in 20 years Durban is going to run out of a sustainable water supply. We have to **develop the infrastructure** to prevent that from happening.

Historically, this information was delivered by **in-house by the DWS** with inputs from a whole bunch of research institutions which might have included ourselves. What they call this whole thing, it's called a reconciliation. They do a reconciliation projection forward in terms of supply and demand and that's what they work with.

[on the DWS appreciating the input of research institutions] Absolutely. Having said that, you've probably already learning that the **DWS is in disarray**, it is **not functioning** particularly well. Quite some of our work has actually been with the department of Environmental Affairs, because it is a functional entity that you can work with. You are correct that the DWS does appreciate input, and more now than it has ever done before because its own capacity is so low. But it is really struggling at the moment by its own admission.

105: The **UIEP** had the palmiet catchment, belspruit (?) and mpapameni which is above lion's river which is where the midmar dam is, they had these three case study sites that we were going to work on. We had been working in the **traditional authority** area in relation to the **eThekweni municipality** so we put the Msunyati as a case study into that research. In the upper catchment of the Umgeni people don't think about it [traditional authority] that much whereas down in Durban we think about it all the time, because like 43%, it was 38% three weeks ago and just now it has gone up, of our city is under Ingonyama trust land. The way it works is that it's called the Ingonyama trust, it was set up in 1994 just around the time of the democracy there was a big fight where the IFP which was the Zulu party and the Zulu people didn't want to come into the election and it had to do a lot to do with the Zulu king and the people didn't want to come into the election so as part of the negotiations of 1994 they established these kingdoms almost if you will where the traditional authority you have a lot of them in the eastern cape but the strongest are in KZN, because its under one trust, the ingonyama trust and the sole person of the trust is king Goodwill Zwelithini kaBhekuzulu and he is the custodian of all that land which was under the homeland of KwaZulu. In our city we have I think 15 traditional councils, and basically they govern that land alongside the municipality so it's a system of **dual governance** and it makes it **very complicated**.

108: We also established the **technical committees** with the municipalities, particularly those municipalities that are culprit, that are polluting. Right now we have 3 technical committees with the culprit municipalities where we sit together with all the technical people and discuss the water resource management issues with them, and also for means of communication we have the **water associations**, which include the **farmers as well as the irrigation board**. Over and above that we are establishing a **CMS**, where we try to **integrate or collaborate or partner with all stakeholders** in the CMA. The CMS is being developed by all stakeholders in the catchment. Our main aim with the CMS is to **involve stakeholders in water resource management**. Because whether we are a CMA or not there should be a strategy that involves the stakeholders at catchment level. So therefore we said we will not wait for this CMA to be fully operational, then the establishment of the CMA will catch us along the way with this document so we can protecting, managing and preserving our water resources being polluted. So that is where we are in terms of establishment of CMS. Once the CMA is fully established then there will be catchment management committees and those will be responsible for implementation of the catchment management plan and that is derived of a CMS. That is how we are involving all stakeholders in the WMA so far.

The **CMF are non-statutory bodies**, so it is just **voluntary platform** where they **raise issues**, then the decision is taken within the **Department [WS]** so in terms of resolving those issues, when it comes to the water associations, those are the formal structures, they are a statutory body, where they take the decisions because there is a management committee that governs the water associations.

109: We play a number of roles. We started off in a **watchdog role**. We were out in the community, on the ground and we served as a **mouth piece**. We made sure that the issues on the ground were **voiced** and **put on the table**. We still continue playing that role even though at times it sort of seemed, toxic, it wasn't healthy between us and government authorities. They had a **skewed perspective** on what we were doing and what we wanted to achieve and I also think we had a sort of **untrusting** viewpoint towards what they were doing. Then years went on by and that shifted to coming into this partnership whereby now we are **sitting face-to-face with them**. When we talk, they listen, when they talk, we listen. It has become a more hand-in-hand process and it's more... there is this word our politicians like using, they call it **cooperative governance**. That would sort of capture

what our setting is. We have a cooperation with the necessary authorities at whatever level. We built that relationship over a long period of time and we place those matters at their table and have a **trusting** that they will take it into regard as much as we will be able to respect them and hear them out.

109: yes so it's a very participatory process, I think it's even from the way our government is, it's very participatory, it allows for free comment and expression but yeah, in the end there is that feeling where some others feel like it's a waste of time because some have voiced but nothing is taken into regard. But the process as a whole is very inclusive.

Indicator 4.2: Protection of core values

To what extent 1) is commitment focused on the process instead of on early end-results? 2) do stakeholders have the opportunity to be actively involved? 3) are the exit procedures clear and transparent? (All three ensure that stakeholders feel confident that their core values will not be harmed.

102: The stakeholder meetings of the CMA are **totally ineffective**. Everyone raises concerns but **nothing is done** with it. There is **no formal authority to enforce compliance**.

101: Nee, dat is wat wij vermeld van stonden. 4 keer per jaar gaat de CMA (proto) naar een van de 25 regio's (subcatchments) waar ze dan een meeting hebben in dat gebied en dan hebben ze dus een agenda en dan worden allerlei issues besproken met iedereen rond de tafel. In sommige gebieden is industrie heel belangrijk en zitten die ook aan de tafel. Het voorbeeld wat bij mij heel erg aansprak is in 2015 in Richard's Bay (industriegebied) daar was een meeting waar we bij mochten zijn en daar zat iedereen rond een grote tafel en toen werd dus gevraagd wat is de situatie, alles gaat nog goed maar we zien eraan komen dat over 3 maanden grenzen gaan bereiken zodat we dan gaan moeten korten op de verdeling van allemaal water vraagstukken.

105: **pollution research group** is part of UKZN. What's very important is that in that paper that I wrote I talk about the strong **relationship between the pollution research group and EWS**, which is also part of that **experimental governance**. So when you see in that paper that EWS adopts this experimental governance, the reasons that they have been able to do this is that they have very cleverly over a **long period of time established a strong relationship** with the pollution research group, and the pollution research group through this work with EWS has done a lot of **innovation** so they have for example **together developed** the urine diversion dry toilets that are right across the periphery of the city. And so that work continues because now we are part of the **Bill & Melinda Gates Foundation** platform for reinventing the toilets so we're doing a lot of research on reinventing toilets.

103: Yes so the feedback that I've heard from that is that they [CMA stakeholder meetings] are **not too effective**. It is more like a **talk shop**, that's my perception from what I have heard. A lot of the people involved in these projects are a **community of practice**. A lot of people know what other people are doing in another catchment and particularly in the palmiet catchment the people will **criticise** other people from other catchment, there is a whole lot of politics around it.

109: To be honest, it's more of them coming in with an idea about which they **feel very strongly**, they put it on the table and then it depends on that whatever is placed on the table on whether we are in agreement or not. In most cases, if we are in **disagreement** it is a **back and forth** process, whereby we try to come to a **common ground**. And then if they really feel strong about some of those matters, it turns into a **tussle**, into pushing various **agendas through**. I'm just trying to think back to some of the cases where that has happened, for instance the development of establishments that are environmentally sensitive, or policies or laws around the natural environment and so forth. It's a matter of them giving us the **space to voice our opinion** and approvals and them going back to sort of **cater to what we want to hear**. But at the **end of the day**, **the buck truly does start and stop with them in terms of things happening**. So we have that voice of influence but in the true matter of the word we do not have an immense sense or deal of power in terms of the final say.

Indicator 4.3: Progress and variety of options

To what extent are procedures clear and realistic, are a variety of alternatives co-created and thereafter selected from, and are decisions made at the end of the process in order to secure continued prospect of gain and thereby cooperative behaviour and progress in the engagement process?

- ➔ The failing governance of the DWS, that's why the more functional department is that of environment and (?) listen to transcript Duncan Hay.

101: Nou dat was vanuit de CMA dit is de situatie maar daar werden dus nog vragen gesteld door de deelnemers die hadden zichzelf ook goed verdiept in de problematiek. En staande die vergadering als we nu teruggaan in ons verbruik met 1/3 (landbouw, industrie, gemeente) de mensen waren wel aanwezig maar niet de overheid. Als we dat doen dan kunnen we het nog 3 maanden langer uitzingen. Dat is toen tijdens die vergadering gezegd dat doen we, maar dan moet het CMA (de regional office) moet dan met de gemeente afspreken dat die dan ook 30% teruggaan. Zonder dat daar een voorstel voor was besloten dat ze dat gingen doen. De landbouw en industrie hadden overcapaciteit dus teruggaan met 30 procent was mogelijk en ook voor de gemeente was het ook mogelijk om 30 procent te verlagen. Dat is toen zo geregeld.

zonder voorstel is dat besloten en toen is het aan de department gevraagd om dat wel te bestendigen zodat men elkaar daarop kan aanspreken. En dat is toen ook gebeurd. Dit is de "echte" participatie. In Richard's bay was een min of meer gelijkwaardige groep van mensen die elkaar verstonden. We hebben diezelfde missie gedaan in een ruraal gebied daar was geen industrie aan tafel, vooral bosbouw, een NGO en bewoners en de bewoners klaagden dat ze geen water hadden, dat ze maanden geleden beloofd waren dat het geregeld zou worden maar dat er nog niets geregeld was.

In een stakeholder meeting (CMA) eigenlijk kunnen daar geen besluiten genomen worden, want die liggen protocolair vast dus het is die en met name dan de department of the CMA die toe kan wijzen vergunningen om water te onttrekken of regelen dat er transfers komen. Dat is dan vaak dat dat uiteindelijk in Pretoria beslist wordt, ook al is het probleem regionaal. Dat is op dit moment echt het probleem. Als de regional head in Durban kan maar heel beperkt bepalen wat wel of niet gebeurd.

[wie heeft het laatste woord?]

Het kan zijn dat een voorstel door de gemeente door de department (DWS) wordt gedagvaard, dan wordt het ene department door het andere gedagvaard, maar dat heb ik in 7 jaar niet een keer meegemaakt. Beslissingen moeten helemaal naar zo een beetje de minister naar boven. Het beleid is sterk gecentraliseerd op het gebied van beslissingen. Omdat de wet op decentralisatie nog steeds niet is doorgezet ruim 20 jaar na dato.

104: So when I started engaging in the freshwater side it became apparent not just to me but to a large number of individuals and groups that very little attention was paid to the contribution that nature, **ecological infrastructure** could play in contributing to the supply of water. So we are the INR, we're not an engineering organisation, we focus on the natural side. There is a project, send me a note after this, there was funding for the Green Fund, we are looking for the contribution that nature can make to water security conceptually and within the context of the Umgeni river basin. So in simple terms, how **catchment management, restoration and conservation** can contribute to the **supply** of freshwater. So that really and it surprised me that it wasn't part of the norm. For me it has been my life I thought everyone understood this stuff and then you engage in the engineering side and there is very little understanding of the role of nature and so what we have done a large collective is really been promoting this whole concept. In fact, there is a project you will hear about, EIWS (Ecological Infrastructure for Water Security). This is the now of how this thing is involving. So there was some initial work done through the Green Fund, it has now been taken forward as the Jeff6 for ecological infrastructure, and that is leading straight into the policy domain. As a result of that there is a clear influence and prioritisation of improved catchment management as a policy response.

[on whether IBT schemes and EI are compatible] We recognise that it is **not just green and grey**, not just green infrastructure and hard infrastructure, it's **both system working together**, as an example, the main IBT came from the Mooi river system into the Umgeni river system. As it relates to the building of the Spring grove dam, obviously that destroyed a large quantity of natural habitat, primary wetlands and riparian areas and we as the **INR actually were involved in developing what we call biodiversity offsets** and in fact the entire biodiversity offset system for entire country was developed with Spring grove dam as a case study. So not just the practice of developing an offset system and process but also taking that practice and putting it into policy. So that is one of the ways the INR operated. The offset stuff was relatively commercial, we actually had to bid for it, but then we take that experience of practice and pushed it into policy and that is what the institute does as a rule.

109: Yes, it lies mostly on that [clash between NGO on environmental issues], because we acknowledge when they do place issues, but the discourse or the breaking away of us [the municipality and DUCT] on the same path comes from the point where **they don't see the light in terms of let's try to find alternatives, or mitigate, let's try and see how we can actually make this work with a softer approach.**

Condition 5: Management Ambitions

Policy ambitions assesses if current policy is ambitious, feasible, well-embedded in local context and if it forms a cohesive set of long-term and short-term goals within and across sectors.

Indicator 5.1: Ambitious and realistic management

To what extent are goals ambitious (i.e., identification of challenges, period of action considered, and comprehensiveness of strategy) and yet realistic (i.e., cohesion of long-term goals and supporting flexible intermittent targets, and the inclusion of uncertainty in policy)?

102: If a CMA were to be created, it **would need serious authority and capacity**. The **current board is not capable** of taking on the role in the CMA. They usually bring in **junior consultants** that are **not experts**. In this vacuum many organisations have **stepped up** and started filling that void. Now if there would be a CMA board that has overriding authority, it **could take years** to make the **relationships** necessary to build **trust** and this **authority**. It **would be desirable** though.

I think it [CMA PU] is still desirable but there hasn't gone enough thinking into the **business plan** of how the CMA will operate in the catchment. There was a really good plan drafted in 1998, it was called the "towards a catchment management plan for the Umgeni" or something like that and that was a detailed plan and if they would have implemented that within 4-5 years then I think it would have been quite effective, but of course then **the geographics got widened** and things have changed quite a lot and **I don't think anyone knows what a CMA will effectively do** in that catchment anymore. I mean the CMAs in the Breede and the Incomati work fairly well. They were established 10-12 years ago now. I think it can still work but I will need **much stronger leadership** and a **very clear mandate**.

