

Chapter 2

Water Governance and Management and Climate Change

2.1 Introduction

In this chapter, I will present three case studies to indicate how research on water governance and management as well as climate change is influenced by the utilisation of research paradigms and theories. I also indicate how research paradigms and theories influence policy recommendations. The first case is an investigation of climate change adaptation strategies in Australia and South Africa, with particular reference to South East Queensland and South African local government structures (i.e. municipalities). Climate change is indirectly related to water governance and management, but a salient issue when conducting strategic water resources planning. The second case study deals with the Department of Water and Sanitation's *National Water Resource Strategy, Second Edition*. The last case study investigates the United Nations Development Programme's Water and Ocean Governance focus area. The purpose of presenting the cases is, furthermore, to give an overview of the challenges related to research in these domains. At the end of the chapter, I will show how my alternative approach, to research in the water domain, will address these concerns. I end with a conclusion, wherein I introduce the following chapter based on the challenges I uncovered during the analyses.

2.2 Climate Adaptation Strategies in Australia and South Africa

Although not directly linked to research on water resources, the issue of climate change has the ability to influence global water governance processes and has the opportunity to link national water policies and strategies with global policies (Scholz 2008). It is for these influencing and linkage reasons that I include climate change adaptation strategies as a case study. According to the Intergovernmental

Panel on Climate Change (IPCC) (2007), in biophysical terms, climate change is the change, over time, in the averages and variability of surface temperature, precipitation, and wind and related transformations or changes in the Earth's atmosphere, oceans, water resources, snow, ices, land, ecosystems as well as living organisms (plants and animals). This definition puts exclusive attention on the biophysical environment. Yet, climate change also has a social component.

Climate change has come to dominate social, political and economic agendas. The issue is so pervasive that it is unthinkable to have a conversation about the environment without ending up talking about climate change, its causes and how it might or will impact the natural environment and human society. Because of its salience, societies at all levels, from the individual to the communal and governmental, are giving serious consideration to climate change and its ramifications. Adapting to, and mitigating the consequences of climate change, have spawned numerous technical and societal efforts, reports, plans, programmes and treaties. How we produce research on climate change, its impact and our responses to it, is the central feature I will be discussing in this case study. My framework for analysis is PULSE³ (people understanding and living in a sustained environment). The two documents I will analyse using PULSE³ are; *Adapting South African Cities and Towns: A Local Government Guide to Climate Change Adaptation Planning* by Ziervogel and Methner (2009) and *Climate Change Vulnerability in South East Queensland: A Spatial and Sectoral Assessment* by Choy et al. (2010). Another reason for this choice in material came from a project a research group at the Council for Scientific and Industrial Research (CSIR) conducted for a South Africa metropolitan municipality. The research group approached me to conduct an analysis of the two case studies because municipal officials approached the group and asked for a comparison between the Australian and South Africa. The choice of the case studies therefore has a pragmatic angle. I, therefore, picked these two adaptation strategies because of their linkages to local government structures in two different political settings.

The purpose of the CSIR research project was to develop a climate change adaptation plan for the municipality. To get a sense of what such an adaptation plan entails, the CSIR researchers investigated similar research conducted in a South African and an international context. It was for these reasons that the two reports were selected. In other words, they fit the work description the CSIR researchers embarked upon for the municipality's study. The report by Ziervogel and Methner (2009) had an uncanny resemblance with the terms of reference of the commissioned research for the metropolitan municipality. The research project manager subsequently requested the analysis of the two reports. The purpose of which was to investigate the way in which research scientists generate knowledge around the issue of climate change and adaptation and how they frame recommendations to officials at local government level. An analysis of this nature, gave important insight on how to develop the commissioned adaptation plan for the metropolitan municipality.

2.2.1 Climate Change Assessment and Adaptation

The assessment of climate change involves the risks and vulnerabilities faced by society and communities in light of the potential effects of climate change. It is important to assess vulnerabilities, since it is an attempt to define the scale of a threat. With a vulnerability assessment, the research scientist and policy maker can also start determining the (effective) means of ‘promoting remedial action to limit impacts by supporting coping strategies and facilitating adaptation’ (Kelly and Adger 2000: 325). An assessment, thus, involves the mobilisation of resources to deal with potential threats at different scales and, as such, it is part and parcel of the policy process. Adaptation does not only have a physical or ecological dimension. There is a human dimension too, where people have to make adjustments to the availability of resources (of whatever form) and risks at various spatial, societal (Adger et al. 2005) and temporal scales. Scientific knowledge has, over almost three decades, played a significant role in the formulation and implementation of policies to curb climate change impacts (Füssel and Klein 2006). That said, and since humans are an integral part of vulnerability assessments and adaptation plans (e.g. John et al. 2015), it also follows that the way in which we generate scientific knowledge influences policy adaptation plans and their implementation. The type of research paradigm a scientist uses to generate knowledge and develop recommendations (agency) is central to problem conceptualisation recommendation implementation.

2.2.2 Paradigm Assessment of Adapting South African Cities and Towns’

The *Adapting South African Cities and Towns: A Local Government Guide to Climate Change Adaptation Planning* by Ziervogel and Methner (2009), outlines a number of steps municipalities should take to adapt to climate change. The six steps are (1) create a coordinating adaptation committee; (2) assess current climate trends and future projections for the municipality; (3) undertake a climate vulnerability assessment; (4) undertake an assessment of adaptation options; (5) develop a municipal adaptation plan; and (6) monitor, evaluate and adjust the interventions on an ongoing basis (Ziervogel and Methner 2009).

The steps are preceded by an explanation of why the practical guide is necessary; the promotion of robust adaptation to climate change in the context of sustainable development. The authors note that: ‘An adaptation strategy should be a systematic, proactive and coordinated response to enhanced climate variability and projected climate change. [The adaptation strategy] refers to the overall process that guides... [the municipality’s] planning and decision making for a sustainable future’ (Ziervogel and Methner 2009).

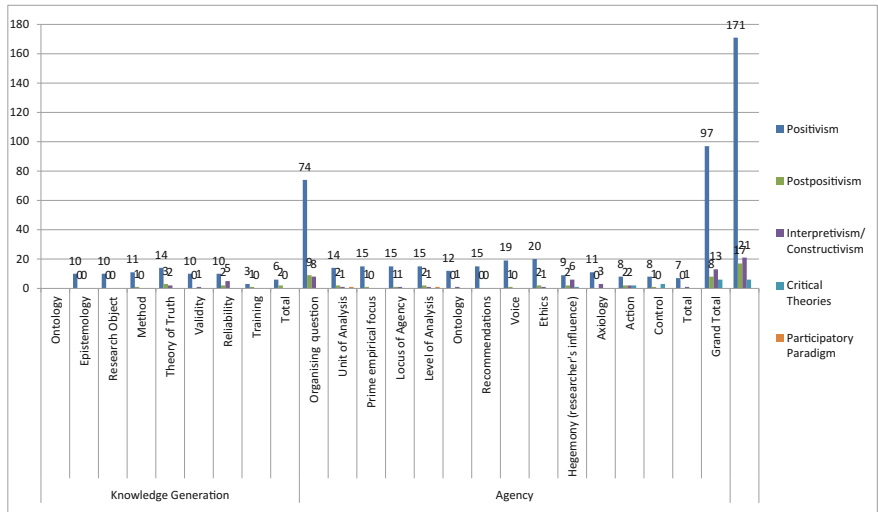


Fig. 2.1 Paradigm assessment of the Ziervogel and Methner report

2.2.2.1 Knowledge Generation and Agency

Figure 2.1 represents the paradigm assessment of the guide.¹ The diagram indicates that the dominant research paradigm used to generate knowledge is: positivism. There are also elements of post-positivism, interpretivism, critical theories and the participatory paradigm present in the strategy’s development. An assessment of the author’s training could explain why this is the case. Ziervogel scores high on the positivism and post-positivism research paradigms, while Methner’s training profile shows a mix of positivism, post-positivism, interpretivism and the participatory research paradigms. The critical theories research paradigm is absent in both cases. Also, the topic dealt within the guide is of a positivist and possibly post-positivist nature. I will elaborate on this statement very briefly.

The climate change discourse is framed with science in mind. For instance, scientists talk about ‘[t]he science of climate change...’ (Doulton and Brown 2009: 191); ‘[d]espite the overwhelming scientific consensus that humans are influencing the planet’s climate...’ (Ladle et al. 2005: 231) and a study ‘[r]epresent] the first major global assessment of climate change science in six years (Jarraud and Steiner in Solomon et al. 2007). These quotes indicate that climate change is discursively linked to the scientific method. It can also be argued that

¹There is a major difference in the scoring between the two documents. The reason for this is that I did the assessment of the entire *Adapting South African Cities and Towns: A Local Government Guide to Climate Change Adaptation Planning* and only the executive summary of the *Climate Change Vulnerability in South East Queensland: A Spatial and Sectoral Assessment*. The length of text one assesses has an impact on the scoring of the text; the more text one assesses, the higher the scores and vice versa.

climate change has become synonymous with the scientific method, which, in turn, is infused with positivism. This is seen in Ziervogel and Methner's (2009) guide where knowledge generation follows positivism. The metatheoretical assumption on the method they used scored the highest (14) of all the categories under knowledge generation. This was followed by the research object (11); ontology, epistemology, theory of truth and validity (10), and training (6). Reliability's score of 3 was the lowest. This is not to indicate that the study, or the method they used, is unreliable. The publication is a guide, and not an assessment of vulnerabilities, which explains reliability's low score. In short, they used the positivist knowledge of climate change to inform municipal officials.

Ziervogel and Methner (2009) followed a specific method in presenting the six steps. The steps are outlined in a seemingly logical dyadic order. They are also clear about their views on adaptive municipalities. For instance, they note that: 'An "adaptive" municipality: takes proactive steps towards reducing the vulnerabilities and risks associated with climate variability and climate change' (Ziervogel and Methner 2009: 4). They go on to say that adaptive municipalities follow 'a coordinated and integrated approach', which is based on the latest climate information' (Ziervogel and Methner 2009: 4). Such municipalities also monitor their strategies on a constant basis (Ziervogel and Methner 2009). These are very specific and to the point statements indicating what exactly is meant by 'adaptation' within a local government setting. In terms of agency, Ziervogel and Methner (2009) indicate through these statements that they control the research process without any inputs from municipal participants (Guba and Lincoln 2005; Lincoln et al. 2011). The voice of the scientists is therefore dominant, with policy makers being informed by the scientists (Lincoln et al. 2011).

In terms of voice and recommendations, these scored the highest and second highest in the research paradigm assessment's agency component (20 and 19), respectively. This was followed by: the unit of analysis, prime empirical focus, locus of agency and ontology (15); organising question (14); level of analysis (12) and the hegemony or the researchers' influence (11). Agency therefore resides with the researchers in a top-down manner, where the scientific method is directing municipal officials on how they should be implementing climate change adaptation strategies.

The recommendations they made are also predominantly positivist. For instance, they list a number of vital lessons from municipalities that have developed adaptation strategies. The actors involved in the implementation of these lessons are: political leaders or champions within the municipality, local research institutions, coordinating adaptation committees and, lastly, stakeholders (Ziervogel and Methner 2009). The locus of agency is therefore top-down, with the level of analysis being systemic. For Ziervogel and Methner (2009), municipal officials and top political leaders are the most important actors that should actively govern to bring benefits to citizens. Said differently, it is a case of 'who governs, and who benefits' (Hobson and Seabrooke 2007), with political leaders and government officials governing and citizens benefitting. The authors of the strategy also do not ignore ideational entrepreneurs like researchers and climate change scientists. For them a direct and cooperative link between those who govern and those with the

necessary skills and knowledge regarding climate change, should be created and sustained, in order to maximise the benefit for citizens.

2.2.3 *Paradigm Assessment of Climate Change Vulnerability in South East Queensland*

Choy et al. (2010) produced the *Climate Change Vulnerability in South East Queensland: A Spatial and Sectoral Assessment* as part as the South East Queensland climate adaptation research initiative. This plan was a partnership between the governments of Queensland and Australia, Griffith University, the Commonwealth Scientific and Industrial Research Organisation (CSIRO), the University of the Sunshine Coast and the University of Queensland. The aim of the enterprise was to provide research knowledge to permit the Queensland region to prepare and adapt to climate change impacts. From this undertaking, adaptation strategies to assist decision-makers in industry, government and the community were developed (Choy et al. 2010). The report by Choy et al. (2010), concluded the first phase of the project. It contains a regional assessment of human settlement vulnerability to climate change at spatial and sectoral levels.

2.2.3.1 Knowledge Generation and Agency

I analysed only the executive summary of the report since this part of the report was an excellent rendition of the entire manuscript and contained all the relevant information of the study, including the methodology. The research paradigm that is central throughout the work is positivism (see Fig. 2.2). Positivism is dominant in both the knowledge generation and agency portions of the executive summary. Interpretivist/constructivist elements and the participatory paradigm are also present. Regarding knowledge generation, the scientists used an integrated framework. This structure included external (or exposure) and internal (or sensitivity) and adaptive capacity dimensions of vulnerability. The authors note that this approach was chosen because it was the most common avenue used in global environmental change and climate change research (Choy et al. 2010).

In terms of the method utilised, the team of scientists assessed the region's vulnerability to three impacts: extreme heat, extreme rainfall and coastal hazards. They based these severities on a set of indicators (Choy et al. 2010). For the scientists, the research object and the associated ontology and epistemology are positivist because the Queensland region has inherent qualities existing dependently of the researchers. The impact of climate change on Queensland can, therefore, be investigated from a distance and in an objective manner Lincoln et al. (2011) through the gathering of empirical data and analysed through statistical analyses or computer modelling.

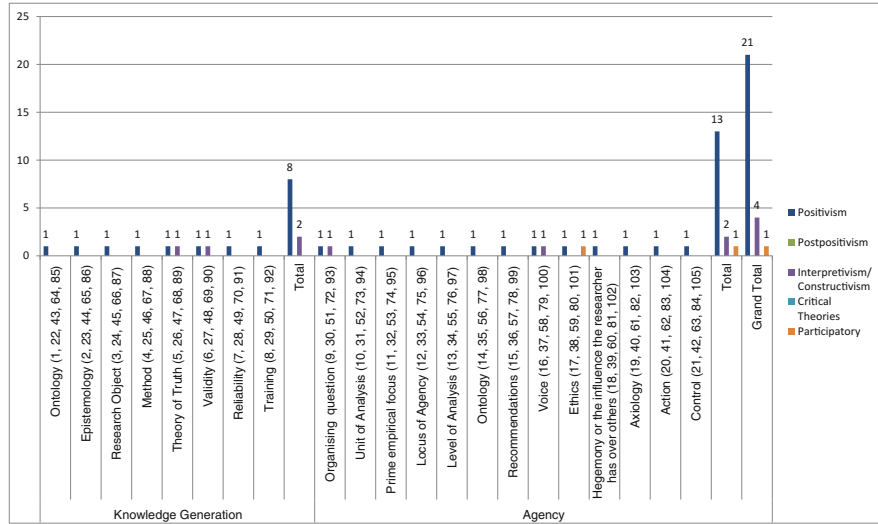


Fig. 2.2 Research paradigm assessment of the South East Queensland report’s executive summary

With respect to theory of truth and validity, interpretivist/constructivist elements are present. This is so only in the presentation of the results of the climate change assessment. For instance, the scientists state that: ‘In SEQ [South East Queensland], climate change is *projected* to lead to an increase in average annual temperatures, a change in average rainfall and sea-level rise. In addition, more extreme weather events are *projected*, with an increase in rainfall events...’ (emphasis added). They also note that: ‘Of particular concern are a number of areas within the Sunshine Coast and Gold Coast jurisdictions that *appear* extremely vulnerable to extreme rainfall’ (emphasis added) (Choy et al. 2010: i). That the scientists use the words ‘projected’ and ‘appear’ is an indication of the uncertainty inherent in climate change modelling and the effects on the environment. Climate change scientists are aware of this uncertainty, and are part of their lived-experience leading to defensible knowledge claims and the construction of validity through consensus (Lincoln et al. 2011).

Positivism is also dominant in the treatment of agency or the recommendations the scientists put towards policy makers. The only metatheoretical assumptions from other research paradigms are in the organising question, voice and ethics. The researchers report on local authorities that have been proactive in ‘...developing policies geared toward climate change strategies in the last few years despite the fact that there was no statutory obligation to do so’ (Choy et al. 2010: i). This is an indication that the local authorities are not in an absolute top-down relationship and has autonomy to construct their own policies irrespective of the central government’s involvement or not. The local authorities’ actions can be seen as interpretivist/constructivist, since they are acting independently from the regulatory

environment; they don't wait for legislation to tell them what to do. The scientists bring their voice to bear on planning practices. Here they say that: '...the analysis of the current planning schemes illustrates that adjustments will need to be made in order to improve planning practices' (Choy et al. 2010: i-ii). The scientists are acting in an activist role calling for the improvement of planning processes. They put forward adaptive management 'to deal with uncertainties and evolving climate science, better cross-scalar and cross sectoral integration in the policy delivery process' (Choy et al. 2010: ii). While employing their voice in an interpretivist/constructivist manner, the scientists advocate for the utilisation of a positivist theory, adaptive management, to advance policy planning and scientific knowledge. From an ethical point of view, the research process is aimed at revealing special problems faced by human settlements in light of climate change. This is the only element from the participatory paradigm. The reason for this could be that the report is a product of a participatory initiative between scientists and policy-makers and that the policy-makers highlighted the special problems facing their jurisdiction.

The scientists reported on three sectors where climate change will have impacts: coastal management, the health sector and emergency management. For the three sectors the scientists made explicit recommendations. The use of the word 'will' appear repeatedly. For instance, to reduce '...vulnerability in coastal areas *will* need to consider the identification of sustainable options...' and '[n]ew concepts *will* need to be integrated into local planning schemes...' as well as '...successfully addressing the challenges posed by climate change *will* require an understanding of the complexity of stressors and external drivers on human health...'. The scientists further note that: 'Climate change...*will* bring new challenges to the emergency management sector...' (emphasis added) (Choy et al. 2010: ii). In this regard, the scientists are making their voices heard by informing policy-makers of what 'will' happen if policy makers do not take certain actions in a timely fashion. The prime empirical focus is to supply order, create and maximise welfare by the political leadership of the Queensland government (e.g. Hobson and Seabrooke 2007). The scientists are therefore directing policy makers through predictions based on their knowledge and epistemic reputation as climate change scientists.

2.2.4 The South African and Australian Adaptation Plans Through the Lens of Analytic Eclecticism

From the research paradigm assessment a critical question arises. Are those scientists, with the necessary climate change knowledge and skills automatically the ones that can inform municipal officials on the implementation of adaptation strategies? More specifically, is the positivist paradigm suitable for such an endeavour? Considering that local governments are the sphere of government closest to citizens (Zybrands 2011), in the case of South Africa, it would appear as

if a combination of research paradigms might be more suitable. The human element is central in this relationship because climate change scientists are but one of many stakeholders in the climate debate and discourse; ‘ordinary’ individuals are also making an impact and having a say in the matter. The ethos of analytic eclecticism will be able to enlighten the questions I ask above, especially with respect to what more is needed to inform practitioners and what factors are also necessary to take into consideration when science informs municipal officials. The two studies are doing well in highlighting the issue of climate change, how it could impact on different government sectors and what to do about such impacts. What they omit, though, are the acknowledgement and integration of other research paradigms. This is evident from the low scores the research paradigms, other than positivism, received. A possible reason for this is that the authors are not aware of alternative research paradigms and, therefore, it is a case of ‘out of sight out of mind’, so to speak. What I will do in the next couple of paragraphs, is to apply the ethos of analytic eclecticism and the repertoire of theories, from the PULSE³ framework for analysis, to better understand how knowledge can be deepened and how agency be influenced and better understood at local government level.