101: [Staan de leden van de proto CMA zelf achter de CMA?] Ja. Die zij ook heel gefrustreerd dat ze van allebei de kanten uit elkaar getrokken worden. Wij hebben ze ervan bewust gemaakt dat ze met elkaar een geweldig team vormen. En wij hebben ze een beetje trots gegeven. Aan het einde van die dag hebben ze ons bedankt dat we doorgezet hebben en dat we het programma hebben omgegooid en dat heeft hun een enorme boost gegeven om te beseffen dat wat ze aan het doen zij is eigenlijk geweldig. Een enorme drive is dat dan ook om dat te herkennen. We hebben in de traject daarna niet alleen naar de techniek van water management of zuivering of van stakeholder engagement gekeken, maar ook naar de soft skills; hoe werk je samen? Hoe kan je creatief een oplossing vinden? Dan zie je dus dat je het organiseren van een Nederlandse workshop daar een enorme verandering krijgt gewoon omdat je het op een andere manier aanvielt.

De praktijk is nog niet waar de theorie zegt dat het zou moeten zijn. Structuur is vastgelegd in de wetgeving maar die is nog niet voldoende operationeel gemaakt, de CMA bestaat nog steeds niet. Dan moet die CMA nog zijn eigen territorium gaan bevestigen.

101: Eerst was het idee 13 CMA, toen 9, toen 1, nu weer 6. Ze zijn beter qua grootte op elkaar afgesteld, CMAs zoals Olifants, is relatief klein ten opzichte van PU, dus ze willen de gebieden meer op elkaar laten aansluiten. Hoe staan jullie daar tegenover? – Dat is nou echt politiek,, daar gaan wij ons minder druk over maken, we hebben nu goede contacten en we hebben goede projecten. Laat ze eerst nou maar die 6 CMAs oprichten.

105: The CMA are too big of scale, they might set up the **framework** for it or drive the compliance but they don't actually... It would be **too complicated**. Yes [scale is] definitely [an issue in terms of effectiveness – geographical area of the CMA is too large] and it has been set up so that you do

manage down to scale. So **devolving** things **down to scale** has been quite **cleverly done** so who is responsible for that. It's just the **implementation** that is **weak**.

108: I get you loud and clear. I think what you are saying is that is why we are developing a CMS, because that is the **first function of a CMA**, is to **advise** on the **protection, management, conservation and control the water resources** and also to **coordinate the activities** within the WMA so the strategy wants to achieve what you are saying because there are initiatives that are taking place within the catchment. So as you said, the downstream user doesn't know what is happening in the upstream.

Indicator 5.2: Discourse embedding

To what extent is sustainable policy interwoven in historical, cultural, normative and political context?

"The "experimental governance and incremental learning" discourse reveals both a local state and citizenry that are attempting to move towards greater sustainability through experimental governance and adaptation." (Sutherland et al., 2014).

100: If we are **extracting water** from the sea the amount of water we extract is **very tiny**. But what we did do is the **specialist studies** in terms of the catchment the **CWDP which is a licence** that you have to do scientific studies to show that you are **not environmentally harming** the environment in extracting seawater. All of these studies has to happen and if the national regulator finds that we do not comply we will have to look at another area or move up also to an area where we would be able to comply.

Yes, but the basins that we considered; we considered the one during the drought we took out the water from the Tongaat basin treatment plant and we transferred it to the Hazelmere system which is about 6 mL and will only be used in critical conditions. We are looking in the same in the south so that is something that is happening. The **studies have been done** and there will still be **water left for the biomes** in the water and it does **not harm the environment**. We have done **aquatic studies** that show results about **availability of water**. Very interesting is the study that acacia is doing, they look at the Technical studies. We have quite a competent team from the Netherlands led by some of the officials of Acacia.

We are now developing reused water and **two desalination plants** in the north and the south to 150 mL each, the feasibility is complete and one of the areas we have done the **EIA**.

We are also looking at IBT [inter-basin transfer] in the south together with Umgeni water that will assist, especially when water becomes critical, we then **look at the availability of water in the catchment and the areas that we feed**, and then share it. In some areas it is a little bit **more resilient** than in others. Part of the process as well is looking at the **resilience** where we can interconnect different water treatment plant areas to make water available maybe not in large quantities but to suffice during scarce times

106: it comes down to we're looking at a country as a whole so our IBT we take quite a bit of water from the **Thukela system** and put it in the **Vaal system** and the reason for this was because obviously on the eastern seaboard has a lot more water than the inland region and a lot of our industry and economic drivers sit within the interior of our country. So that was one of the primary reasons for this IBT. It then starts with looking at the catchments but then also start to look at the country as a

whole in terms of the systems that are required to advance the country. From an IBT perspective they have been **done fairly well** and I haven't been involved in them but in terms of the knowledge that I have of the systems they also **utilised to balance power supply** as well, so the direct IBT they pump during your low demand periods and bring it back down through the turbines during a high-demand period, so it's a dual... the one is basically a **big battery** and the other is the water supply from a water use point of view.

It comes down to the demand on our side as opposed to the demand on the interior, for water. So the Thukela system is not dammed at all. All of our water comes from the Umgeni system, so water that goes into the Vaal doesn't come off the Umgeni system. In actual fact, the Umgeni water system gets water from the Thukela system as well through the Spring Grove dam and the [inaudible]. The way the system was set up was fairly well-structured and looking at moving water to where it was needed without it negatively impacting on the system that you are abstracting from.

I think so, it's [IBT schemes for water security] very dependent on it. We saw it with the drought the impact industry, if there isn't the water supply that has a massive economic impact.

107: Yes how it works with a PPP process, when a private party signs this contract, they provide all finance and the capital to build the plant. The municipality provides the ground and they will get a lease or rental fee for that premises. Ultimately during the contract, so for those 20 years, the private party owns those assets, simply because they are funding it. They provide the water supply and the necessary infrastructure, as well as the operation and maintenance, as well as the offtakers. They collect the revenue streams from the offtakers and the only revenue stream that the municipality is getting is from the affluent.

So you can see now how PPPs can provide sustainable solutions to municipalities. In those 20 years we have minimal downtime. In those 20 years we've had probably 98-99% uptime, which means that the private party was able to supply all the offtake partners and basically the municipality wasn't burdened with supply arrangements or maintenance. So that is a very very successful way of maintaining this service to your customers but at the same time not burdening your operation and maintenance teams. You don't have to worry about supplying these two industries. They take full risk of operating the tertiary plant.

"Supporting tools and communities are highly important for the establishment phase (e.g. CMFs are the chance for the success of the CMA establishment, because they give a reason to have representatives at the level that accommodates them. Sustainable development principle is more introduced at the establishment level even after the establishment process, there is a follow up on environmental management programmes, to monitor the progress within established tools. Governance configuration tools also forms a huge part when establishing processes take place." (Stuart-Hill & Meissner, 2018, 124)

109: Yes, it lies mostly on that [clash between NGO on environmental issues], because we acknowledge when they do place issues, but the discourse or the breaking away of us [the municipality and DUCT] on the same path comes from the point where they don't see the light in terms of let's try to find alternatives, or mitigate, let's try and see how we can actually make this work with a softer approach.

"This Provincial Growth and Development Strategy (PGDS) provides KwaZulu-Natal with a strategic framework for accelerating and sharing the benefits of an inclusive growth. This has to be achieved within a coherent equitable spatial development architecture, putting people first, particularly the

poor, vulnerable and other groups currently **marginalised**. At the same time, attention also must be given to the provision of **infrastructure** and **services** that cater for the needs of the people, in a manner that **preserves and restores natural and historical assets and resources**. This strategy will strengthen and expand the existing social compacts between the development partners in this Province.” (CMS, 2019, 4).

“The National Water Resource Strategy-2 states clearly that water is scarce and it requires careful management to enable provision of basic water services and equitable allocation, while meeting the needs of inclusive economic growth without threatening the integrity of aquatic ecosystems” (CMS, 2019, 15)

Indicator 5.3: Management cohesion

To what extent is policy relevant for the water challenge, and coherent regarding 1) geographic and administrative boundaries, and 2) alignment across sectors, government levels, and technical and financial possibilities?

101: wij daar aantreffen was het **beste wetgeving** op het gebied van water van de hele wereld. Waarom? Zij hadden geen remmende voorsprong, alles was opnieuw opgebouwd van 1995 en rondgekeken en overal de wet en regelgeving overgenomen die het beste bij hun situatie paste. Er is echter een **verschil tussen de regelgeving perfect hebben en de praktische implementatie**.

Zij hebben van ons geleerd dat je niet altijd moet wachten tot je toestemming krijgt maar misschien af en toe stoppen als je hoort dat het niet mag, dat je soms even wat praktischer moet denken dan in de vorm van theorieën en modellen en regelgeving. Dan hebben we van elkaar geleerd om over de grenzen heen te kijken en te leren van hier **hoe het al die overheidslagen samenwerken en niet in coconnetjes zichzelf opsluiten** maar proberen meer **te integreren**.

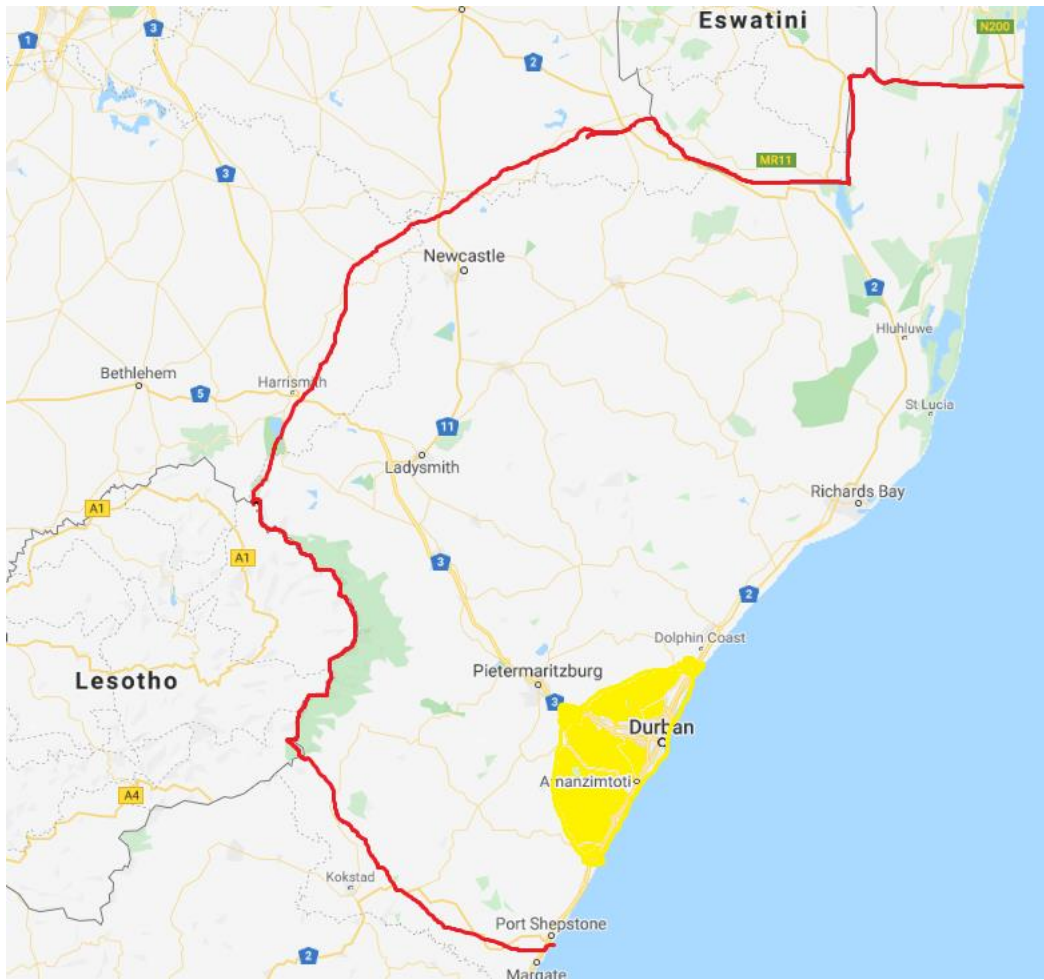
In deze regering van Ramaphosa was het zo dat in 2005 was gedacht dat er 13 CMA's zouden komen dat is in 2012 naar 9. Er zijn op dit moment 2 CMA's in ZA. De anderen zijn er nog niet. In 2014 is de proto CMA P-U die is er wel. Dus als wij praten over de CMA P-U dan is dat nu nog een groep binnen het DWS regional office KZN (te Durban). Ik heb de mensen op de speed dial. Het eerste jaar hebben we gekeken naar hoe zit het nou en in het tweede project hebben we actief gekeken naar het opstellen van een proto CMS. Zeg maar het waterbeheer plan wat we hebben **vertaald** naar hun regio.

Een politieke obstakel is dat het slogan is “water is life”, zonder water geen ontwikkeling, dus zeker in zo een land als ZA waar de verschillen zo groot zijn is het water bijzonder politiek hoe je het water verdeeld. Wie heeft er recht op water? **In de wet staat** dat iedereen recht heeft op water maar een andere wet zegt dat als je eenmaal een dak hebt gebouwd in een hutje dat je daar mag wonen en vervolgens moet de overheid zorgen dat er water bij komt, waar dat dan ook is. De tweede slogan van de department is “sanitation is dignity”. Dat heeft te maken met afvalwater, en hoe krijg je dat gedaan in de informal settlements? Makkelijker gezegd dan gedaan. Dat is dus eigenlijk een **belangrijke ontwikkeling**.