Now that we know that positivism is the predominant research paradigm used in both reports, we can move forward and ask what can we do to better inform government officials? I will start with the subject matter: climate change. At first glance, it would appear as if climate change is a straight forward positivist or even post-positivist subject matter. The majority of scientists involved in climate change research are natural scientists and would approach the subject from an empiricist perspective. Even so, if we should move from a post-positivist premise that a single reality can never be fully understood (Guba and Lincoln 2005; Lincoln et al. 2011), it opens the possibility for the application of the interpretivist/constructivist and participatory research paradigms, not forgetting the critical theory paradigm.

From an interpretivist/constructivist perspective, should researchers acknowledge the existence of multiple realities that are cognitively constructed, they might be able to investigate how practitioners view climate change. They might be surprised that practitioners, may or may not, hold the same views as the scientists do since climate change is such a pervasive topic on the social agenda. Alternatively, researchers might realise that they are dealing with so-called climate change optimists (i.e. people believing that climate change is caused by human activities and that climate change is real) and pessimists (i.e. people not believing that the global climate is changing). The views held by practitioners will influence the way in which researchers might want to approach optimists and pessimists during their research. Since the mix between optimists and pessimists are a possibility, researchers engaging in climate research will come into contact with persons holding subjective and objective realities about climate change. These realities are co-created by the human mind and the surrounding environment (Guba and Lincoln 2005; Lincoln et al. 2011). This environment includes large volumes of information from a variety of sources, which may include scientific journals and television documentaries or sources of information that can treat climate change in a topical manner; news outlets and electronic media are examples. The practitioners might,

however, not hold the objective reality of human-induced climate change at heart. They are free from this scientific objectivity (Heshusius 1994; Lincoln et al. 2011), which could put the objective scientist at odds with the practitioner with no 'objective truth' on the subject matter.

In such an event, scientists usually fall back on their rational science in an attempt to convince the practitioner of the realities of anthropogenic climate change. This creates a power relationship, where influence starts to play a significant role in the working relationship between the scientist and practitioner. Such a situation is akin to two political parties trying to convince voters that their respective pathways to corrective action are correct. Put differently, a knowledge tug-o'-war ensues. This can be a fruitless endeavour with both science and practice suffering; no longer is it about science and practice, but the psychological convictions of the parties and their influencing endeavours. This way of influencing is seen in the step-by-step way Ziervogel and Methner (2009) wrote their guide. The guide puts science at the top, directing practice on how to implement more sustainable practices and policies. The Choy et al. (2010) report on climate change in South East Queensland, follows a similar way of putting science in the service of practice and policy. In this report, the top-down relationship manifests in a number of explicit directives. For instance, the report notes that: 'an improvement in disaster risk assessments and the prevention, preparedness, response and recovery phases of disaster management will be necessary in order to deal with the expanding and changing risks caused by climate change' (Choy et al. 2010: ii).

To get around such a situation calls for the incorporation of methods from the interpretivist/constructivist, critical theories and participatory paradigms. Here interviews, focus groups, deconstruction of text and language, face-to-face learning and the analysis of power structures (Lincoln et al. 2011) could produce much needed information on how practitioners view climate change. This could place the researcher in an emancipatory position and setting. The views of practitioners are like a window on the policy domain they operate in. For instance, governments at all tiers are influenced by the ideology of the ruling party. How government practitioners view climate change is not so much a matter of personal conviction but also of organisational functionalism. By understanding the current ideological undertones of government can help researchers in developing effective recommendations that are likely to have an influence. There is no hard and fast rule to apply, in this regard, but sensing the type of ideology is likely to create a better understanding of the undercurrents in government and how to interact with practitioners. Governments have limited financial and human resources at their disposal to execute policies. This can place enormous strain on government officials to deliver services. The day-to-day functioning of officials is also influenced by multiple tasks to implement programmes within a specific time frame and budget. An understanding of how government officials operate could help fostering higher levels of empathy in scientists when making implicit or explicit recommendations (i.e. exercising agency). A scientist might think twice about a specific set of recommendations when taking such realities into consideration and opt for more realistic guidance in a more participatory fashion.

2.2.5 Theory for Practice: Social Learning and Policy Paradigms

What is furthermore telling, is that both reports rely, to varying extents, on a single theory to interpret and direct matters for practitioners. In the case of the South African guide, Ziervogel and Methner (2009) implicitly refer to adaptive management, especially when they outline the criteria of an ‘adaptive’ municipality, and talk about adaptive capacity and resilience. Choy et al. (2010: ii) refer to adaptive management explicitly when they call for ‘...planning processes through adaptive management in order to deal with uncertainties and evolving climate science...’ Adaptive management has secured a place in climate adaptation because the theory closely parallels frameworks for general climate adaptation (Lim et al. 2005; Ebi 2011; Hess et al. 2012).

Adaptive management is a middle-range, problem solving theory; it identifies the management procedure that practitioners need to follow in order to mitigate climate change and achieve sustainable development and resilience against vulnerabilities associated with climate change. Adaptive management is a problem solving theory (e.g. Cox and Sinclair 1996) because it rests on positivism, takes climate change as a given and recommends solutions to practitioners on how to formulate policies, programmes and plans to mitigate climate change consequences. The practices suggested by adaptive management also calls for certain adaptation procedures like co-learning and the implementation of policy through stakeholder engagement.

The theory of adaptive management highlights a number of factors. According to the theory, systems are complex in their arrangement of stakeholders, relationships and resources. These referents operationalise ‘complexity’ by deducing that the multiple relationships between the elements cause complexity. The reality of climate change is therefore perceived as complex. As such, the natural and social systems that are influenced by climate change are complex to manage. These systems also hold inherent uncertainty. To cope with complexity and uncertainty it is necessary to emphasis ongoing learning and for this to happen continued stakeholder input is necessary. Stakeholder involvement alludes to democratic principles of transparency and inclusive political processes. In this regard, adaptive management tells us that the only way through which climate adaptation can be achieved is through the rational perception of reality as complex and the invocation of democratic principles (Ebi 2011; Hess et al. 2012).

The adaptive management approach involves a number of primary elements. The first is management objectives that are regularly revisited and revised. This is followed by a model of systems being managed. Third in line is a range of management choices followed by monitoring and evaluation and mechanisms for incorporating learning into future decisions. The last element is a collaborative structure for stakeholder participation and learning. According to adaptive management theorists, adaptive management integrates management and learning instead of separating these (Hess et al. 2012). Proponents of the theory go on to say

that adaptive management is a structured approach responding to uncertainty associated with complex systems management. When applying adaptive management, actions are adjusted in response to feedback towards management objectives. It also entails responding to changes in the context it is being implemented. These changes can be anticipated or not (Eberhard et al. 2009). To reiterate, adaptive management is characterised by structuralism, based on democratic and collaborative ideals and focusses on ecosystems or issues related to ecosystems. From an adaptive management perspective it is also possible to anticipate changes in a system.

In this regard, adaptive management is depicted as a cycle that starts with assessment, moves on to planning and then implementation, monitoring, evaluation and lastly adjustment. Assessment could entail estimations of the likelihood and severity of risks and the gauging of exposure to hazards and associated vulnerabilities. Regarding planning, priorities need to be identified, followed by the formulation of response strategies. Such initiatives need to be implemented and could entail communication of responses and proposals to stakeholders. Monitoring and evaluation requires data that is relevant to expected impacts and interventions and a comparative analysis of events before and after the implementation of interventions. Adjustment takes place based on the outcomes of monitoring and evaluation with a view of changing future conditions as stakeholder input (Hess et al. 2012) (Table 2.1).

Climate change is not an easy problem to deal with because of its global geographical spread that will have different perceived impacts on geographical regions, societies and ecosystems. Because of this, climate change is not a pleasant prospect for society and the scientific community making the problem difficult to understand. This complication has been diminishing as technology and our knowledge of meteorological systems advanced over time. Even so, the geographical spread of the problem, and its asymmetrical perceived impacts, gives rise to the problem's unpleasant character. What is more, it is not certain if, and how, the adaptation and mitigation plans put in place now will bring about the desired results. With respect to uncertainty, the Intergovernmental Panel on Climate Change (IPCC) categorises

Table 2.1 Adaptive management's ontological and epistemological structure

	Concepts	Actors	Independent variable	Interceding variables	Dependent variable	Causal mechanism
	Complexity Resilience Sustainable development Systems Collaboration Adaptation Policies	Stakeholders Government officials	Climate change	Policy cycle Adaptation Mitigation Co-learning	Systems	Realisation that climate change is a real threat to the biosphere and human society
Connections	The policy cycle connects <i>positively</i> with adaptation and mitigation in that it is through government intervention that adaptation and mitigation are achieved					
Complementarities	Democratic principles of collaboration and inclusion results in resilience and sustainable development					

uncertainty into three typologies: unpredictability, structural uncertainty and value uncertainty. I will only consider unpredictability. For the Panel (2007: 1), sources of unpredictability are: 'Projections of human behaviour not easily amenable to prediction (e.g. evolution of political systems)' and '[c]haotic components of complex systems.' As we have seen in the two adaptation reports from Australia and South Africa, the uncertainty is mitigated by a belief that the policies humans develop, and put in place now, will have a positive influence to deal with climate change in future. The Australian report was explicit about the effects of climate change on certain systems. This also translates into a belief that climate change is real, and its impacts are not the stuff of 'science fiction'. These beliefs are the main understandings contained in both reports. In this regard, I will argue that the reports base this belief on scientific research already conducted, in other words, empirical evidence, and the pronouncements of experts, especially the Intergovernmental Panel on Climate Change. Put differently, the empiricism inherent in the reports constructs the scientists' beliefs. There is, therefore, a Humean understanding of cause and effect around climate change, adapting to it, mitigating it and putting specific policies or policy recommendations in place to advance climate change adaptation and mitigation. The convictions highlight why the specific policy recommendations, through the theory of adaptive management, is absolutely necessary. So, climate change is unpleasant because humans are not absolutely certain about its impacts on society and the natural environment. This uncertainty links directly to the human condition, in that the constant improvement of the human condition might be in jeopardy. It is also uncertainty, as already indicated, that makes it unpleasant because of its geographical spread and the different (perceived) impacts on various regions across the world and within countries.

Be that as it may, adaptive management shows a striking resemblance with the steps contained in the theory of the public policy process and its positivism. The public policy process involves problem identification, agenda setting, and design of the policy (policy formulation), policy adoption, decision-making, policy implementation, project management, assessment and dynamics. Training is also an important element of the public policy process (Cloete et al. 2006; Funke 2014). Information gathering and analyses are important functions in the public policy process for it is these processes that indicate the advantages and disadvantages of the choices outlined in the public policy process (Howlett and Wellstead 2011; Lundin and Öberg 2013). What is also important to note from a public policy perspective, is that it is made in a complex socio-political landscape where various actors interact with one another to make and implement policy (Cloete and Meyer 2006; Funke et al. 2011).

The public policy process is depicted in a structuralist manner with a linear flow of processes from problem identification to the consideration of alternatives. Structuralism is also a central characteristic of adaptive management. This structuralism is embodied in the ordered and linear way in which it should be implemented. Positivism also plays a central role in the adaptive management cycle, especially with respect to the setting of priorities, assessment and gauging of risk exposure and vulnerabilities, monitoring and evaluation and the implementation of

change management. Democratic principles, such as stakeholder engagement and communication, are another characteristic of adaptive management, also something embodied in the public policy process. In both adaptive management and the public policy process, these communication and engagement are assumed to lead to more effective policy formulation and implementation, as opposed to a command and control way of policy development techniques (Rogers et al. 2000; Roux et al. 2009). Ironically, adaptive management, as it is propagated in the two climate adaptation plans, puts command and control in the hands of the scientists that direct public officials on how exactly adaptation plans need to be implemented. This is more the case with the South African report than the Australian report. In the latter, the scientists followed a more participatory approach in researching the issue. Nevertheless, it is my opinion that because of climate change science's inherent uncertainty that adaptive management has found appeal as an approach to develop and manage adaptation plans.

To reiterate, it is not wrong to describe things or to solve problems using one theory. Yet, there is a price to pay. Adaptive management is very much in vogue as a way to plan for, and implement practices, to make communities, governments and companies more resilient. Yet, rarely do one-size-fits-all solutions deliver on their promises. This can have a debilitating impact on practitioners as they get demoralised (e.g. Miller et al. 2004) when implementing the principles of the theory and see that change is happening slowly or not at all. It can also have an impact on scientists in the long run. As practitioners see that the recommendations put forward by scientists have minimal or no effect at all, they could start losing faith in scientists' ability to deliver sound recommendations for the problems facing the human condition. This can erode the legitimacy of science, scientists and their methods to generate knowledge, and ultimately erode the legitimacy of knowledge itself. As mentioned earlier, PULSE³'s repertoire of theories can aid in avoiding a mono-theoretical explanation of, and solutions to the problem, by highlighting the factors not mentioned by adaptive management. It is possible that climate change, and its impact on local and provincial governments, can be made more understandable through a variety of theories or a combination of theories. This is particularly the case for climate change with its variety of sources and global impacts, which gives it an inherent complex character.

Questioning the applicability of one dominant theory will bring to light alternative theories with which to highlight issues. Problematisation will highlight other factors that are at play within the issue's realm. This is not to say that adaptive management should be discarded entirely. Yet, a questioning attitude could force one to consider alternative views of reality and by implication theories explaining reality. A critical solidarity attitude is therefore needed in this regard.

Here it is necessary to look at those theories that seem likely candidates that are a close fit for explaining the issue, the opportunities and problems it could possibly create as well as the stakeholders involved. A glance at PULSE³'s repertoire of theories component, indicates theories that could be of potential value to government officials: the theory of social learning and policy paradigms stands out. I will briefly outline some of the assumptions contained in the theory.

The theory of social learning and policy paradigms has the following assumptions.

- a. Important factors influencing policy at a specific period are past policy and associated practices.
- b. Previous policy influences learning for new policies.
- c. Past policy is more influential on present policy than social and economic conditions.
- d. Practitioners' interests and ideals are shaped by policy legacies or the meaningful reactions to preceding policies (Sacks 1980; Hall 1993).
- e. Experts in a certain field push for policy change.
- f. These experts either work for the state or government departments or give government advice.
- g. The advice comes from a privileged position situated at the intersection between the bureaucratic apparatus and epistemic communities.
- h. Politicians do not play the most important role in social learning, but the officials or experts specialising in the particular field (Hall 1993).
- i. The state act autonomously from social pressures with various stakeholders not playing a primary role in the policy process.
- j. Learning happens when people gather new information, which is then applied to their succeeding actions.
- k. Social learning is a deliberate attempt to adjust the goals or techniques of policies in response to past experience and new information.
- l. Learning takes different forms (Hall 1993).

The theory of social learning and policy paradigms has a specific take on paradigms and their role in the policy process.

1. Paradigms are not fully commensurable and measurable in a scientific sense.
2. Paradigms contain their own account of the world practitioners operates in.
3. The views of experts are controversial because the process of paradigm replacement is more sociological than scientific.
4. Authoritative issues are central to policy paradigm processes.
5. Politicians face conflicting expert opinions from different paradigms.
6. Because of this, politicians will decide whom to regard as authoritative, especially regarding issues of technical complexity (Hall 1993).

The theory of social learning and policy paradigms shows a resemblance with adaptive management. However, the social learning and policy paradigms theory differs from adaptive management when it indicates the important roles policy paradigms play in the policy formulation process. Of importance, is the emphasis the social learning and policy paradigms theory place on the assumption that politicians can be subjected to expert opinions contained in different research paradigms.

2.2.6 Discussion

It is now possible to integrate adaptive management with the elements of the social learning and policy paradigms theory. Adaptive management is a new version of the original theory of policy formulation and implementation as outlined by Harold Lasswell. Lasswell made his contribution to the policy sciences in the 1950s and into the 1970s. His work on the policy sciences is characterised by ‘analytic differentiation’ and the development of ‘frameworks to ensure logical comprehensiveness’ (Ascher and Hirschfelder-Ascher 2004: 23). For Lasswell, political psychology played an important role in the policy process. People follow their interests together with others. When enough people are willing to invest in others’ interests, an adequate degree of cooperation can emerge to achieve individual objectives ‘through efforts to identify and secure the common interest’ (Ascher and Hirschfelder-Ascher 2004: 26). The collaborative efforts between people are one of the main tenets of adaptive management. Collaboration is enshrined in the concepts of ‘co-learning’ and ‘stakeholder engagement’. What is more, Lasswell also developed one of the most influential conceptualisations of the policy process. He defined a number of functional activities in the decision making process: intelligence, recommendation, prescription, invocation, application, appraisal and termination. This process is functional because each stage represents an activity needed by a system to move on to the next phase. Lasswell’s process is also cumulative since each series of activities produce results ‘that are fed back into the process’ (Nakamura 1986: 142). According to Nakamura (1986), various researchers used the ideas of Lasswell to develop their own conceptualisation of the policy process. In 1969, for instance, Polsby, acknowledging Lasswell’s contribution, defined the process as policy initiation, incubation, modification, adoption, implementation and appraisal. Furthermore, and according to McLain and Lee (1996: 438), ‘the approach [of adaptive management] borrows heavily from adaptive control process theory, which addresses the question of how to construct decision-making devices, capable of learning from experience.’ What is more, adaptive management also relies to a great extent on operations research and management science. Operations research and management science use the scientific method and mathematical models to assist decision makers to make choices when faced with a complex environment (McLain and Lee 1996).

These arguments show that adaptive management is founded on previous theories of the policy process, its associated practices, the management of organisations, operations and the scientific method (a paradigm). What is different with adaptive management is that it brings into play the concepts ‘resilience’ and ‘sustainable development.’ These two concepts are important from an ecological perspective, since adaptive management’s roots lie in ecology (Holling 1978). Why this overlap? It is possible that when adaptive management was first developed, it might have been a derivative of Lasswell’s policy science framework. The developers of adaptive management might have seen that the environment was omitted from the original Lasswell theory and decided to incorporate factors, elements,

concepts and causal mechanisms that are directly related to ecology. This is how resilience, and later sustainable development, may have found their way into adaptive management theory. Because of ecology's positivist inclinations, the direct cause and effect relationship between the policy process and resultant resilience and sustainable development, was quite appealing and became the foundation of conversations between ecologists and practitioners. In other words, whereas Laswell's theory of the policy process focusses exclusively on public administration as a context, adaptive management focusses predominantly on the ecological domain. The settings, therefore, differ, but the paradigm and processes described remained the same.

From a theory of social learning policy paradigms perspective, adaptive management rests on past policies and associated practices found in government departments and other state and non-state entities: the linear and circular policy process. Put in another way, the theory of social learning and policy paradigms tells us that ecologists probably learned from Laswell's policy processes, adapted it and developed adaptive management. Because adaptive management has such a strong resemblance with the policy process, it can be argued that it responded more to the past policy than prevailing social and economic circumstances; the same process of developing adaptive management was used in a different situation.