100: Talking about the cohesion, there is **three sections**:

1. within the organisation: it is **well structured**, organogram is there, generally it is interdependent. For example if you have a project to provide services to some rural community, **planning department initiates** together with a community liaison, so there has to be a **community engagement** liaison either with the community or with the councillor and agree on the extent of the project. Then the planning department looks at the **feasibility, the bulk infrastructure**, the entire plan is all put together. Then it moves on to **the design department** who adds the final additions and checks the infrastructure and checks the technology and signs off the drawing then it goes on to the **construction department** and they will look at the budget availability and at the implementation of the project. If it doesn't go that route, for instance a larger project it goes **through a consultant**, he will do the design and the implementation based on the availability of funds from our capital budget.
 2. So that is one aspect, then there is **private development**: where we engage in the **private sector** which will look at parcels of land which they want to develop and this is more for the middle to higher income. And they will engage with the **Water department** but the same process as above then unfolds.
 3. Then the third, **public housing**: is with the housing department they have a programme for instance for 10,000 houses per year, they would seek funding for the engineering. We come in as a **service provider** and provide water and sanitation but the same process will apply.
-

Jurisdiction EWS: Stretches from Durban to the west until Cato Ridge (51 km), to the North to Tongaat (40 km) and to the South to Umkumaas (50 km) and is marked yellow. There are 3 roads, one to the North, West and South. In between these roads it is predominantly rural settlements (60%). The Pongola – Umzimkulu CMA is marked in the red area.



100: CMA is managed by DWS, some are very large catchments, their responsibility is to look at all the activities in the catchment. Sometimes it travels through the municipal areas and then looking at the municipal strategic plans. Generally speaking you will find informal settlements scattered along these catchment areas which then has an impact on the streams or esturine. The CMA will then address that [water pollution]. Yes it [the EWS mandate and CMA mandate] is **to a certain degree integrated**, for example the river systems, eThekweni has its **pollution officers** to check on the river systems in certain places they have loggers to look at the **water quality**. The stormwater managers have loggers to measure the flow of water and the impact that the catchment has on the streams.

I think it is integrated in a fashion, if it is agriculture it is KZN agriculture that is responsible for much of the upper catchment. When it comes into the eThekweni area there is a mix between KZN agri and eThekweni agribusiness. Then there is DWS they work as a regulator and they look at the levels of the streams and look at the impacts downstream, whether the water flows into the dams etc. Looks at extraction etc. Is it well managed. And also we have a lot of sugar cane farming so that impacts the water and that too is monitored by the DWS.

102: There is **no leadership** from the DWS whatsoever. If there would be a CMA, it might be best to **upscale the authority** of the DWS, but right now they are **lacking serious capacity**. Sometimes they attend meetings but they are definitely **not the authority** they should be.

It is that **middle level** where things **fall apart** but you know perhaps if you look at the examples where there are CMAs it might work a little bit better in the Incomati I'm not so sure about the Breede. [...] They have a **coordinating role and an allocation** at different levels because obviously the municipalities also have a role as do the water user associations.

They [Ingonyama Trust] see themselves as a **separate authority** and not bound by for example municipal regulations even though they are within the municipal area.

101: Wij hebben in 2017-2018 in de laatste fase van Kingfisher hebben we heel veel tijd en effort gestoken om de proto CMA te helpen een **proto CMS** te schrijven een ontwerpversie. En vervolgens hebben we ondersteund dat met de **externe stakeholders gemeentes, environmental NGO, Department of forestry, boerenorganisaties** (waterboards, zijn cooperaties die de water services in hun gebied regelen. Dit zijn voornamelijk de oude blanke mannen die het water al honderden jaren in de hand houden. **Er is veel politieke strijd om deze waterboards**, er is zeer gemixte berichtgeving over, communities (met name in de rurale gebieden zijn dat vaak de chiefs), industrie [noemt stakeholders in aantekeningen]. **Waterboard [...] sommigen hebben hun eigen stuwmeren en sommigen kappen af van de bestaande infrastructuur.** [of dat akkoord is door de overheid] dat is momenteel een **enorme politieke strijd** want met name de waterboards, die al eeuwen in bedrijf zijn, die hebben heel **veel water rechten** zeggen ze en worden geacht met vergunning te mogen onttrekken. Daar is de politieke strijd en soms lees je dat ze opgeheven zijn, soms dat ze opnieuw opgericht worden en soms dat ze gewoon gecontinueerd worden. En daar moet je op letten als je stukken leest over de afgelopen jaren dat is bijna van minister tot minister anders [dat beleid] er is geen bestendig beleid wat betreft de waterboards. Dat is een constatering.

Hij [de CMS] is geschreven met het idee dan hebben we tenminste iets daarmee kunnen we 5 jaar vooruit. We hebben een basis gelegd voor als het CMA echt wordt opgericht en een eigen board en governance structuur heeft kunnen we kijken of we deze CMS actualiseren of een nieuwe CMS schrijven op basis van deze om die dan aan het nieuwe board aan te bieden.

Wij hebben in mei vorig jaar de verkiezingen gehad, duurde een maand voordat de nieuwe ministersploeg aantrad, daar is een kabinetsreshuffling overheen gegaan van de 35 departementen waren nu naar 25 gegaan, dus er is een schuifoperatie in Pretoria en nu zo langzamerhand zie je dat dat naar beneden komt en ook door de metro's gaat.

103: It's quite hard to say because just like my PhD which is about water security relationships over time, I'm kind of seeing this all playing out. We **don't have this overall CMA** which we are meant to have so there is this **institutional void** throughout the whole catchment area. Then what you see is that there is all these **different projects** merging at different spaces and at different times. They all merge and are heavily related to their particular context so they are very **context(location)-specific**. There are forums in place where people can interact with other catchment management forums that they have sub-committees. I have never attended.

Yes, well I suppose if you look at it from a legislative perspective there is a reason why they wanted to have these higher level institutions. But the biggest problem is **implementing** the CMAs. Yes it would make it a lot more **complicated** for someone working in **local government**, so what I'm getting from what you're saying it's more about the Sihlanzimvelo programme. And you see for their particular approach it would make it more complicated.

I think this [the **fragmentation** of water governance] is related to this **institutional void** and what I mean by that is there is **no CMA, no consensus**, so you basically have lots of **different groups** doing

different things based on who is willing and able to do **different project**. It would be a value to have the overarching framework/strategy, but from my perspective it would be particularly useful to have the enforcement side. Because if you look at the Water Law is promulgated, the DWS are the custodians, the owners of water, but if you actually look at the reality the national level is not really involved. Like in the Palmiet level no one from the national level would ever come there.

When you actually start asking questions such as why did the Umgeni ecological infrastructure partnership why did that actually start, then you actually see with that it's because of this **institutional void, no CMA, no overarching vision**.

103: you have the NWSA that clearly separates the service provider and the water service authority. Those organisations don't necessarily have to do catchment management, but then you have the next strain of water legislation which is the NWA which refers to CMA and what not. There's **not much integration** particularly from a catchment management perspective like how exactly the water services authorities should act in the catchment management space so then what will happen is that your water service authority are mandated to do certain things and that's mandated by the water services development plans so that's what they have to do. And if you look at that plan and search for the word ecological infrastructure or that type of thing it is not part of their scope of work. The integration aspect is lacking.

104: You are sensing correctly [that governance is rather fragmented]. Let's make this as real as I can make it. The water from the Umgeni catchment serves the third largest economy in South Africa. It would be reasonable to think that there was some kind of water authority/agency that is the custodian of that water resource that is coming from that catchment and with a few transfer but largely from one area to service that region, you would think they would be a custodian or agency. Well it's **fragmented**, there are **different agencies** doing **different things** and it is **not held together effectively by the DWS**.

104: You would have heard the Umgeni Ecological Infrastructure Partnership (UEIP). (not yet). When I spoke about a coalition and a partnership around ecological infrastructure we have this partnership of 20-odd organisations that are focusing on this and this is the UEIP. I've been thinking about **if a CMA was imposed** upon the province/area, as opposed to this, which hasn't happened because a lack of willingness and capacity to do it, us to a coalition of the willing as you call it and **building something from below**, I ultimately think that it might end up with as the governance of the system evolves, this bottom up approach which probably also involves Durban and a whole bunch of municipalities, involves researchers and a whole bunch of NGOs, whole bunch of land users, so I think this will ultimately be a **better way** of securing **better governance, better institutional arrangements**, better governance of the system because of **where it has actually come from**.

105: What is going on now is there are **2 things** going on here. You are interested in this whole project of river rehabilitation projects. So the interesting things is that a lot of the river rehab projects are developed around, so in Durban, what was interesting is that in 2015 there was a **convergence between the Climate Change agenda and the water governance agenda in eThekweni** municipality and that was prior to that time the water people, Debra Roberts who was the head of the Climate change adaptation stuff were really sympathetic to it but they didn't really buy in to the whole climate change this is the water engineering as in EWS, but they were struggling with water scarcity in the city. What was interesting is that you got this convergence of water and climate governance and I set up a research project around it because I saw that convergence happening and I have got a short opinion paper that I wrote that will be useful to you. So what's important is that once

we got this convergence between people who were worried about water security aligned with people who were concerned with climate governance in eThekweni which was then expanded to the broader Umgeni catchment. And so they established the **UEIP**. And that became an **umbrella framework** for looking at how we could use – because under the climate change agenda there had been a big focus on using community-based ecosystem services adaptation to address climate change – so the key idea in Durban is that we should use our **environmental asset base** to help us **adapt to climate change**. What happened when you started to get that convergence of the water governance with the climate governance, is that Neil MacCleod who was the head of the EWS at the time, did I give you his email? [...]. The important thing that you need to link to is that the **EWS** had been very focused on **service delivery** because that is their **mandate** and that's what we were writing about [names 2014 and 2015 papers]. But at that time Neil MacCleod and Debra Roberts who were two very powerful leaders in the space they started to converge around the ideas. Neil made this big jump where things really started to change where he started to talk about water governance and water security being linked to climate governance and climate adaptation and most importantly that water security was being connected to the need to restore the environmental asset base so: first the recognition about the convergence of these two things, this was in 2015, I'll send you the opinion paper. It was when the UEIP was formed. What was critical about that moment is that water security in the Umgeni catchment. Neil started to argue that we needed to focus on EI and the environmental asset base and we needed to focus on water quantity and water quality. Prior to that that hadn't been happening. Those things were clearly separated. Around 2014/2015 when the UEIP started this change really came. It was the leadership that was very important.

105: Ok so that's the interesting thing, you're kind of catching this at an perfect moment for your research, because what's happened now is that while all this has been going on [the convergence of water governance, EI and climate adaptation] there was supposed to be this CMA from the government and there was this **vacuum** and I'll send you a whatsapp with the newspaper article that explains it's ridiculous the whole group [I'm assuming this is about the current board of the CMA?] has got **no experience in water and sanitation** and they linked into a major corruption thing in selling water tanks so especially in this COVID crisis and the need for water it is just absolutely shocking but I'll send it to you. That basically shows how **dysfunctional this whole system is** and you have got people who have got no idea what they are supposed to be doing. So what's important for your work is that in the **absence of this national level understanding and influence**, the CMA were not established so what we think happened and Mark Graham from GroundTruth also agrees is that because of so many people working on the ground in the Umgeni catchment, local municipalities, researchers, activists like Duncan, people like Graham who have a lot of influence. We realised that we had to **work from the bottom up**. So what started to happen was that you started to get these catchment rehabilitation emerging, you had Geoff Tooley's **Sihlenzimvelo project** that emerged because he was doing it in terms of stormwater management, you had the **wizeways project** which was a private party so you had all these different pulses that started to emerge and Patrick and I were saying to each other look at these things popping up all over and have different governance structures but they are all trying to do similar kinds of things. That was really interesting because that has been going on for about 4 years and they have all kind of strengthened.

105: Yes but you must remember it [Dutch waterschap model] is not working over here and what we're seeing is a reverse process that what's happening I think is that all these little pockets of catchment management but at a small scale, and what is happening now is that and they are now starting to organise and through the efforts of eThekweni municipality because of this language and discourse it has created the space for this to happen. You have all these little pockets and it's

happened quite quickly if you think about it it's all happened in the last 4 years and now the city has taken on this new TRMP and is linking in [gets a call and cuts out]. So what we are seeing is so with the absence of the CMA but through this collaboration and what I was telling to tell you in the beginning is that this idea around the catchment rehabilitation project or catchment management programmes is very much around this **integration of climate governance, water governance, job security and poverty, it's got all of those elements** in it. It is not just one element around water quantity or water quality and it's really really important for you to tell that story around Durban in your thesis because I think it's quite unusual and its very important because these **catchment management programmes have therefore got a much broader focus** in what they are trying to achieve. And that gives them **political power**.

105: Yes that [the bottom-up leaders from the projects and collaborating municipalities forming a CMA] is a real possibility and it would probably be a much stronger possibility actually. Look I don't think national government would, they would want to control that process of the CMA, that's the tricky thing because if we establish this whole governance network from the bottom up and then you get the national department becoming this sort of top-down, I mean we tend to having part of our whole informal settlements programme with the national government as well with the whole national vs local and you must understand there can be **quite a bit of top-downness from the government**. The benefit though is that with the **ANC local municipality, provincial government, national government so at least that's all politically aligned**. It would be very different in Cape Town if they would try to do it it wouldn't work at all [CT voted DA]. So we might have more chance because of that but they still want to control it. And that's my concern because you will get this whole network that will emerge and it's a perfect way of actually establishing the catchment management agency from the bottom up. But with all this **dysfunctionality** and actually **corruption** and politics, because a lot of these people that have been appointed by national level have been political appointments. They want to assert their authority or actually do it for their own gains, they will not allow that to form in that way.

106: I think it [having a CMA and therefore another layer of government] would complicate things more. There was a strong drive to have it established, and they basically came in and presented it as essentially another **layer of governance**. So they were going to have **elections for district representation** from communities and they would then decide what would be able to happen with the water within those areas. It was also very big and we see it even within catchments in our city, in some there is a water shortage, in some there is excessive water. **So a CMA that is sort of trying to set policy for a whole CMA region without focusing on individual catchment I believe would create an additional challenge because it's not one-size-fits-all.**

So we were saying you should be looking at **integrating the existing ward councillors** into some form that gives you representation of the **whole catchment** and then representation from the municipalities that then create the structure you need to manage that area. Because one of the things that we recognised and we are engaging with other municipalities with is obviously what happens in the municipalities upstream of us impacts on us within our catchment.

108: Actually for now it is still a challenge. Because we are **not a fully operational CMA**. And within the ambit of the DWS, so whereby we are **relying on the Department**. But for now what we are doing – that is why we are pushing the CMS, because we can see there are some gaps at a local level in terms of coordinating some of the activities also in water distribution because the CMS includes the water allocations plan. It identifies where in the catchment [gets interrupted by external noise] – it is assisting now mostly is to have these institutions, **water associations or irrigation boards**, that is

how we are able to coordinate some activities and even the challenges that are being experienced are being communicated through these structures that we have. The forums, like the Richard's Bay committee that deals with the water quality or discharge of the affluent into the sea, that all the industries sit on that committee, we have various committees like the **reconciliation strategy** committee that deals with those issues, they **coordinate** some issues but it all involves the leading institution of the DWS in that regard. And then as a CMA we define our functions within that – if maybe they talk about evasive plants, than that is our responsibility as a CMA to budget and make sure they are being removed in those areas where there is a stress in the water resources. And also the department is still taking a lead in terms of **building the infrastructure** like the dams and doing those transfers [IBT] within the catchment.

108: [why is the CMA currently not functional?] it is that **fragmentation of coordination of activities** within the catchment. We don't know what is happening in the different catchment, there is that fragmentation that has opened up that hole, for now.

108: Maybe for now it is [the cohesion between the CMS and the already existing mandates of municipalities] premature to comment on that because we haven't implemented the CMS yet. But in terms of **cooperating and providing information** there are coming forward. They are much **cooperative** because some of them even arrange venues for us, they provide catering if we are organising a meeting for the development of the CMS and they are also part of the strategy development. They are much cooperative in terms of providing input. But what I've learned is that you know water resource management I think it took a long journey to be **decentralised**. So it's something that not everyone understands well.

Note: in the creation of the governing board of the CMA there is a trend of DWS employees who become involved with the CMA. The Proto CMA is currently a group within DWS regional office.

Confirmed by: In terms of adequate and competent staff, the CMAs currently face no issues. This was not so during the early days of the CMA. In order for the CMA to 'hit the ground running' staff from DWS that have roles that correspond to the CMA functions should ideally be transferred to the CMA. This however is a major stumbling block. Transfer of staff requires numerous processes and at times, the staff may not even be willing to relocate. Incentives should be in place to entice staff transfer to CMAs from DWS. The legal process involved in staff transfer should also be streamlined (Stuart-Hill & Meissner, 2018).

109: I'd say it's **not very well integrated**, it's a very much **not in my backyard thinking**. I just put a very simple example: within the stretch of the two cities Pietermaritzburg and Durban, you've got a river that is not in a good state, which is where the Blue Deal comes into play, the Msunduzi river, plagued by issues that are affecting its water quality, which in turn affects the downstream user which is Durban. The approach is, looking into the past, in terms of there being a working together in that situation has been quite poor. Both (all officials working on either side) have an understanding of the issues and problems and what needs to be done but it's sort of people working in their own **silos**. So up here we have individuals who take heed of the situation, we know what's going on, we propose, but then the downstream user has an understanding but is not part of the processes, is not involved in whether he can play a hand in supporting that. So yes it's very **disjointed** in terms of the approach of **governance** as a whole. You can also look at it from water quantity issues where the provision of water in various areas especially upstream/downstream and how the decision-making around that is done is very singular. People are doing their own thing.

well, they are **streamlining** it, I think what we are very good is, I don't mean to brag but in terms of individual stakeholders who are **passionate** about the catchment and its management, and it getting into a better space or state. I think we surpass a whole lot of areas around us. People are **concerned, want and are doing something about it**, we by far have the people in abundance, various organisations trying to find solutions to these matters. The issue lies in people working on their own, but also on top of that you have areas or **platforms** at which all of these stakeholders can meet in this space and plan and come together to propose solutions. But it lies in some of them not participating. Especially with CMAs, we now have **CMFs**, so those are a perfect **example of us having structures** in place where people can come and propose what needs to be done. Stakeholders are highly involved, but unfortunately missing are the people that are able to make the decisions and make the necessary change. A local government or officials they are the ones that are not coming to the table. That is why most of us there is a disjoint in many of the areas. Especially CMAs and CMFs play a crucial part in those processes being successful. There are passionate individuals that want to make change happen but they don't have a "mother figure" that can say okay we rectify this, we back this in monetary or coordinating. So I think if that can happen a lot of issues can be solved.

Condition 6: Agents of change

In order to drive change, agents of change are required to show direction, motivate others to follow and mobilize the resources required.

Indicator 6.1: Entrepreneurial agents

To what extent are the entrepreneurial agents of change enabled to gain access to resources, seek and seize opportunities, and have influence on decision-making?

"the apparent absence of innovation champions [policy entrepreneurs] is closely linked to surrounding power structures. Change needs to be supported by the legitimation and empowerment of new or existing champions." (Johannessen et al., 2019).

103: That's a difficult question. If you just look at Durban's environmental and climate governance, one of the words that is thrown around a lot is learning by doing, experimentation. That type of philosophy is quite prominent in our environmental governance space. So there is always people willing to try to do different projects. **Resourcing is obviously a problem. For instance our research team is fairly small** and we would only work in a certain space.

105: So you were asking me so what I was saying about that **experimental governance** is enabled this kind of, it was definitely Neil MacCleod who's led this kind of experimental approach so that's what opened up the new way of thinking about water security because the city, up until that time, he [forgets name of engineer] had been working a lot on recycling water for the city, so the city put a lot of effort into trying to look at the cultural and social perceptions of whether people would accept recycled water in the city. [looks up name of engineer, Rob Dier]. His job was to basically look at whether there would be an **uptake of recycled water**, so could the city do what Namibia did and actually start recycling water. They had **engaged religious organisations, different** groups and there was quite a lot of resistance where people said we are not going to use recycled water.

105: So then the shift came in 2014 where they started to recognise the **value of ecosystem services** and actually fixing up the catchments to enhance **water quality and quantity**. And that's the relevance to your work, the link between these large river rehabilitation projects and the whole water governance. The critical **turning point** was around this **2014/2015** with the **establishment of the UEIP** with the goal of if we can rehabilitate our rivers and we can use EI to support providing water into the system and improving water quality we can provide water security in the system, so it was a new discourse to the one I explained that Rob Dier was leading around recycling. Having said that the city still very much continued to roll with the idea of recycling and particularly around sanitation approaches where it's continued to work very hard through the **pollution research group**.

107: The other most important **benefit** for the municipality was that as much as it was economically viable, **funding was a barrier**. If we had to do it with our **municipal capital budget**, we certainly would not have been able to do the project. With a PPP process we were able to do that because once it goes **out to tender**, a **private party leverages** all the private funding necessary for the building and construction of the tertiary plant. So basically it is funding for the entire project, finance, construction, build, operate and maintain. And when we say PPP it's similar to the American model where there is a transfer at the end of the project. Obviously when I said **guarantees** I meant in terms of the **volume** [that they will be taking off] but also for a private party to invest in a tertiary plant they needed a **long-term offtake arrangement**. The PPP provided that because we entered into a **concession contract**. So the municipality and the consortium DWR so basically the municipality

provides the affluent, the private party builds the plant and has separate offtake arrangements with the industrial partners so they are basically now providing the water we would have been providing but at a specification that was required for those two industries and so you can imagine the benefits for the industrial partners, because now they got access to cheap second-grade water. Instead of paying potable industrial tariff which is very stepped-up in terms of volumes, they had now gained access to cheap second-class water. The second offtaker was an oil refinery. The paper company signed on 40 megalitres per day, the oil refinery signed on 3.3 megalitres per day, the capacity of the plant was 47 megalitres per day so certainly they didn't want to push it right to its maximum. That contract we are currently now out for a new PPP. We are 19 years of that 20 year concession contract. And in terms of that contract the municipality has benefited so much in that it has provided a water security for itself. So when we went through a drought like Cape Town did a few years back we now had this recycling plant which is providing water to the industry on a continuous basis. So even if we would have water restrictions, this water would still be available. These restrictions would have been detrimental to the industries.

109: I can positively say yes [being able to achieve the goals for the NGO], within different pockets of areas where we have made our footprint. With those activities, one of the key things is the **environmental awareness** component and that is I think one of the biggest things that we put out there. We cannot bring about change if we don't change the mindset of the people we are working with. With that happening, areas, communities have been transformed. We have some **amazing stories** that are proof that we are doing effective work. We do understand that it is a process. If we are able to make the necessary change even if it is a slow process as it is, we will get to a process where these things are happening across the board. I can positively say that we have made the necessary change and the impact in the catchment not as quickly as we'd like it to be but there has been a moving of the needle.

*"Political capacity: In KwaZulu-Natal before the premier was replaced, some indicated that he had the capacity and was innovative. South Africa is also **in need of a vision** and this vision needs to be clear about feasibility of decision, but **there are no innovation and 'stand-up individuals**."* (Stuart-Hill & Meissner, 2018, 119)

Indicator 6.2: Collaborative agents

To what extent are actors enabled to engage, build trust-collaboration, and connect business, government, and sectors, in order to address the water challenge in an unconventional and comprehensive way?

*"The level of **trust** between ordinary citizens and the state around water issues, and the provision of water services in particular, has improved significantly since 1994.(64) Members of civil society organizations that **actively engage** with the local state around water rights **acknowledge a positive relationship** and recognize what has been achieved in the context of the challenges the municipality faces. However, there are **high levels of mistrust of the local political system**; communities do not always feel that they can depend on their elected councillors to address their development needs. The state empowers and co-opts communities through material provision but disempowers them in its engagement with ordinary citizens through the **ward committee system**, which was designed post-apartheid to ensure participatory democracy but that has not met its goals."* (Sutherland et al., 2014)

101: Er zitten 2 kanten aan: ja er was veel verwondering over en weer van waarom doe je zoals je doet. Een aansprekende presentatie voor ons is veel beelden weinig woorden en een goed verhaal. In za hebben we presentaties gezien in de vorm van dat de hele wetstekst wordt overgeschreven wat zijn mandaat was volgens de wet en dat stond hij dan voor te lezen. Tja, dat was daar gebruikelijk. Dus iedereen zit heel erg in die **mandaatsfeer** en wij waren de **vrijbuiters**. Omgekeerd, omdat wij juist heel erg die vrijdenk functie hadden maar ook wel heel dat **men het fijn vond dat wij het op een andere manier aanvlogen** en dat zij daarmee aan het denken gezet werden. De nieuwe aanpak werd **goed ontvangen**. Het mooiste compliment wat ik gekregen heb is:

In 2015 gingen we naar 2 stakeholder meetings met de mensen van die proto CMA. Daar zouden we een workshop geven over hoe gaan we nou die CMS structuren. Daar zat een dag tussen en wij kwamen daar op kantoor om dat voor te bereiden en we zagen aan de lichaamstaal dat ze zeiden tegen ons jongens even dimmen, we zijn al met jullie op stap geweest en daar hebben we veel tijd aan besteed en dat was goed en gezellig, maar nu moeten we even al onze dingen doen dus kom even niet storen en wat we morgen doen hebben we eigenlijk geen tijd voor. Dat lieten ze blijken in hun lichaamstaal, even rustig, ik moet rapporten afmaken etc. etc. We hadden afgesproken dat we de workshop van de volgende dag even zouden doorspreken en voorbereiden en ze hadden er eigenlijk geen tijd voor, ze hadden 5 minuutjes maar dan gingen ze iets anders doen. Dus we hebben gezegd ok succes we zien elkaar morgen daar ok ja. Toen hebben we die avond als Nederlands team bij elkaar gezeten van ja wat moeten we hiermee, de signalen zijn overduidelijk, ze **zitten hier niet op te wachten**, toen hebben we **het programma helemaal omgegooid** en in plaats van over de inhoud te praten (tijdens de workshop) hebben we de tijd genomen om hun over hunzelf te laten vertellen aan ons. Wat zijn hun persoonlijke drijfveren, waar zijn ze trots op? Waarom doen ze dit? Op basis daarvan konden wij zeggen ok als je daar naar kijkt hoe ga daarmee om. Wat bleek is dat die mensen een **enorme interne drive** hebben. Hoe ga je met je werk om? Wat frustrereert je? Vooral het feit dat **het dan weer linksaf is en dan rechtsaf**, veel **crisis management**, **de wet is niet duidelijk**. We willen het allemaal goed hebben maar als we het dan gedaan hebben moet het weer anders. Toen vertelde wij hoe wij omgingen met die dagdagelijkse last. We hebben een op een interviews met hun gehouden en vervolgens hebben we dat in een veilige setting naar elkaar laten spelen. Ze is de mensen van het proto CMA team (6 mensen) en 3 mensen van het Nederland team.

103: With the Palmiet project initially it was meant to be a proof of consent case study for the Umgeni ecological partnership, this was around 2014 where the EWS and the Environmental Planning and Climate Protection Department (EPCPD) within the eThekweni Municipality they **came together** and there was a whole notion of **using ecological infrastructure** to improve water security (both **quality and quantity**). This was on a really **large scope** throughout the entire catchment, so from the foothold all the way in the Drakensbergen to the coast in Durban. So idk you've come across but people referred to it as the **UIEP**. Initially, EWS wanted to do quite **technical interventions**, so that would be reinstating the river **bank using reconstructed** wetlands that type of thing. But it was in close vicinity to the base of the Palmiet catchment which was where there was an ... informal settlement called Sihlanzimvelo. So basically what happened is that Cathy was quite instrumental in this process and she **started talking** to the head of the EWS at that time, Neil McCleod. So the **University came in**, the human geographers from the School of Built Environment study, they came in and looked at how people have different relationships with water along the river. They went into the informal settlement and **asked them** about their relationship with water. They also went to the Palmiet river watch. It also involved some school children. So they slowed down the whole project to say ok what is people's relationship with water. So basically this was **transdisciplinary**, there was **co-production of knowledge** it brought in different stakeholders.