From the two climate adaption reports analysed earlier, we also see that the actors pushing for the adaptation of adaptive management are natural scientists and a political scientist (Methner). They also work in an advisory capacity. The form of the advice they give is not the same in both reports. In the South African case, the advice is more in line with directives than advice as 'an opinion or a suggestion about what somebody should do in a particular situation' (OALD 2013). It is here where the South African report is more sociological or political than scientific. This sociological/political disposition is also discernible in the Australian report where certainty of the impacts of climate change is presented as given. In other words, it would appear as if the scientists did not ask what is in the practitioner's interest. They assumed that what they are doing is in the practitioner's interest. There is therefore a political tone inherent in both reports. This is not to say that the reports are unscientific. Anything but! Yet, it is as if the positivist paradigm becomes a conduit for the power relations emanating from the scientists' thinking, which infuses the discourse within the reports. There is therefore no recommendation from one policy paradigm to another in the reports. It is rather a case of implementing the same policy process infused with different factors, elements, concepts and causative explanations. It is, therefore, a matter of supplanting one theory (the policy process) with another almost identical theory (adaptive management). This could be one of the explanations why there are mixed results when it comes to the implementation of adaptive management in different contexts (e.g. McLain and Lee 1996; Stankey et al. 2005). Scientists researching adaptive management's theory and practice in various contexts recognise some of its elements that are borrowed from the public policy process, warts and all. I am of the view that practitioners, when presented with 'advice' on how to implement adaptive management, recognise some of the elements of the public policy process and think: 'We are already implementing

some of these elements, all that is needed to shift the focus away from policy *per sé* and bring in climate change and other environmental aspects.’ In my opinion, it is therefore not a matter of adaptive management’s failure, but rather the differences in the scientists’ and practitioners’ perspectives that are, in turn, influenced by the contexts in which both parties work. The theory of social learning and policy paradigms teaches us that practitioners’ interests and ideals are shaped by past policy legacies or the outcomes of previous policies (Sacks 1980; Hall 1993).

In the context of using positivism to sway the practitioner, do the experts play a more important role in social learning than the practitioner (Hall 1993)? To a certain extent, yes, but not in a dominant way because the implementation of government policy is not a straight forward and rational process based on strict cost-benefit analyses. In my experience as a former public official, there are a myriad of other factors at play, such as the standing of the practitioner in the organisation, her or his key performance areas that determine to what extent she or he advances up or down the organisation’s career ladder as well as monthly income and the practitioner’s health and family responsibility. The latter can play an important role in the amount of time the practitioner has at her or his disposal to implement policy. Management and leadership styles are just as significant, but not the only dependent variables. In other words, contextual and personal variables also play their part, not to mention previous experience and education in managing the issue. The social learning of practitioners through experts can happen directly or there can be a time lag between the presentation of the expert’s ideas and the practitioner taking notice. Then there is also the way in which the expert presents his or her ideas. If the practitioner is not interested in the manner in which it is presented, and feels unimpressed, the idea is unlikely to have the desired effect. So, learning can happen or it cannot, depending on specific personal and contextual circumstances. This means that social learning is a deliberate attempt to adjust the goals or techniques of policies in response to past experience and new information (Hall 1993), should the practitioner choose to take the new information into account. Having explained all these factors, it is quite possible that the state can act autonomously from social pressures with various stakeholders not playing a primary role in the policy process (Hall 1993), including experts.

Why would a practitioner reject adaptive management rather than adopt it as a practice? Because authority issues are central to the policy paradigm change process, it is significant to note that a practitioner in a government department might be a climate pessimist, something adaptive management finds difficult to explain. Paradigms, as worldviews, also play their part. Not every practitioner believes that climate change is human induced. Also, not every practitioner believes that there is such a thing as climate change. The climate pessimist could be the reason for the positivist way of depicting adaptive management processes because researchers might be convinced that science, and the scientific method, could carry the necessary weight that will sway the climate pessimist. Such a climate pessimist might use her or his leadership role as a lever to diminish the influence of the scientist, the knowledge they generate as well as the types of agency they recommend. The psychological elements: emotions, beliefs and convictions of scientists and

practitioners can be key causal factors in the success or failure in the uptake of adaptation strategies and their science. Dragging feet on the implementation of adaptation plans are plausible in this context. What if the practitioner is a climate optimist rather than a pessimist? In this case, the adaptation report is likely, but no surety, to be taken seriously during formulations to deal with climate change. Said differently, it could be a positive factor in the uptake of science in the policy process. It could also come at a price for the scientists in that their contribution might not be explicitly recognised. This could hold implications for the service science performs to practitioners and citizens—the ivory tower might become an attractive recluse for the scientists should recognition not be forthcoming. These are hypothetical situations created with some of the factors contained in the ambiguity theory of leadership. The point I try to make with these hypotheses, is to indicate that adaptive management, as a theory of practice, is unlikely to highlight why adaptation strategies could succeed or fail. Emotions and passions, as well as the complex dynamic of everyday bureaucratic and public administration environments, could play a far more causal role than the prescribed processes to bring about resilience and sustainable development.

Theories, other than adaptive management and the theory of social learning and policy paradigms are also applicable to the issue of climate change its varying impacts on society and how to address it as a global governance issue. A few of these theories that comes to mind are: (1) interactive governance theory assuming that governance, often not harmonious, depends on the interaction of a variety of actors and their interactions (Kooiman and Bavinck 2013); (2) modernity theory noting that the era of modernity arose due to the advent of the industrial revolution (Adams 1993) (with the accompanied burning of large volumes of fossil fuels) described by Giddens (1990) as a juggernaut or a runaway engine that has enormous power that humans cannot control, to some extent, but something that can also get out of hand; and (3) the theory of risk society giving credence that modernity has created a number of risks or large negative impacts on environmental and social systems (Ritzer 2000; Björkman 1987), climate change included.

The link between these theories and climate change is recognisable. Climate change, a result of the burning of fossil fuels that has reached unprecedented levels since the industrial revolution, created risks not only for the environment but also for society at all levels and scales. The amelioration of these risks could come from the interaction among a variety of actors in an interconnected and often non-harmonious fashion. Because of this, and since climate change is a global phenomenon, this issue will remain at top of the international agenda for some time to come. Addressing the problem of climate change will not only find credence within the natural sciences because of this type of science's centrality to the investigation of the phenomenon. Social science, and social scientific theory, for that matter, also have a role to play. After all, the problem emanates from society, and what better way to look into the social sources of, and societal vulnerabilities to global and regional climate change, than through a social scientific lens. The other theories mentioned here indicate other causal narratives that explain not only why climate change is a reality, but also how humans could go about ameliorating

climate change impacts. The burning of fossil fuels has reached unprecedented levels in modern human history, particularly in the northern hemisphere. This has created risks for all countries, and not just for those burning the most. In this regard, ethical considerations as to who should take responsibility or at least cut back on emissions become clear. Here, I would like to end by asking if adaptive management contain sufficient causal narratives to indicate who should take responsibility. In my view, I think adaptive management is very silent on climate change's ethical dimensions, because it side-lines the human element of which ethics is a major part. And since adaptive management is a problem solving and structuralist theory, it places the responsibility of amelioration on government structures and the development of policies, programmes and plans along positivist prerequisites. Adaptive management does not give an indication of the role of the private individual or citizen, which is, in my view, just as important a role player in society than government officials and the political elite.

Would it not have been better to conduct the studies by involving public administration experts and officials from the start? I noted that local government is supposed to be the closest to the people. In many South African rural municipalities, I have experienced that citizens are more concerned about the supply of basic services like water and sanitation, refuse removal and electricity distribution (Meissner 2015), than with matters relating to climate change. If these services are in short supply, why would one, in the first place bother with climate change, and secondly ask natural scientists to conduct such a study without the input from public officials. It is after all, public administration processes that hamper service delivery; and the discipline of Public Administration would also need to be part of climate change research endeavours.

2.3 South Africa's National Water Resource Strategy, Second Edition

2.3.1 Introduction

I argue that research paradigms and theories are the foundations of water governance structures because they constitute the development of governance along dominant thinking within a discourse. This argument has implications for the practical application of views and concepts in water resource governance. Change in society does not occur automatically; it is usually caused by an event or someone. The latter operates from a certain cognitive outlook and with an intention in mind. Individuals play an important role in complex governance processes with feedbacks into policy processes (Meissner and Jacobs 2016). Individuals can be private citizens, public officials and private sector practitioners, arguing from a certain approach to ameliorate a problem. Approaches can be as holistic as possible, but if they do not rely on an eclectic foundation with multiple research paradigms and

theories, they are unlikely to provide the necessary understanding for practitioners. Complex challenges demand the integration of diverse expertise and ingenuity (Meissner and Jacobs 2014). This diversity includes a variety of research paradigms and theories. I will analyse the South African Department of Water and Sanitation’s (DWS) National Water Resource Strategy, second edition (NWRS2) (DWA 2013), to understand which research paradigm(s) and theory or theories influenced its development. I will analyse the Strategy using the PULSE³ framework for analysis before ending with a discussion and conclusion.

2.3.2 Paradigm Assessment of the NWRS2

In this section, I present the NWRS2’s paradigm assessment. It consists of two parts; the first discussing the meta-theoretical assumptions around knowledge generation and the second the assumptions on agency. Throughout the discussion, I will use examples from the Strategy to illustrate the points made.