At the end of the day, GroundTruth from Hilton was appointed as the service providers for this project [western aquaduct]. They are coming in and implemented the environchamp model. It is when you develop people within the community and **empower** them and then they **become agents of change** by training them to transfer messages to people. But then they also co-engage with citizens. I haven't heard updates on that. That process involved quite a bit of tension.

105: the LIRA project was actually quite important because they held learning labs where they got **municipal stakeholders together**. I think it was a lot to do with Geoff's insights, they saw the potential of doing **catchment rehabilitation** projects. And so what happened is only in the last three months they took the Sihlenzimvelo project which was already being funded and they formed a transformative catchment management programme. That is new in the city. Geoff has done a lot behind but now Sean is doing a lot in leading it because he has been engaging with other municipalities. The programme is called **Transformative River Management Project (TRMP)**.

105: So in the case of an **institutional void**, you've got this **fantastic water act** and great idea of a CMA, and then a **complete implementation failure** for a lot of reasons. And because this was not taking off, **people on the ground do not sit passively** and wait for things to happen that's what this shows all these things that have happened from the bottom up and driven by the local state because they have mandates to do and integrating across departments like I showed you in that convergence and that all come together to create this possibility to start forming a governance network to actually fill that institutional void. So the institutional void has allowed it so for instance in the Breede or the Berg you've got much more influence and its much more controlled with the commercial farming and it's all formalised, all in the formal system, this [in the Umgeni catchment] is all in the **shadow networks, the informal networks, bottom-up informal partnerships between the states and civic society, researchers**, it's a completely different pattern and that's why it's so interesting compared to say the Berg or the Breede.

107: So basically, this project [PPP] here in terms of **recycling wastewater**, the **municipality** had the **expertise**, it essentially came from the **planning department** many years ago back in the early '90s where there was research about sewer affluent and recycled water. We had this large wastewater treatment works, it's called the Southern Wastewater Treatment Works in the southern basin of eThekweni, it's a very industrial zone of the municipality and we had quite large industries there who were **heavy water users** – very **wet industries**. One of those wet industries was Mondi, a paper manufacturing company. So they basically then approached the municipality and wanted access to recycled water, they undertook the process themselves but certainly that wasn't their core and it wasn't a sustainable approach for them to provide that recycled water. They knew they were very close to our southern wastewater treatment works hence the reason is that they approached the municipality. And they knew it was one of our biggest, with a capacity of 200 megalitres a day that normally did primary treatment and there was a sea outfall that we discharge affluent. So then the municipality did their small little trial and found out that yes technically it is feasible, can be done, but certainly we don't have the resources to expand this to a large scale for a tertiary plant to produce that water. So the process was they did a feasibility study to look at the economics of it. Let's see if they can be a feasible project. The only vehicle that existed for that purpose was a PPP. The industry being that private industry, a very big customer, they were consuming in the region of 40 megalitres per day, so you can imagine huge use. They were purchasing that, most of it potable water. They were trying to recover and recycle some of it in their processes but certainly they were not getting the volumes and the economics of it. The municipality registered a PPP process, in terms

of compliance there was the municipal finance act but at that stage the municipal systems act was still incorporated into PPP process, the feasibility study showed a positive net present value and rate of return in the sense that it was a financially appealing project as long as there were guarantees in place. And I say guarantees as in there was offtake arrangements, because the municipality was certainly able to provide the feedstock, that was the affluent to this tertiary plant, where a private party can undertake tertiary treatment to provide industrial grade water and supply to offtakers. So in terms of feasibility they look at other customers in the area and were able to secure another offtake partner. That private party was now Veolia, a French tech-based water company. So then we started a PPP.

So now to make this PPP viable for the municipality as well, they had to be a win-win situation. So we were distributing affluent through our sea outfall, primary treated affluent. Now by supplying a feedstock to this tertiary plant we were now able to get a revenue stream for our sludge, so instead of discharging to the sea outfall. Another benefit was that from an environmental perspective we were discharging less and the other economic benefit was that we now had brought in more potable water into our network, because that potable water that was kind of secured for these two offtake partners was now available for other customers in eThekweni and at that time there was a peri-urban community that we had to supply water to now if we wouldn't have the PPP, that would have meant we needed to build the infrastructure, the pipelines to bring the water in, so obviously there was a huge saving for the capital cost.

107: I was approached by CT municipality about a week ago and basically had a Zoom meeting with them and looking at how we can assist them with their water reuse project so in terms of our processes and how we have streamlined them in terms of moving the project forward. So yes I also presented a number of times in all the forums.

[It was] very well received, in those platforms there are the private parties, the bankers attending and they are very [inaudible, but suspect keen]-eyed to investing, and you must remember these are the type of projects that kind of attract their eye, they are not the normal infrastructure project, because with those normal projects the municipality does its normal bidding every year, they have a AA credit rating, they get enough finance every year so it doesn't really wet their appetite. It doesn't secure them for the long term.

108: Yes and bear in mind that the Amakosi are more in peri-urban or peri-rural areas and the dynamics are not the same as the person in the town, so you find that those people in the traditional authorities are still looking for drinking water. So you see that it is totally different from that person in the town who has drinking water. There is still that **inequality**. When it comes to the rural areas, people are still looking for drinking water. They are **not part of the water resource management**, it was the situation was totally different. So when you go to those areas to talk about water resource management, they say we can't talk about water resources because we don't have water, our rivers are dry, we don't even have the water for drinking, how can you say we must conserve water which we don't have for drinking. So now you are brought into another discourse when you talk about water resources in the rural areas. And now because they think that you are coming from water and sanitation then you are coming to talk about when are you **putting the project** for running water to their area and then you find those most of the issues are around the drinking water, which is **water services**.

Yes it's easy to talk [with the Amakosi or traditional leaders] because they are more welcoming, because when they see the government, their hopes are being raised because they [the government]

are coming to talk about this. And then they find the space to figure out all the issues that they have in their area. They use that opportunity when you come to them.

"With regards to co-learning, the CMAs have formed partnerships with local and international water resource management agencies. This is a positive aspect in that it allows for the transfer of skills between agencies. One issue with regards to co-learning is that CMA staffs are preoccupied with their own workloads. Within the institution, there seems to be a lack in the sharing of information between staff members" (Stuart-Hill & Meissner, 2018, 14).

Indicator 6.3: Visionary agents

To what extent are actors in the network able to manage and effectively push forward long-term and integrated strategies which are adequately supported by interim targets?

[de aanpak van de workshop omgooien] **101:** Op dat moment nog niet maar dat heeft wel de basis gelegd om dat op een alternatieve manier om dat zodat ze zelf op te gaan schrijven en daarmee meet trots te creëren. [Je zei we hebben dat afgemaakt en daar gelaten. Wat wordt daar nu mee gedaan? De lange termijn?]

Dat was een van de redenen om te pleiten dat een van de projectgebieden voor de Blue Deal nog steeds in dit gebied is, zodat je nog regelmatig bij hun over de vloer komt en hun contacten kan houden, maar het gaat nu niet alleen maar meer om hun. We willen nu naar concrete problemen en oplossingen werken en niet meer alleen maar probeert om een organisatie op poten te brengen. Dat is een verandering maar nu met dit project waar zij ook een van de partners zijn blijft het contact. Wij zijn alleen niet meer het eerste contact punt. Ik heb nu gezegd [tegen de proto CMA board] dat er een ander aanspreekpunt komt en dan merk je dat vertrouwen moet je winnen dat kost tijd, veel tijd. De vergelijking tussen een Nederlander is een sinaasappel en een Zuid-Afrikaan is een kokosnoot. De Nederlander heeft een zachte schil en de kokosnoot heeft een harde schil dus dat kost veel tijd en moeite om daar doorheen te boren. Dat is een verschil. Het andere verschil is dat de sinaasappel allemaal partjes heeft. De Nederlander is van het partje werk is anders dan het partje kennissen, sport etc. Dat zijn allemaal aparte dingetjes en dat moet op de agenda end ie moeten gepland worden. Bij de kokosnoot, als je de schil eenmaal onderbroken hebt, dan is het vruchtvlees loopt allemaal door elkaar heen en alle facetten van het leven lopen door elkaar heen. Als ik om 2 uur 's nachts bel wordt er opgenomen en wordt er gevraagd over hoe het met mijn moeder gaat etc. Dus je leert van elkaar en je moet open staan voor elkaars mogelijkheden en beperkingen. Dat betekent dus naar de toekomst toe dat we deze ontwikkelingen zeker blijven volgen, ik ben nu vanuit de Unie [Unie van Waterschappen] Zuid-Afrika coördinator. Als WHD [Waterschap Hollandse Delta] zitten we in deze partnership dus dragen we bij aan de relevante zaken maar op het moment dat de CMA daadwerkelijk opgericht wordt is voor mij nog wel de overweging om of ik niet naast de blue deal ook nog een aparte relatie kan hebben met Durban.

Hij [de CMS] is geschreven met het idee dan hebben we tenminste iets daarmee kunnen we 5 jaar vooruit. We hebben een basis gelegd voor als het CMA echt wordt opgericht en een eigen board en governance structuur heeft kunnen we kijken of we deze CMS actualiseren of een nieuwe CMS schrijven op basis van deze om die dan aan het nieuwe board aan te bieden.

107: Oh definitely [PPPs are the way forward for municipalities] and Speedy would have also told you that other municipalities have visited us and we have basically shared our experiences and outlined how a PPP can address municipal challenges in a very sustainable manner, and so I'm also of the opinion that PPPs are the future, if you are looking at degrading infrastructure, no capital budget in many of the municipalities and a limited funding for the municipalities. PPPs certainly provide a solution for that, because the private parties the way I see it the municipalities have the vision, they know what they want, they want the economy to be driven they know they want the customers to have sufficient water etc. But the private parties have the much-needed expertise and funding / resources / technology.

108: Yes that [that the CMA will have a coordinating and to advise on the protection, management, conservation and control the water resources and also to coordinate the activities within the WMA] is the vision that we are pursuing because as you know right now there is the Umsunduzi Blue Deal project which tries to improve **water quality** in the Umsunduzi catchment so we started piloting the Hydronet there where some of the stakeholders that are taking monitoring of water quality they are feeding information into the Hydronet and then we develop it. We want to build in one area and replicate in another area. But for now we are still focusing in Umsunduzi. Once the CMA is fully operational, the approach that we are adopting, we say let's do it at the same time; the same time we implement it, we develop it.

108: [why is the CMA currently not functional?] it is that fragmentation of coordination of activities within the catchment. We don't know what is happening in the different catchment, there is that fragmentation that has opened up that hole, for now.

Condition 7: Multi-level network potential

Urban water governance involves a plethora of actors and interests from all levels of government, organizations and (private) stakeholders. For sustainable solutions, working in networks is an essential determinant for effective solutions.

Indicator 7.1: Room to manoeuvre

To what extent do actors have the freedom and opportunity to develop a variety of alternatives and approaches (this includes the possibility of forming ad hoc, fit-for-purpose partnerships that can adequately address existing or emerging issues regarding the water challenge)?

*"Hordijk et al. (2012) [in: Sutherland et al., 2014]] argue that in order to foster transitional or even transformative processes, social learning needs to be developed through collective leadership, trust, the willingness to take risks, and the development of social structures that foster experimentation and innovation. EWS, under the leadership of its Head, Neil Macleod, purposefully adopts a **flexible policy framework** to ensure adaptability in service provision and the room to manoeuvre. Consequently, water governance in eThekweni Municipality is **flexible and adaptive both in terms of process and practice**. The organizational culture at EWS has developed around an openness towards learning, support for experimentation, a lack of fear of being innovative, and of learning from mistakes. This organizational culture develops confidence among EWS officials at all levels to open up the space to discuss, among different actors, what is and is not working in water and sanitation provision and how research or community engagement might improve the policy and practices of the state." [in: Sutherland et al., 2014].*

103: [On the LIRA project] The action plan has 3 themes: 1) governance 2) social issues 3) environmental issues. What the action plan tries to do is assign responsibilities to different activities within these themes. So for example, you can have multiple organisations responsible for certain activities. What I would like to point out is that it is completely voluntary. From this action plan the community of innovators emerged. This was kind of the group overseeing and we meet every 4 months to discuss progress made on the action plan but what happened is we have this action plan but then people go off and do their own thing. So there is this general framework but then do their own thing and then report back. So the UKZN's work is based in the informal settlement because we are doing research there. Whereas Palmiet river watch they do different things higher up in the catchment.

I suppose one aspect that I'd like to bring to your attention is that just by virtue of where the Palmiet catchment is it is below any major dam. It doesn't actually contribute to improved water supply because it doesn't flow into a dam. So basically all rivers in eThekweni are below the dams so a lot of the projects that are set up come from that perspective. We're not concerned with improving water quantity. From his [Duncan] perspective he will say you need to improve ecological infrastructure to improve **water quantity** to go into the dams but that is because of their particular position within the whole Umgeni catchment, whereas we are right at the bottom, like the end-of-pipe if you want to use the engineering terminology. Our river rehab projects are more looking at the **quality** of the water and **urban flooding** or **infrastructure maintenance**. It is a slightly different focus.