2.3.2.1 Knowledge Generation

The paradigm assessment indicates that the NWRS2 is underpinned by positivism (see Fig. 2.3). The meta-theoretical assumptions that scored the highest are ontology, epistemology, research object and theory of truth. These four assumptions all received a score of 22 each. They were followed by method (20), validity (18), reliability (14) and training (10). The total score for knowledge generation was 150. The total score for the second highest paradigm (interpretivism/constructivism) was

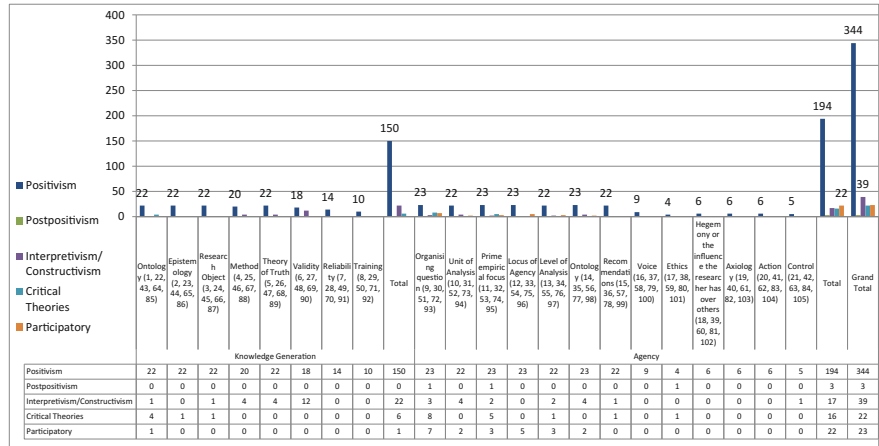


Fig. 2.3 Paradigm assessment score of the National Water Resource Strategy, second edition (Meissner 2016a)

22. For interpretivism/constructivism, validity was the meta-theoretical assumption with the highest score (12), followed by method and theory of truth with a score of four each. Critical theory's total score was only six. The breakdown of its score was four for ontology and one for epistemology and research object each. The participatory paradigm's total score was one for ontology only (Meissner 2016a).

Two explanations could shed light on the high score the four positivist meta-theoretical assumptions received. The first inference relates to the nature of the resource the Strategy deals with. The second conclusion, and related to the first, is the type of science that deals with planning around water.

Water is a chemical compound that is necessary for the production of goods and services in all spheres of the economy. Water is also considered to have 'great power' for humans; it is a 'magical force' in that it shapes, renews and nourishes earth and life on it. It is seen as the planet's life blood (Gillings 2010). The importance of water for the economy, and as a life sustaining substance, is exemplified in the vision, goal, principles and objectives of the NWRS2. The vision is 'Sustainable, equitable and secure water for a better life and environment for all.' The goal to achieve this vision is: 'Water is efficiently and effectively managed for equitable and sustainable growth and development.' The centrality of water as a resource that sustains life and the economy is further set out in the Strategy's objectives. According to the NWRS2, the three goals support the country's social and economic goals and the sustainable management of water resources. Firstly, water is essential for development and the eradication of poverty and inequality. Water also needs to contribute to the economy and job creation and, lastly, water has to be protected, developed, used, conserved, controlled and managed in an equitable and sustainable manner (DWA 2013: 12). The central message in all this is the betterment of the quality of citizens' lives. For South Africa's citizens to exist, the water resources of the country need to be managed in a particular manner. The economy and job creation take centre stage making the Strategy anthropocentric instead of ecocentric. What is also noteworthy, is the way in which water is used for the advancement of the country's citizens. South Africa will not only manage its water resources, it will manage it in a sustainable manner, and it will control the water resources inside its territory (DWA 2013). This is not to say that the environment is kicked out, so to speak (Meissner 2016a).

Sustainable development resonates strongly throughout the Strategy. The philosophical foundations of sustainable development were laid in 1987 by the World Commission on Environment and Development (the Brundtland Commission). According to the Brundtland report, humanity has the ability to make development sustainable—to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs (UN 1987). According to Beder (2001), governments incorporate economic positivism into sustainable development. Beder (2001) further contends that sustainable development prioritises the importance of equity within and between generations, while economic positivism highlights economic efficiency. Equity and efficiency are combined in the NWRS2 in this manner. It is therefore not sustainable development that is positivist. It is its incorporation into economic positivism that gives sustainable development a

positivist flavour in that the practice of sustainable development will bring about the better management of South Africa's water resources.

What I have said so far indicates that the Strategy relies on the positivistic approach to planning. In positivism 'science and technology are combined to establish a model with clearly defined goals...objectives with measurable achievement of goals, the collection of information on possible alternatives as well as associated costs and benefits and a selection of alternatives or set of alternatives that bring about "maximal achievement of public goals at minimal costs"' (Berke 2002: 23 cited in Depalma 2009). In the Strategy's preface, the former Minister, Edna Molewa, states that: 'If we are serious about achieving equity and redistribution and the goals of our developmental state, we need to streamline our policies, legislation and strategies for both water resource management and water services' (DWA 2013: i). The main goal of the Strategy is that: 'Water is efficiently and effectively managed for equitable and sustainable growth and development' (DWA 2013: v). These growth and development goals are in line with the National Development Plan (NDP) noting that: 'Current planning assumes that it will be possible to achieve an average reduction in water demand of 15 % below business-as-usual levels in urban areas over the period leading to 2030' (NPC 2011). Water supply plays a central part in the Strategy. Yet, water will not only be supplied through the construction of dams and other water-related infrastructure. Water supply alternatives include desalination through a variety of technological means such as membrane-based, ion exchange-based and precipitation-based technologies. As for water re-use, annexure C outlines the National Desalination Strategy. Another alternative is the re-use of municipal wastewater for urban and industrial uses, treatment of acid mine drainage and the direct re-use of treated municipal wastewater for potable purposes, among others. To achieve this, a National Strategy for Water re-use is explained in annexure D. In both these water re-use strategies, cost and benefit play an important part in the rationale behind their implementation. The desalination strategy notes that: 'Desalination is already being implemented in South Africa and is cost-effective compared to the alternatives' (DWA 2013).

Also noteworthy is the utilisation of technical reports or scientific studies to substantiate arguments or generate ideas. These reports and studies are from the natural sciences and include some prominent names in water research. Peter Ashton conducted research on South Africa's freshwater resources (e.g. Ashton 2007), transboundary rivers (e.g. Kistin and Ashton 2008) and water quality issues (e.g. Ashton 2007). The NWRS2 also cites reports produced by Roland Schulze from the University of KwaZulu-Natal. Schulze is known for his work on climate change (e.g. Schulze 2011a; Stuart-Hill and Schulze 2010) and adaptive management (e.g. Schulze 2011b). Also noteworthy is the use of Nel et al.'s (2011) *Atlas of Freshwater Ecosystem Priority Areas in South Africa* (DWA 2013; Meissner 2016a).

The Strategy also relies on research published by the Water Research Commission (WRC). Not only does the Strategy reference the Commission's published research, the WRC is also mentioned as a strategic partner in the research and development of water resource issues. With respect to research and innovation, the Strategy notes that: 'More than half of water research activities, funded and

coordinated through the [WRC] are conducted by universities, science councils, organs of state, the private sector, water utilities and other agencies such as the [Council for Scientific and Industrial Research]. A number of water role players make significant and independent input, such as Eskom, Sasol, mining and agricultural companies. Hence, the consolidation of collective intelligence, enabling the development of a comprehensive inventory of all water-related research nationally, is of strategic priority' (DWA 2013: 94). Policy development is influenced by a variety of actors; scientists (Meissner et al. 2013) and technical personal from institutions like Sasol included. The analysis of the knowledge used is mainly from the natural sciences. This corroborates a conclusion on research conducted on South Africa's water resource institutions by Meissner et al. (2013); that most of the research comes from the natural sciences where positivism is the dominant research paradigm in generating knowledge.

The issue with the above-mentioned studies, is that the scientists that produced them are not interested in the philosophy of science. They will not consider questions like what do we mean by "truth", or what is progress in science or explain scientific products. It is quite possible that the philosophy or science was not part of their training or their main concern (Kratochwil 2007) when they conducted their research and drafted their reports. Regarding this, Kratochwil (2007: 34) asserts that: 'To that extent, the actual investigation of scientific practice, disclosed by detailed studies in the development of scientific thought in different fields, is always considerably at odds with the ideals of science and its account of progress. Apparently, warranted knowledge is generated in a way quite different from the positivist reconstructions that underlie our textbook histories of science.' He goes on to say that various sciences developed because they did not take the scientific method too seriously (Kratochwil 2007). For the scientists that produced the scientific studies, used to produce the NWRS2, scientific progress was possibly not the main concern. What was important for them was to show, through scientific evidence, the reality of the country's water resources and how to manage that reality.

2.3.2.2 Agency

Positivism also scored high under the agency component with a total score of 194. The meta-theoretical assumptions that scored the highest were organising question (23), unit of analysis (22), prime empirical focus (23), and locus of agency (23), level of analysis (22), ontology (23) and recommendations (22) (Fig. 2.3). A possible explanation for this is the nature of the agent that developed the Strategy: the government and more specifically the Department of Water and Sanitation that utilised knowledge generated by the positivist paradigm. From the strategy it is clear 'who governs and who benefits' (organising question); government governs and the rest of society benefits. This particular 'organising question' manifests in the following passage from the Strategy: 'This Strategy responds to priorities set by Government within the NDP and National Water Act imperatives that support sustainable development' (DWA 2013: iii). The NWRS2 places a lot of

attention on structures of rule, like the National Water Act (No. 36 of 1998) (RSA 1998), constitutional rights of 'access to sufficient water' and the Water Service Act (No. 108 of 1997) (RSA 1997) as well as the Southern African Development Community's (SADC) Revised Protocol on Shared Water Courses (DWA 2013). The ideational entrepreneurs mentioned above also give credence to this positivist unit of analysis. The prime empirical focus of the Strategy is on the supply of order and welfare maximisation (Hobson and Seabrooke 2007). Good governance is put forward to ensure that unsustainable water management does not lead to risks to employment, the environment, human health and political stability. One of the most important priorities in the Strategy is the management of water for the generation of electricity (DWA 2013), deemed a strategic economic priority by the majority of people in the country. The locus of agency is top-down (Hobson and Seabrooke 2007), and relates to the nature of the government department that produced the Strategy and 'who governs and who benefits' assumption. Regarding this, the DWA (2013: 1) states that the NWRS2 focuses particularly, 'but not exclusive ... on the role of the State, specifically the Department of Water and [Sanitation] (as water sector leader)...'