105: All of these **programmes** are **coming together in the TRMP**. So if **national government allows the space** for this to form it could become this **governance network** of people that are all engaged in

catchment management, one would think that that would be the ideal sort of governance mechanism to pull up into the CMA but then you have got to look at the CMA and say how is it organised and how does national government want it to work and land down. And of course if you look at the whole catchment we are only a small part of that whole CMA it's a huge area. It's basically the whole of KZN. That's part of the problem and KZN is under Gauteng is the most populated province of the country so compare that to the Breede or the Berg.

So what I was going to say about scales is that now we are seeing this bottom-up process forming upwards and the interesting thing is how that's going to meet with the top-down CMA coming down.

Indicator 7.2: Clear division of responsibilities

To what extent are responsibilities clearly formulated and allocated, in order to effectively address the water challenge?

102: The municipalities impose that on account of them being **water service providers**. There is the NWS and the NWSA (national water service act) and under that part the municipality is a service provider and as such is **entitled to raise money** for water. So they **generate an invoice** which the user pays and a certain amount of that they pay to the bulk water supplier Umgeni water and that **covers** their costs and then a certain amount of that **tariff Umgeni water sends to national DWS**.

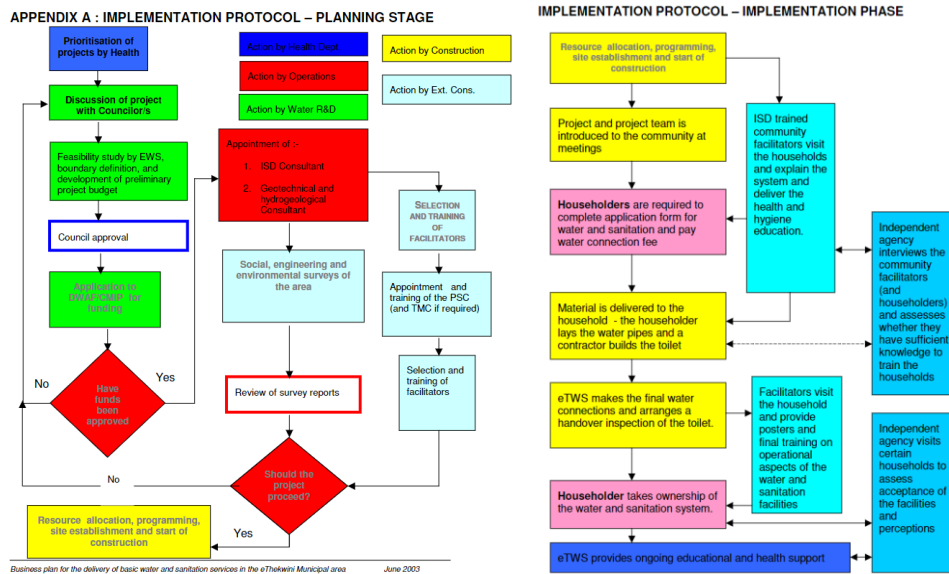
They are a **parastatal** is the term so not directly body of government they are **an independent entity** and can **raise funds by themselves**, they have an **independent board of governors**, well its **meant to be independent** and they are employed by Umgeni water as an entity and not by the national government. In that way they **have parallels to the waterchappen** here.

102: If a CMA were to be created, it **would need serious authority and capacity**. The **current board is not capable** of taking on the role in the CMA. They usually bring in **junior consultants** that are **not experts**. In this vacuum many organisations have **stepped up** and started filling that void. Now if there would be a CMA board that has overriding authority, it **could take years** to make the **relationships** necessary to build **trust** and this **authority**. It **would be desirable** though.

On the eThekweni Municipality website there is an elaborate business plan that explains how actors can make plans, how they are approved/rejected by official bodies and who exactly is responsible for executing the plans. Source:

http://www.durban.gov.za/City_Services/water_sanitation/Policies_Plans_Guidelines/Pages/Business-Plan.aspx

This flowchart applies to both challenges.



104: So you have your water running down your river which will inevitably go into a dam or a reservoir. While its running the **custodian** is obviously the **DWS**, while its running free. The moment it is **abstracted from a dam** or even from a river for residential and commercial and industrial use it is effectively taken up by a **waterboard or water utility**. In our instance that is **Umgeni water**. The bulk water supplier **purifies** the water and supplies it on to what we call **service authorities**. **Water service authority eThekweni** is a **water service authority**. Its job is the **reticulation** to users and there are three or four within the Umgeni catchment all supplied by Umgeni water. The bulk water utility is **owned by the state**, it falls within to a large extent the DWS, it's an agent of the DWS, a parastatal. The shareholder is the SA government through the DWS. So when I buy water, I buy it from our local **municipality** which is a water service authority (WSA). It receives the water and reticulates it to me effectively, I pay for the water, as a proportion of the payment I pay a sanitation charge.

The **waterboard** is your **water utility**. So Umgeni water is our water utility and is constituted as a waterboard, it has a board of directors which represent in the same way a company would, the only difference is that that board is **appointed by the ministers** of water and sanitation.

105: : I'm not the best person to ask about this [the three-tiered system in SA from national, provincial to local] because I don't work at the national level, someone like graham would be much better, but my understanding is that the **CMA is a national imperative**, my understanding is that the CMA would come down from national government with its structure so it's very much controlled and **coordinated by national government**. The CMA is the **coordinator of water resources** in the country so we had a big restructuring in water in sanitation around the 2000's where the role of the government shifted away from the provision of services to actually regulating or managing the water resources and then the water services authorities were formed which are basically the municipalities so EWS to supply and provide water and in the case of EWS they have a parastatal in Umgeni water who does the bulk water provision. So there was quite a **clear division** around **national government being the regulator and policy maker**, and of course the water act was very **progressive** so if we could have stuck to that, it was very progressive in its time and still is I think. So that should have worked and in my opinion if that would have worked in the catchment management agencies which is around the management of water, and the management of the resources, which is a national mandate and they would run the CMA across the country but within those CMAs you would have

these provincial government and of course the provincial water service authorities and other environmental department so cutting across the different departments as well. But the thing is if you've got this model of these CMAs coming in from the top and managing these actually large catchments now and then you've got this much more localised municipalities coming from the bottom up, you could imagine there could be some sort of political wrangling around it. I mean having said that local government is very compliant with national governance. There is a lot of compliance and in fact they are not called of government anymore now they are called spheres of government because it's not hierarchical, there is meant to be this **cooperative governance**. There is also COGTA (cooperative governance and traditional authorities) and they also coming into the space. COGTA are also important.

105: Yes and the way it's structured, the municipal systems act and all of those things that support that, it gets devolved, it gets **decentralised** and its very **clear** who has to do what, all of those things are clear, and if you would have a more functional DWS, if that was strong even at the provincial level or had these CMA been established being implemented in the spirit in the way they have been set up that would have really made such a big difference but that's what failed.

106: Yes so the point I was making is that **DWS are responsible for the water**. The challenge is that what happens in the **catchment** has an impact on the **amount** and the **quality** that exists within the river. So what we find is that **DWS is fairly thin on the ground** in terms of **enforcing their mandate**. So there are times we have referred things through to them and little or no impact comes out of it because they don't have the resources. It's part of the challenge of how they set up the whole catchment management agency is they **almost tried to replicate the ward-based system** that we have within all the municipalities. So you created yet another layer but the problem with that is that the municipality is deciding how a property will be developed and that impacts on what sort of run-off you get and what quality run-off you get. And so the DWS is responsible for the water, but they have **no mandate to control** what gets developed in the catchment so that is the sort of conundrum that you are constantly having in how these catchments are managed.

107: So basically our **DWS are the regulator**. **National Treasury is basically your arm of government**, that's your national arm of government. Then you get your DWS and provincial arms of government. So in terms of Speedy's processes – the **planning branch** – usually work together very closely with the **DWS** and they are **kept informed** about demands our and progress. So we have what is called the **KZN reconciliation strategy**. In that sense is that we inform them about our water projects. They incorporate that in their plan. In terms of support, yes they support the project simply because the municipality is addressing the water security. You must remember, the **municipality has the bulk water supplier Umgeni water** but in terms of meeting the needs of its citizens in the municipality, that's the **municipality's responsibility**. They know exactly in terms of **demand, yields insurance, as service authority and service provider**, so they have the opportunity to undertake a lot of these project themselves and also determine the level of service they require.

108: For the CMA? Fortunately yesterday there has been an advisory commission that is tasked with advising the board of the CMAs throughout the countries. Yesterday was for KZN. The governance board will be comprised of experience and skill based individual from different sectors.

[more specifically,] It's advertised, there will be an advert that will go on newspapers, that will be disseminated in all the WMA that specifies the criteria whether you should have experience in water resource management, also in human resource or finance. There are a number of requirements, then people per sector will nominate maybe 3 people that would be submitting their CV to the

department and the advisory board will look at those CV and looking whether they are meeting all the requirements that have been set and then they will make a recommendation to the **Minister** where they will say these are the 20 people that you can select your governing board. Maybe it will consist of 8 of 9 people depending on the decision that the minister will make.

108: Yes definitely [it is hard to have a stick behind the door for the CMA without statutory authority] because the challenge that we are having on that regard for **compliance and monitoring** there is a **grey area** between the **department and the CMA** which is actually the section of the NWA, section 19 and 20 that we are responsible for with the CMA, but then the section 52, 53 and 54 they fall under the main account. So you find that there are still those grey areas where the **prosecution is done within the department**. You find that we picked up the **water directives** and issued it to the culprit or to the polluter, and if the problems persist then we involve the DWS to prosecute. Yes, those are the **challenges sometimes**, more specifically the municipalities, you don't just prosecute, you need to follow some protocols to assist the municipalities.

108: Yes yes that is the idea [for the CMA to have a coordinating role] you know when we are operating the Proto CMA we are getting into another space now in terms of the you know the powers, **we don't have full delegation in some of the activities**, they are still centralised at a national level.

M: And do I understand correctly that this needs to be decentralised? The CMA needs the authority to be able to engage with these pop-up stakeholders?

108: Yes because the legislative framework it directs us towards that. If it is not in place then surely there is hole that is there because the **powers are still centralised** so then surely there will be no coordination taking place or collaboration or partnership. It will take place informally but not in a coordinated fashion.

108: Yes, actually you know the **CMA sometimes becomes a political struggling of powers**. They are saying maybe there is a **sabotage within the system**, they say if we established the CMA then we **lose powers**, because some of the functions will go away. Then my responsibilities will be reduced, which means that if I had 25 staff then probably I will remain with 10 so we don't know, there are many theories that cause this delay of **decentralisation of water resource management**. Because for me, I always look at the decentralisation as the **empowerment**, a system of making sure that the **local stakeholders are aware about the water issues**, that they shouldn't be wasting water, they shouldn't be polluting water, because we are a water scarce country, we don't have much water and we need to protect it in terms of **quantity and in terms of quality**. Because if you have polluted water it's the same thing as if you don't have water.

Indicator 7.3: Authority

To what extent are legitimate forms of power and authority present that enable long-term, integrated and sustainable solutions for the water challenge?

*"The **dominant** and most **powerful** water actor in Durban is **eThekweni Water and Sanitation Unit (EWS)**. It is a delegated Water Services Authority (WSA), which gives the department certain **legal powers** and **responsibilities**. It is strongly influenced by the South African Constitution and national government, which set the legislative and policy framework for water and sanitation provision in the country. However, as a result of good leadership and a highly capacitated and motivated staff, with its innovative and transformative approach to water and sanitation, it **holds significant power** in the municipality, in **South Africa and internationally**" (Sutherland et al, 2014).*

103: [on the LIRA project] So then in terms of decision making, any organisation or individual they ultimately choose what they want to do in this project. SO there is not one person at the top saying who needs to do things. It is rather consensus based.

I think if you look at theoretical models of capacity where you have individuals, organisations and **enabling environment** and I was just at this ING (?) Delft conference on capacity development and they use that terminology for capacity development theory. If you actually look at these project, is that what 's actually lacking is the enabling environment. It's the rules, that type of thing. You can have all these little kind of small projects doing different things in different ways but you should also look at it from an entire systems perspective. So you do need that **overarching perspective** and that's obviously what is lacking at the moment.

104: They [**Umgengi water**] are **high** [in the decision-making process] as an **operational entity**, the operational executives of the waterboard, are high on the tree and make **fundamental decisions** around water resource management. They **negotiate prices** with the municipalities and as a specific example of what Umgengi water has done recently, is so in terms of the **IBT schemes** that we spoke about the new IBT scheme will come from the Umkomaas river into the Umgengi system and the operational executive within Umgengi have said we are going to invest in catchment management in that catchment in support of better quality water coming in the system when the dam is eventually built.

105: so they [the Ingonyama Trust] have their **own set of rules** and norms and what is critical about it is that the Amakosi and the Nsinduna are **able to allocate land**. The land **belongs to the state**, to the people of South Africa, but the way it is perceived is that it belongs to the Ingonyama Trust and actually the people that get given the land by the traditional leaders now they perceive as if they own that land and we've done a lot of interviews about this and the people will say yes I own this land but actually **legally they don't**, they **have a lease**. It's a lease **given by the Ingonyama trust** for them to use, but now people are starting to sell that land so there is a whole process and its becoming more and more complicated and in fact the deputy president in the report of 2018 where they looked at all the legislation since the Apartheid and what should be changed and there was a big challenge on the ANC doesn't want this Ingonyama trust land because it is **not part of a democratic south Africa**. And of course the traditional authority in KZN the people are very much in favour of it. And I mean it's got its strengths because yeeppers I mean it's certainly one way of redistributing land and it happens very fast as we are seeing in our city but it brings about a whole lot of **inequality** that creeps in so there is a huge debate about it but what really important is that it changes the governance and that is one of

the other critical factors that makes us different tot the Breede or Berg catchment. In the Incomati catchment there is traditional authority land there. So this double layer of governance is really really critical and how you bring the traditional authorities into the CMA because there is all, that's where COGTA is important so they are supposed to be the bridge between different spheres of government.