Control of the water resources in South Africa invokes the hydraulic mission, or the mobilisation of more water through engineering (Reisner 1993). The hydraulic mission's rationale is to establish conditions where water supply facilitates socio-economic development and political stability (Turton and Meissner 2002). The hydraulic mission is a type of 'ideology' that becomes part of the 'sanctioned discourse' and 'leading to the creation of a dominant belief system...' (Turton 2000 cited Turton and Meissner 2002: 39). It is not only feats of engineering that plays a role in the hydraulic mission but also political considerations, and especially the interaction among different actors within the ambit of hydraulic engineering programmes (Meissner and Turton 2003). This interaction is the likely reason for the emphasis of an ideology within the hydraulic mission's discourse.

The promotion of the hydraulic mission is quite evident in the NWRS2, and although it emphasises that the country '...move beyond "traditional engineering solutions" of infrastructure development...' it calls for '...a multitude of strategies, including [WCWDM]..., further utilisation of groundwater, desalination, water re-use, rain water harvesting and treated acid mine drainage.' The WCWDM (water conservation and demand management) stance is prioritised and is likely to lead to the postponement of water engineering infrastructure, the mitigation of climate change, the supporting of economic growth and enough water for equitable allocation. The WCWDM approach rests on a positivist research paradigm underscoring activities like water resource management, distribution management, and consumer demand management and return flow management (DWA 2013). The NWRS2 utilises knowledge developed by Seago and McKenzie (2007) to indicate the benefits and practical interventions of WCWDM. The interventions include among others: water quality management, social awareness and education, water resource rehabilitation, dam storage optimisation, alien vegetation removal, pressure management and metering retro-fitting, effective pricing, polluter pays, regulations and so on (DWA 2013). These, except for social awareness and education,

fall within the positivist paradigm because social awareness and education are more likely to be implemented successfully through social scientific research rather than positivist heavy natural scientific disciplines.

2.3.3 The NWRS2 Through the Lens of Analytic Eclecticism

The positivism of the NWRS2 shows research paradigmatic limitation. That is not to say that we understand less about water resources in South Africa and the relationship between the resource and the functioning of society. The research conducted by water scientists over the years informing the knowledge and agency content of the Strategy, have generated useful insights. Their research has also provided pragmatic ideas on how to create opportunities and ameliorate problems. Even so, the prior assumptions about what type of knowledge is relevant (e.g. hydrological data, reconciliation of systems and the increase of supply) (DWA 2013), which actors are relevant (engineers and hydrologists) and the structures of rule, such as the National Water Act (No. 36 of 1998) (RSA 1998), are the foundations on which knowledge is generated and agency affected. The problem with this arrangement is that after a while the assumptions are considered law-like by researchers and practitioners. The assumptions are not questioned and they become the central canon of knowledge generation. Because the NWRS2 is built on the (rational) scientific method, reinforces its assertive character. The result is an increase in the sophistication of arguments that influencing recommendations that agents (e.g. government) have to implement. This is possibly the reason for the focus on technical solutions such as WCWDM, desalination and water re-use (DWA 2013).

Metatheoretical assumptions from other paradigms are, however, present within the NWRS2. When the Strategy discusses support to municipalities, it states that this will be done through: ‘Mobilisation of partnerships and support from the private sector in respect of technical expertise, funding, training and implementation’ (DWA 2013: 58). Elsewhere it states that: ‘Education and awareness is not the function of national government only; and all sector institutions, private sector organisations and civil society should be institutionalising the promotion of [WCWDM]’ (DWA 2013: 58). These two examples are indications of agency based on the participatory paradigm, to a certain extent, that supply order and welfare maximisation by political elites (Hobson and Seabrooke 2007; Meissner and Ramasar 2015), practitioners from different spheres of society and researchers. This means that there is not a paradigm shift from positivism to the participatory paradigm, but rather an evocation of participatory paradigm assumptions on how the technical aspects could be achieved. The NWRS2 is, from an international relations perspective, quite neorealist in nature. According to neorealism, state practices are ‘calculating’ and ‘economically rational’ (Ashley 1984: 233). Although ideational and agency elements are present in the NWRS2, they are toned down in favour of structuralist and

material elements. The emphasis on economic development and energy generation, as priorities, speak to the material domain, while the dominant and developmental state is in reference to the structural realm. Those agents and ideational aspects that are mentioned, such as science backing the various aspects of the NWRS2 and the scientists whose work had been referenced, are, as far as I am concerned, also structuralist and material. Ashley (1984: 235) notes that: structuralism '...aims to construct the objective relations... that structure practice and representations of practice, including primary knowledge of the familiar world.' He follows this by another argument when he says that: 'What concerns structuralists in general is not practice *per sé* but the logical conditions that account for the significance and signification of practice within a community.' Because the developers of the NWRS2 referenced natural science studies, indicates the signification of natural scientific practice in the South African water sector.

Should we discard the paradigmatic ways in which the NWRS2 is constructed? Not at all! What needs to happen is to investigate the relationship between alternative research paradigms and how these relate to the various issues raised throughout the Strategy. Alternative theories could assist in this matter. Before I get to these alternative theories, I would first like to discuss the theory I believe underpins the NWRS2: rational choice.

2.3.3.1 Rational Choice underpinning the Knowledge and Agency of the NWRS2

In this case study, I have already alluded to the influence of economic positivism and associated costs and benefits on the NWRS2. One of the basic principles of rational choice theory is the idea that all action is in their core 'rational'. The other part of this tenet is that humans are likely to calculate the possible costs and benefits of any action before making a decision. The theory recognises only purely and calculative actions and not actions based on, for example, emotional or habitual action. Rational choice theory has a close relationship with mathematics in economics (Scott 2000). As such, rational choice theory can be considered a grand problem solving theory with an affinity to mathematics and economics. Rational choice theory tells us how to achieve objectives either individually or collectively. It is in this regard, a 'theory of advice' (Ostrom 1991: 238). It is plausibly, because of this close relationship with mathematics and economics, that rational choice theory is featuring so strongly as a fundamental understanding of reality in the NWRS2.

Rational choice theory rests on a number of assumptions. One of these premises is that complex social phenomenon is explainable through basic or elementary individual actions on which occurrences are composed of. Examples of social phenomena include the formation of rules, institutions, norms as well as communities. The establishment of these aspects is called instrumental action and this action is based on individuals that act deliberately and in a self-conscious manner. In this deliberate way, individuals are in a position 'to define a hierarchically ordered set of preferences and who can make quasi-mathematical calculations to

determine the ideal strategies for realizing those preferences based on their estimates of other actors' behaviors in a given situation' (Sil 2000: 356–357). Individuals behave because of their wants and goals that express their preferences. People act within specific constraints and based on the information in their possession about the conditions under which they are acting. The theory also notes that humans have to anticipate the conclusion of alternative courses of action and calculate which one will work best. The alternative with the greatest benefit will be chosen (Scott 2000). Actors will choose the most efficient means to achieve objectives. Rational choice theory is, in many of its guises, concerned with the provision of public goods (Heywood 1999), such as water. When it deals with public goods it is called public choice theory. The benefit of the goods cannot be withheld from individuals who choose not to contribute to the provision of such resources (Heywood 1999).

People act rationally at both the micro and macro levels (Goode 1997). If we assume that people are rational or act in a conforming manner to the theory's predictions, we can then develop the best strategies actors could adopt in situations with specific structures (Ostrom 1991). What are some of these predictions? When there are an infinite number of social dilemmas, rational choice predicts a large number of 'equilibria.' These 'equilibria' will range from the very best to the very worst available outcomes without a 'hypothesized process for how individuals might achieve more productive outcomes and avert disasters' (Ostrom 1998: 2). Said differently, a hypothesised process, like a research project that starts with *a priori* assumptions, will not be necessary to indicate how individuals might go about developing policies to address problems through recommendations based on *a priori* assumptions.

Another assumption of rational choice theory is that the social environment, surrounding the individual, influences the strategic choices of actors. Even so, the social environment does not shape the identity or interests of the actor. Instead, the actor uses his or her or, in the case of organisations, their cognitive ability to identify the correct way of achieving actions. This identification of the correct way is based on cost-benefit calculations (Coicaud 2014). The structure in the case of the collective organisation could be the organisational hierarchy that either promote or inhibit innovation or that encourages the use of specific theories to inform policy. This structure encourages decision-making that views 'the cognitive process of deliberation and decision as void of emotions...' (Coicaud 2014: 500). In this case, the theory of rational choice notes that psychology explains only deviations from rational behaviour (Mercer 2005). Emotions cause people to lose track of the 'how to act rationally' and also 'how to capitalise on the outcomes of their rational behaviour'. Said differently, emotions make individuals to act less rationally than what the hierarchical structure stipulates. Individuals are also unable to calculate costs and benefits less efficiently when they are influenced by emotions.

What this last statement about cost-benefit calculation and emotions' influence says, is that rational choice theory explains how actors should reason, and not how an actor actually reasons. If an actor follows the theory closely, the more rational its judgement would be. The less it follows the model, the less rational decisions, are

and the more likely the result of undesired outcomes (Mercer 2005). Said differently, and on an ontological level, rational actors exist prior to external social contexts (Wallin 2014). What this means is that rational choice theory is the 'paradigmatic positivist tool of analysis' (Smith 2007: 394) underpinning the strategic choices contained in the NWRS2 (Table 2.2).