106: To make things even worse, I don't know if Speedy mentioned this, we have a large portion of our outer catchment which is predominantly what goes into the dam watersheds, is **Ingonyama Trust** land, which is **tribal land**. So the Zulu king has an area of what he then governs, now that falls within the **municipal boundaries**. So we've got the Ingonyama Trust board and the eThekweni municipality which is supposed to manage everything that is happening within the municipality. But what happens within the tribal land is managed by the Amakosi which is the chiefs basically and then they have Usunduna, headmen that look after certain sectors within their areas. So we might have a number of Amakosi in eThekweni, so you've got these tribal leaders, then you've got ward councillors that are elected, and even within that set-up we find there is **friction** in certain aspects. So for example if you want to develop land in the Ingonyama Trust area you have to approach the Usunduna or the Amakosi and then they will allocate you a piece of land. You don't own that piece of land, you can't buy it. The board will employ a surveyor and they will peg out an area once it's agreed with the community. That is then allocated to you on a rental basis, you get a 99-year lease. Now as it stands right now, we are not seeing any development plans as city of what gets developed on that piece of land and it's creating a major challenge at the moment we've got houses that are worth 10-12 million Rand that are being developed in these areas. **No formal sewer, no formal water supply**, and there is no formal township layout that exists in the area that is being developed. So that's another level that is present. **So you have the three tiers of government and somewhere in slotted in between there is this tribal authority as well. And now it is becoming quite a major strain it has been recognised by all parties that it is something that needs to be resolved it's just how long it's going to take to resolve it.**

Yes so it's more they [DWS] are not seen as the authority. So in the tribal areas. So in the tribal areas the Amakosi is seen by the local people as the authority. And it's quite interesting because we have dealt with a lot of them and a lot of them have the indigenous knowledge they have has been passed down, they have a much better grasp of the value of looking after catchments and wetlands and watersheds than our ward councillors do. So that also creates friction. There are situations where the **ward councillors** say they are the authority because **they are the elected councillor** for that area and in some areas are undermining the authority of the Amakosi and from my experience, the **DWS doesn't feature a lot in those discussions**. It seems to be that there in some areas there has been involvement but in other areas they have been absent in terms of input.

108: The **CMF are non-statutory bodies**, so it is just **voluntary platform** where they raise issues, then the decision is taken within the Department [WS] so in terms of resolving those issues, when it comes to the **water associations**, those are the formal structures, they are a statutory body, where they take the decisions because there is a management committee that governs the water associations.

Once the CMA is operational then those **CMA they will remain non-statutory bodies**, but within those CMF there will be a conversion of some of them that shows the capabilities and upgrade it into a **catchment management committees** and those are the **statutory bodies** where they are able to take their own decisions because there will be some delegations of functions to those committees as per the NWA.

108: COGTA is the ones that are responsible for the **affairs of the traditional authorities**. How can I explain this, the COGTA are the wing of traditional affairs and are responsible for **coordinating** the affairs of each and every traditional council. Because each area you find there are 20 or 30 Amakosi, they all have their own traditional councils. Amakosi are the chiefs. The councils look after the affairs of that particular district or area of chief. So for the DWS, if there is anything we want to communicate we use those structures to go and present at the traditional councils if we want them to be part of any process that we are undertaking, for instance the establishment of the CMA. So we do and present the issues. And also there is from those structures above those traditional councils there is they call it – a higher level where maybe... uhm, the eThekweni and the Pietermaritzburg all the traditional councils, they call it the traditional house. That is another structure that is above the traditional council. They meet here and it includes representatives from the traditional councils. That structure [the traditional house] is closer to [gets interrupted by external noise]...

Condition 8: Financial viability

Sufficient financial resources are crucial for good water governance. Willingness to pay for water challenge adaptation services is important to gain access to reliable funding for long-term programs. At the same time, water and climate adaptation services need to be affordable for everyone including poor people or people being disproportionately affected.

Indicator 8.1: Affordability

1. To what extent are water services and climate adaptation measures available and affordable for all citizens, including the poorest?

102: The reality is in eThekweni people who have taps at the household level are usually well-off enough to **not need free water**. Where people really have a problem with access is in the **informal settlements and in the unserviced rural areas**. And so you know if you were to **charge people** for that water I don't know you'd have to **enforce** the payment system a lot more strongly. That **culture of payment** will have to become a lot **stronger** and it's not really where the water is being wasted. I think there is a **fair amount of water that is being wasted in the reticulation system** and in some of the **industries**. I think **water is a human right** and people should have access to it, but if they can **afford it they should pay for it**. But if people are truly indigent as the case may be in the townships then there is no problem in supplying them with water. The wastage there is relatively low.

101: Het water wordt voor 110% gebruikt wat beschikbaar is, er is echt water schaarste daar. Betekent dus dat je het beschikbare water dus optimaal wilt inzetten en dat je hele grote water transfer schemes [IBT] en daar moet heel veel geld naar toe, en dat is iets dat zeker in de Zuma administration een mogelijkheid om te zeggen dat daar iets van moet afvloeien. Op een bepaalde manier hadden mensen het idee dat als er ergens geld beschikbaar was dat zij daar ook van moesten profiteren of ze er recht op hadden of niet. Dat merk je nu dat dat nu veel problemen oplevert.

103: Within this project itself is that people have different values and it merged very strongly, for example the UKZN academic group has quite a strong social justice values, whereas the environmental groups have this strong deep ecology value, so how they kind of perceive people and the natural environment and those relationships is very different. That creates tension, for instance the environmental people are quite radical and very vocal about it so they say these people mustn't be there they must build flats for them. It does create a bit of tension. To add further complexity to this project, the city started, as part of the western aquaduct water infrastructure project, 5 million rand was set aside for ecological infrastructure. I think this was linked with the development bank of SA. The EPCPD put out a tender for the service provider to do things related to provide service for the ecological infrastructure. So now you have this whole politics going on of what I would see as political manoeuvring, because people are trying to get access to these resources. So basically you had this big money for people to spend on water infrastructure and there were a lot of politics around it and it created quite a bit of tension, and I could sense that straight away.

105: My understanding is that there is quite some **exploitation** of this **free water** because in the periphery of the city there is a rapid densification where very wealthy people are moving out into these **traditional authority** areas because they can get access to land through the Amakosi so we've written a lot about that process as well, and these **really wealthy people** are getting **access to FBS** which is not what the city wanted. So my understanding of the policy now is that they are only providing FBS to indigent households which were households where the house value was below

250,000 rand so I did not know that they dropped the water from 9 to 6 but let me ask Teddy about that.

100: Informal settlements are given the ablution blocks that each service 50 units – dwellings. The male/female is separated. It is difficult to control the amount of water they use but reconciliation is done monthly to see that that number of people there how much water they use.

Excerpt from CMS:

Enhance effective revenue collection to sustain Water Trading Entity/Proto CMA

????

Promote effective and efficient expenditure

???

Indicator 8.2: Consumer willingness to pay

How is expenditure regarding the water challenge perceived by all relevant stakeholders (i.e., is there trust that the money is well-spent)?

102: I mean a lot of people just **don't pay their municipal bills** and there is a **lot of frustration** because of the **inefficiencies in the billing system**. Both for electricity and water bc they are combined and people are frustrated with the **high levels of corruption** in both those municipalities [ethekwini and Msunduzi]m Msunduzi has been under administration where the government takes over the running of that municipality, and they've done it twice. Ethekwini has managed to hold that off but they have had some problems lately despite them having some **strong entities** within the municipality such as the **EWS** section.

It's both the inefficiencies in water billing system and the **distrust in that the money is well-spent**. The reality is that the middle class households pay their bills, they can afford to and are scared to be cut off and if you have a direct supply they will be cut off if you don't pay. But in many of the townships there is still a **culture of non-payment** and that persists. I think it is **slowly changing** but there is a lot of work to do in **changing that culture**. Municipalities really **struggle with revenue collection** but they are **not really efficient** in it either.

104: Absolutely, so my first point is absolutely agree, a tiered tariff system which I funnily enough I saw in a rural water supply scheme in Ethiopia in a small community, they had their tiered tariff system, absolutely agree, but the second point to that is that we are making the assumption that people are able to access those free 6kL, most of those people who would get that free water don't get it because it doesn't get to them, so that's a different issue. So I absolutely agree and think **industry should be paying on a very structured tier system** which gives you the incentive to conserve. During the massive increase in the cost of electricity in SA we saw a fundamental behavioural change happening within industry. And still, water is sufficiently cheap that it is not stimulating those massive behavioural changes that we would love to see for the conservation of water.

I think largely it would be **industry** [who should pay for water], **affluent users**, in which I include myself, so those I think the burden should be with those who can afford it. I know industry and commercial users, there has to be better incentives for irrigated agriculture whereas ok so agriculture supposedly uses 70 per cent of SA water, its not like that in our catchment, it's a much smaller user here and my friends are irrigation farmers and the water pricing – so what they pay for water – has no incentive for them to save. But the incentive for them that they have is the pumping cost, so the electricity, not the water that stimulates water conservation. So commercial, I agree, you don't want to touch the poor. You want to give them access, and access for free and as you go up the chain towards the large volume users you charge accordingly.

Ok so I think we sit in an unusual circumstance right now. My own personal view is that while it is a principle to have a tiered tariff system, right now, **I wouldn't be tampering with too much**, because we don't want as a country the last thing we want to be doing is **imposing additional costs** on various economic sectors when at a time when we are trying to give relief because the **SA economy was in dire straights** before the pandemic hit, and we are trying to stimulate the restart. So while a tariff system might be ideal, it's not something I would be tampering with too much right now. I would probably be asking questions about if a municipality is buying its water from Umgeni water at 6R/kL and selling it on at 20R/kL, which it is, what is happening to that 14 rand? Because that's one hell of a **markup**, and I would love to be in a business that has a mark up like that, it's huge. So I would be asking, I know what happens, they take the revenue from water and take it elsewhere where they don't have revenue, so it is technically and legally it's supposed to be ring-fenced [ring-fencing occurs when a portion of a company's assets or profits are financially separated without necessarily being operated as a separate entity.] but that doesn't happen. So I think to water pricing and water value there is room to play at the municipal and water service authority level. I wouldn't be playing too much at the end-user level right now, again, personal opinion.

106: Then the other big aspects is they were talking about another **layer of taxation**. So you've got your **national tax, then provincial rates and taxes**. Now they were talking about bringing in another level of taxation which would then be utilised to fund this new administration. There was big questions asked as to **what value** would that additional tax and administration level provide when you have got the areas in every catchment covered by a **ward**, they have an elected **ward councillor** and so you have got representation and even if that's across municipal boundaries, there are ward councillors all the way up in the catchment.

Indicator 8.3: Financial continuation

To what extent do financial arrangements secure long-term, robust policy implementation, continuation, and risk reduction?

100: All of the **big projects are PPP type model** where we look at **foreign investment** which is outside the capital budget, which then **allows us to improve** the system and **not wait for funding** of the capital budget. The capital budget is spent on the **provision of services within the communities** etc. These are huge project that won't see the light of day because the funds are not available, so the PPP model lends itself very well to fund these project. You can **pay back the money in 30 years and after 30 years the council owns the plant**.

104: I've used this before in presentations, imagine an Olympic size swimming pool. Fill it with sparkling water, that would cost you 75 million rand to fill it. If you would take that same swimming

pool and fill it with the same water that I buy as an end user, it would cost about 50.000 rand. If you were to price it at the price that the water utility sells it to the municipality or water service authority, that would be around 20.000. If you were to take the raw water out of a river and were able to gravity feed it into your Olympic size swimming pool, the price of that water would be the same price as one litre of sparkling water, 40 rand. I'll send you the article so you can get your mind around it. There is a bottom line to this is that the water in SA despite its supposed scarcity is completely and totally undervalued. And undervalued and underpriced. Despite what people might complain about the price. You would understand the rand as a currency, so my household, two of us, our entire water bill for the entire house and the irrigation system for the garden, we pay on average less than 300 rand per month for water supply. Now for me in the context of my household budget, DSTV costs 900 rand, electricity costs 800 rand. I mean it's crazy, so we have been paying attention to the value of water and the price of water because at the end of the day, if we **don't price water** correctly, we will **never secure sufficient resources** to invest in both the **hard infrastructure** for supply and for the **catchment management** which means that water management will also be bailed out by national treasury, because the return is not great enough. The total water transactions value in SA is less than the turnover of Checkers in SA, so... [chuckles].

Absolutely [not financially appealing], and if we take that a step forward into the realm of **looting** and **corruption** which you know SA is very good at, while there is potential looting of water infrastructure projects, nobody who wants to loot the system has thought of increasing the price of water [chuckles]. It is well-known, well understood [that water is underpriced and undervalued] and it appears as if there is an **unresolved argument** going on between our **national treasury and our DWS** where at your top policy level the DWS is saying that ok water supply will always be subsidised and national treasury is saying no, we are going to cost recover.

108: For now, its **centralised**, so the invoice, I'm here in Durban, the invoice is coming from Pretoria, that I have to pay so much, I might have queries about that invoice, I can't go to Pretoria because the function of that invoice is sitting in Pretoria whereas I should be dealing with people who are sitting here in KZN. But because they don't have powers to that issuing of that invoice. Maybe the invoice did not reach your, or you changed residents, postal or email address then you realise that maybe you have not been paying your bills for 2 years. And then after 2 years you cannot still charge that person because you need to make sure that the invoices reach the person, so that I can take you accountable to not pay that invoice, otherwise I can say no my account is up to date and not in arrears because I didn't get any invoice. But if those functions would be decentralised to the catchment level you know I can come to you hey Mr. Mkhize, I have a problem here with my account, what is happening, and then we resolve. And then if you can't pay the full amount that you owe we figure out how can you pay it in instalments and collect it over a period of time, rather than not even paying a cent.

Condition 9: Implementing capacity

Implementing capacity is about the effectiveness of policy instruments with respect to the water challenge. Part of the effectiveness is also due to the level of compliance to policy and regulation and the familiarity with (calamity) action plans.

Indicator 9.1: Policy instruments

To what extent are policy instruments effectively used (and evaluated), in order to stimulate desired behaviour and discourage undesired activities and choices?

101: Dat [het najagen en aanspreken van overtreders] is het probleem, dat gaat niet in stakeholders meetings, dat is duidelijk. Af en toe wordt er de name and shame game gespeeld maar ik vond dat relatief meevallen. Het moet constructief blijven. In het kader van met name de herverdeling van water daar (een onderdeel van de CMS) daar is al een hele lange tijd een programma op, maar men schrikt nog terug voor de laatste stap van naar de rechter gaan. Maar dat zit dus ook dat er lokaal of regionaal dat de compliance niet voldoet, en vervolgens moet het helemaal centraal in Pretoria de beslissing genomen worden of daar een rechtszaak van gemaakt wordt. Dat was zeker onder Zuma zo. Het is nu wel beter onder Ramaphosa en het wordt nu wel echt wel aangekaart maar je kunt niet iedereen op de eerste dag naar huis sturen.

Op het moment dat je constateert dat hier iemand in overtreding is (te veel water onttrekt dan wat zijn vergunning toelaat) dan moet dat eerst van Richards Bay naar Durban, naar Pietermaritzburg, Pretoria, nog 3 stappen totdat het bij de DG is, die gaat naar de minister. Maar voordat dat gebeurt is, is het via Richard's Bay, via de [noemt naam, onverstaanbaar] naar Zuma gegaan, ik noem even namen maar... en Zuma zegt tegen de minister dat ze de vergunning even opkrikken. Dus voordat de vraag naar boven is gekomen van mogen we naar de rechter, is al via de achterkant geregeld dat ze de vergunning aangepast hebben, zodat ze niet eens meer in overtreding zijn. Nou dat wordt op dit moment aangepakt, minister Zulu is daar daadkrachtig mee bezig, maar ja het is nog niet helemaal geregeld.

103: Yes, no not the EWS, the only time I've seen them [EWS representatives] at the meetings are I would say what you would call the street-level bureaucrat where the guy's position is **pollution chaser**, he is the guy that **enforces** things. Within that department there is **not that much capacity**.

Indicator 9.2: Statutory compliance

To what extent is legislation and compliance, well-coordinated, clear and transparent and do stakeholders respect agreements, objectives, and legislation?

100: They have a whole points systems where they do water measures and check those who have accumulated debts it is **all managed rather sophisticated**. And obviously you have a part of **non-revenue water, defaulters**, but those are the challenges we are working through. Sometimes you get the defaulters where they default 1 or 3 months and then we go to them to **install a Lifeline**, which is a **water pressure flow regulator**. Each case is evaluated then if the customer approaches the councillor they will **work out a payment package to assist**. They will work out an affordable package for you to repay your debts.

103:... what I would **hope** is that an overall **CMA** would be more **holistic** and focus more on river **pollution enforcement**. That's where we are currently **lacking**. It might make it more complicated but the biggest problem is **enforcement** I would so. I stay west of where the Palmiet river runs nearby, last week there was metres high of foam floating down the river, so that's like **industrial**

pollution. You have a lot of illegal connections from households into the river, you have a lot of illegal connections from industries so people can **pollute** quite easily without much consequences. With a CMA I would hope you have higher levels of enforcement.

If you look at the material reality of Durban, I think we've got like 18 major rivers throughout the municipal area and if you look at the number of **staff employed** to enforce in the local government they have big areas to cover and also from what I've heard with the enforcement process is that if someone pollutes the river, first they get a warning letter, then a second warning letter, and then only on the third time they fine them. I am not 100% sure on this but also the fines aren't big enough to change behaviour.

April last year the proto CMA met and I attended that meeting and I was the only person who was representing academia and they [the CMA] are trained to **co-produce** or **co-construct** CMS, that was the purpose of the exercise but nothing has happened from that process. And from what I remember, what stood out for me was the enforcement side of things, people kept on saying that there needs to be enforcement. So that's a major gap.

That's a difficult question. If you just look at Durban's environmental and climate governance, one of the words that is thrown around a lot is learning by doing, experimentation. That type of philosophy is quite prominent in our environmental governance space. So there is always people willing to try to do different projects. Resourcing is obviously a problem. For instance our research team is fairly small and we would only work in a certain space.

But with Sihlanzimvelo that's more from the **dominance discourse** in terms of **infrastructure maintenance** which is quite different from if you are looking at **river pollution** and what I would hope is that an overall CMA would be **more holistic** and focus more on **river pollution enforcement**. That's where we are currently lacking. It might make it more complicated but the biggest problem is **enforcement** I would so.

105: Exactly [example of a learning process, gives 2 more examples]. In fact, when I wrote that paper and argued that there was this **experimental governance** and this approach to **learning** and it comes out in **many forms in EWS**. But it's exactly that approach of Neil that enabled that jump to take place. Up until that point when you asked me if – because I was still writing that paper – and they hadn't made that move towards the convergence, prior to that the kind of **experimentation** would be around the dry toilets to address the shortage of water in the city. The biggest one around experimenting was the provision of free basic water because Durban experimented with that and then it got taken up at national level. Durban actually experimented and took the risk of starting a FBS approach which has then taken off. It started with 6000 litres a month based on what the WHO recommended to Neil, but they got it wrong because they didn't calculate it for humid climates and the way the EWS worked, they had stakeholder workshops and dialogs and it game back to that and upped it to 9000 litres a month.

105: Yes or they might be **fined but it's not very much**. In the Palmiet catchment project we had a lot of meetings with a pollution group in the municipality so then they will go and fine offenders but they **do really try**.

106: We have a little bit of a **challenge** within our country that when there is an issue, what tends to happen is that they try to fix the issue, instead of **holding people accountable under the present laws** and governance structures, **you create or set up a new policy or a new** [inaudible]. And what's happened over the years is that you **constantly get these new policies** and structures being added

trying to sort out the problem and the people that are breaking the original legislation or guidelines carry on doing what they were doing and the people that are law-abiding just end up with **more and more red tape**. So I think that **I don't disagree with the need for a holistic CM focus**, man-made borders do not change how the catchment works, but it's more a case of we need, which is always a harder process, we need a better **facilitation of the coordination of the levels** and controls that are already in place. And then use that to through a combined effort to sort out the people that are doing things incorrectly and hold them accountable. And by doing that you will end up with a better managed catchment because we now are **using the legislation we got** but we are doing a consolidated effort. An example: we came across a developer infilling a big wetland. We could have reported it to province because they had the mandate and the big stick to prosecute. But as a city we didn't, we had eyes and ears on the ground we saw it happening we reported it to province, nothing was done, from what we saw. Then we had this big storm in 2017 and one of our national freeways to the extent where it closed the linkage between the southern part and northern part of our city. As a result our national roads agency is involved and we are looking at this aspect, on top of that it had a negative impact on Toyota, which is a big employer within our region and a lot of damage to associated property. We estimated that the infilling of the wetland had costs us about 28 thousand m3 of storage, if that would have been available then yes there would have still been flooding, but not to the extent that we saw. And so it's quite interesting now that this disaster has brought together these different role players. Why did we see this level of damage? How do we prevent it from happening in the future? We are starting to talk from a national roads point of view, a municipality point of view and the DWS has come to the party and this issue of filling of the wetlands and they found the papers of our reporting it to the province and so the national environmental affairs guys have gotten involved now and now we are starting to see some activity. But it's quite interesting that it took a disaster to pull together the levels of government and the various strategic roleplayers to get everything in line and act on it, whereas if that provincial actor had acted in terms of their mandate and held that property owner accountable, we wouldn't be sitting where we are at. And to me that is just shows you the challenge that we have and don't get me wrong there is some guys in DWS and in the environmental affairs department that are really working hard and doing what they can but because of this **lack of integrated effort** you are not seeing the results that you want.

107: No so looking at the PPPS, the **compliance** is done by **GTAC** they are ensuring that all the requirements are met. In terms of the **regulatory requirements** for a water and sanitation project, that's done by **DWS and EAD (environmental affairs department)**. And this PPP project was about industrial-grade water and not about potable water, but let's just say we have got a water reuse project right, which we do have another PPP registered. The **DWS** will provide those water use licences, they are the **only ones who can provide that**. So that's the compliance that will be done by the DWS and the EAD.

108: Yes definitely [it is hard to have a stick behind the door for the CMA without statutory authority] because the challenge that we are having on that regard for **compliance and monitoring** there is a **grey area** between the **department and the CMA** which is actually the section of the NWA, section 19 and 20 that we are responsible for with the CMA, but then the section 52, 53 and 54 they fall under the main account. So you find that there are still those grey areas where the prosecution is done within the department. You find that we picked up the water directives and issued it to the culprit or to the polluter, and if the problems persist then we involve the DWS to prosecute. Yes, those are the challenges sometimes, more specifically the municipalities, you don't just prosecute, you need to follow some protocols to assist the municipalities.

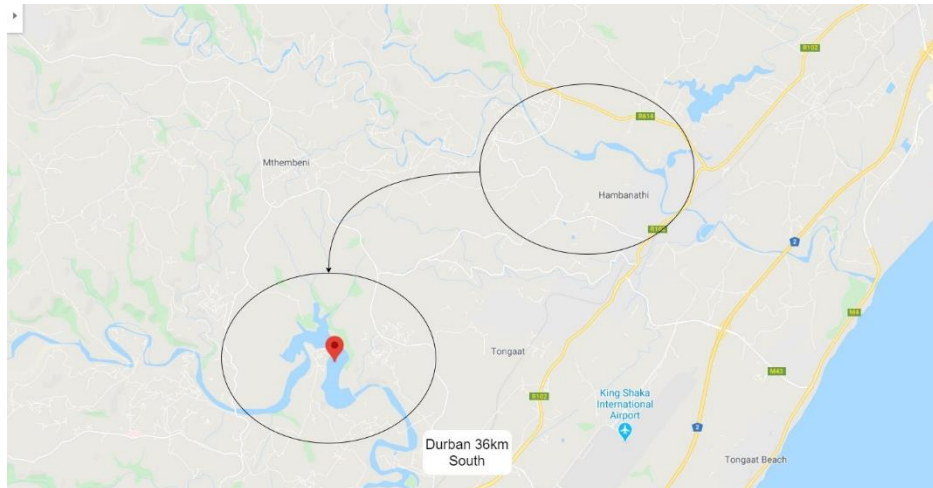
108: Yes [**without statutory status, the CMA will never be able to effectively enforce its mandate**] but once we become a CMA I think **maybe some of the functions** will be **delegated of compliance monitoring**. We had a discussion around the issue of compliance monitoring, because that is the main reason why our rivers are being deteriorated, because we are weak in terms of compliance and enforcement. Particularly on the municipality side, their infrastructure is dilapidated so which causes a blockage and all those sewer infrastructure and all those things goes into our water resources and also deteriorated further our system.

Indicator 9.3: Preparedness

To what extent is the city prepared (i.e. there is clear allocation of responsibilities, and clear policies and action plans) for both gradual and sudden uncertain changes and events?

100: I had a huge programme that I developed based on a **25 year plan** and we started looking at what can be the **mitigation project**. I developed a **water security plan, 25-year water infrastructure master plan and the 25-year wastewater infrastructure plan**, I developed the **reuse strategy for eThekweni** and I developed the **4 year forecast, 25 year forecast growth plan, the water services development plan** all of these documents. Having put all these documents together, to start some of the **implementation of these project with PPP** (public private) at parmashal & noven (???) that checked 100 mL of water into the system. We constructed a **65 mL blend of desalination and reuse water, first of its blend in the world**, we are now looking at **upgrading** that to 100 mL per day, then we are looking down at our **Durban water recycling** where we provide **second class water for the industry**. We are now developing reused water and **two desalination plants** in the north and the south to 150 mL each, the feasibility is complete and one of the areas we have done the **EIA**.

We are also looking at **IBT [inter-basin transfer]** in the south together with Umgeni water that will assist, especially when water becomes critical, we then look at the availability of water in the catchment and the areas that we feed, and then share it. In some areas it is a little bit more resilient than in others. Part of the process as well is looking at the resilience where we can interconnect different water treatment plant areas to make water available maybe not in large quantities but to suffice during scarce times. We considered the one during the drought we took out the water from the Tongaat basin treatment plant and we transferred it to the Hazelmere system which is about 6 mL and will only be used in critical conditions. We are looking in the same in the south so that is something that is happening. The studies have been done and there will still be water left for the biomes in the water and it does not harm the environment. We have done aquatic studies that show results about availability of water.



108: Like now we busy building the Inkomazi dams and that will assist the Durban and Pietermaritzburg communities because those are the economic hub of the province. We need to be ahead of providing water as water is the main factor in any production. The DWS is taking a lead in terms of that.

108: Maybe the sewer is old or the infrastructure is overcommitted, so when they were doing the planning it was meant for 10,000 people but now you are seeing 20,000 people that are using it which causes a blockage in the system and also you find that now the informal settlements that are coming around that particular town which also causes some major challenges in terms of having a proper sanitation facilities. They also don't have a proper dumping site, sometimes they use the rivers as a dumping site because they don't have a proper waste collection point. Then there is a solid waste in the water resources. So difficult yes. There is a number of issues that one deals with when it comes to the settlement or the residential areas, particularly around Durban and Pietermaritzburg. Because there is a mass rural migration to urban areas for better opportunities. So the proper planning is not taking place, how to manage that influx of people. Those are the responsibilities of the municipalities, including human settlement to have proper, yes but the municipality must take the lead.

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