Having discussed rational choice theory's basic assumptions, how does the theory, contained in the NWRS2, understand the problem the NWRS2 is attempting to ameliorate? Based on the analysis done so far, I am of the opinion that the rational choice theory would not consider South Africa's water problems as messy. The reason for making this argument is that the volume of water in the country's territory is the foundation on which rational calculations could be made. Where social aspects like gender, equity and equality play a role, the prescriptions from international norms and standards give guidance (see the UNDP case for more information on these norms and standards). In other words, calculations can be made without the complexity that social aspects bring to the table. Predictions are, therefore, available based on a large number of equilibria without hypothesising how gender, equity and/or equality will affect the possible outcome of the prediction. Having said that, and because the inherent emotional or psychological elements of these social phenomena are ignored, the strategy can be based on the rational choices to increase the country's water resources through desalination technologies and WCWDM. The only unpleasantness to the problem would be, in my opinion, to change policies, plans and programmes to arrive at the vision contained in the strategy. This means that the necessary change in structures will be sufficient to bring about the desired change envisioned in the NWRS2. The cause-effect relationship is therefore Humean with a change in policies, plans and programmes producing the desired outcomes to increase South Africa's water resources. With this linear cause and effect relationship, based on rational choice theory, in mind, we can ask why base the NWRS2 on rational choice theory rather than any other theories that could explain how the NWRS2 might be implemented in the most efficient manner without forgetting certain societal dynamics at play in the water sector? To shed light on this question, I will enrich the understanding of these dynamics with two theories: agential power and the ambiguity theory of leadership.

2.3.4 Theories for Practice

The NWRS2 constitutes a specific understanding of the country's water resources and how to manage or 'control' the resources. The Strategy reduces the country's water resources to the processes as outlined by the water cycle in annexure B (DWA 2013). This reductionist notion is then elaborated upon to show that it is possible to manage water in a reductionist manner—control through the use of technological solutions with education and awareness raising being part of the equation. This reductionism is influenced by positivism and vice versa. In addition,

Table 2.2 Rational choice theory's ontological and epistemological structures

	Concepts	Actors	Independent variable	Interceding variables	Dependent variable	Causal mechanism
	Rational action Deliberate action Goods or resources Social dilemmas Equilibria Predictions Social environment (including structures) Deviation Emotionless action Tool of analysis	Calculating individuals Calculating (public and private) collectivities staffed by calculating individuals that work together in an innovative manner to develop strategies	Individuals and collectivities Social dilemmas Collective action	Instrumental action Information in the hand of actors Rational choice Social environment Cognitive abilities	Social phenomena Equilibria Strategic choices Correct choice of actions Disaster aversion	Instrumental action Calculation Anticipation Provision of resources Large number of social dilemmas Cognitive abilities enabling individuals and collectivities to think about the best way to ameliorate problems and create opportunities Social environment including structures influence strategic choices but not interests and identities
Connections	Deliberate cognitive-based actions influence individual and collective actors to make rational choices in the development of strategies, which contain calculated cost-benefit analysis that will ultimately influence decisions.					
Complementarities	Rationality leads to innovation that enables actors to devise actions based on cost-benefit analyses and efficient outcomes.					

the Strategy is also influenced by one type of ideational entrepreneur; the positivist (natural) scientist. I bracket the 'natural' because natural scientists dominate the water research landscape (Meissner et al. 2013) and social scientists can also argue from a positivist research paradigm. The NWRS2 also portrays the state as '... standing over or apart from society and transcending all social actors' (Hobson 1997: 228). How can we widen our understanding of the NWRS2 and its implementation?

Although the NWRS2 highlights participation of the private sector, the overall impression is that of a Strategy directed by government. Two theories that can bring about a deeper understanding of the situation are agential power (Hobson 2000; Meissner 2004a; Hobson and Seabrooke 2007; Meissner 2014) and the ambiguity theory of leadership (Alvesson and Spicer 2011). Both theories look at societal processes and actors from an interpretivist/constructivist and participatory paradigm perspective.

2.3.4.1 Agential Power

Agential power gives actors agency to influence their environment and each other (Hobson and Seabrooke 2007). Agential power falls into three categories: domestic, international and reflexive agential power. I will only discuss reflexive agential power because it deals with the relationship between societal actors. Reflexive agential power refers to the 'ability of the state to embed itself in a broad array of social forces...' including class and normative structures. This increases the state's governing capacity since it is less isolated from society and other actors external to its immediate governing domain. If an actor succeeds in widening its network of collaboration it increases its power (Hobson 2000, 1997; Meissner 2004a). When an actor is embedded within social structures it is bounded within society. State and society cannot be separated (Hobson 1997: 236). If a state does not routinely negotiate with groups in society it has despotic power and low capacity to govern (Hobson 1997, 2000). Hobson (1997: 238) notes that '...strength can be achieved only through *effective* politics; and this ultimately requires a strong dose of cooperation as opposed to abrasion with society.' Depoliticisation is not an option where there is a seemingly lack of state capacity, but an increase in the effectiveness of the allocation of values in society (Easton 1985) as well as with and through society. To consistently resist civil pressures, in light of state capacity, is a sign of weakness, not strength. This brings to the fore the notion of competitive-cooperation in which two actors get along with each other because their conflict is not zero-sum, but collectively beneficial (Huntington 1991 in Hobson 1997).

2.3.4.2 Ambiguity Theory of Leadership

The ambiguity theory of leadership states that versions of leadership are invented or constructed by people. This construction takes place when they draw on their

assumptions, expectations, selective perceptions, sense-making and imaginations of leadership (Alvesson and Spicer 2011). Leadership exists only as a perception and not a viable scientific construction (Calder 1977: 202 cited in Alvesson and Spicer 2011) that scientists can measure and predict. Because of leadership's constructivist, the theory notes that leadership varies from person to person and context to context. Leadership is often incoherent and complex. Because of the concept's different meanings, it is difficult to say exactly what leadership is. Leadership is a construct that is an ambiguous and contradictory phenomenon. The different meanings and constructs bring out the potential for ambiguous interpretations, understandings and leadership experiences. Ambiguity and fragmentation is at the centre of the leadership process. Leadership itself is highly ambiguous and is a blurred concept, like goodness, that could almost mean anything and everything. As such, people use the concept to reach certain desirable goals. These objectives could include: attributing responsibility to senior managers for numerous outcomes, booting the identity of managers and creating faith that leadership is a panacea or cure-all in almost every undesirable situation. The utility of the concept serves as a lever to create certain things, especially making us believe that leadership can do wonders, which is not the case, according to Alvesson and Spicer (2011). Leadership's attributed meanings are pivotal sources of ambiguity. The sources of ambiguous meaning of leadership are leaders, their followers and the context in which leaders and followers act. Leaders are not always sure about what it means to do leadership, and what they are doing is actually leadership. Followers interpret different acts as leadership. The context promotes different understandings and ideas of the meaning of leading (Alvesson and Spicer 2011).

2.3.5 Discussion

Based on the theory of agential power and the ambiguity theory of leadership, how can the NWRS2's successful implementation be enhanced? To shed light on this question, it is necessary to start with the manner in which the NWRS2 had been formulated. I have already showed that the natural sciences and their rational scientific method dominate the NWRS2's knowledge base and agency. How the Strategy was developed and how it will be executed goes hand-in-glove. It is here where agential power starts to shed light on an alternative understanding of NWRS2 and its execution.

That the NWRS2 relies on scientific studies by a number of prominent scientists gives the Strategy credence based on the standing of the scientists. This is also the case where the NWRS2 invoke integrated water resources management in combination with the notion of developmental state. Other 'scientific' concepts like 'virtual water' (DWA 2013), or the volume of water needed to produce import and export goods and foodstuffs, (Allen 2001; Meissner 2003; DWA 2013), also give credence to the NWRS2 positivist underpinnings. It is therefore not entirely impossible that the NWRS2 is a reaction to current trends in the global water

governance discourse. This is evident where integrated water resources management is combined with the developmental state. The developmental state plays a central role in managing water resources that, in turn, play a critical role in equitable social and economic development (Van Koppen and Schreiner 2014). It is as if the authors of the NWRS2 were including integrated water resources management as a management practice to align it with global practices, despite the criticism levelled against integrated water resources management (e.g. Merrey 2008; Claassen 2013; Van Koppen and Schreiner 2014). It is therefore not only prominent scientists that have power, the concepts they develop can also influence policy. This influence does not only come from within the South African water sector but also the international water governance domain. The case of developmental water management (e.g. Van Koppen and Schreiner 2014), integrated water resources management and virtual water are prime examples of concepts that reside within the international water discourse.

Since agential power gives actors the ability to influence their environment and each other (Hobson 1997, 2000), the NWRS2 indicates a measure of agential power. This is due to the structuralist and material arguments on which the Strategy's knowledge generation and agency is based. Through the NWRS2, however, the DWS embeds itself into a certain structural and material domain; positivism and the knowledge produced by natural scientists. The NWRS2 is bounded to these structures and cannot be separated from them and other material aspects (e.g. cost benefit analysis). The NWRS2 exhibits high despotic power (Hobson 1997, 2000), that could potentially influence government's governing capacity to implement the Strategy. It can be said that the NWRS2, and by extension the DWS, has no or low reflexive agential power (Hobson 2000; Meissner 2004a). How can DWS enhance its reflexive agential power? According to the theory, an actor can influence its governing capacity positively if it widens its network of collaboration (Hobson 2000). When drafting the NWRS2, DWS received a number of written submissions from non-state actors (e.g. non-governmental organisations [NGOs], interest groups, businesses and individuals) (DWA 2013). At first glance this would appear like high reflexive agential power. It is arguably not, because not all South African citizens, NGOs and interest groups submitted submissions. Also, not all individuals are literate and were therefore able to submit submissions. It can be argued that only certain classes in society submitted submissions (i.e. the capitalist and middle classes). The list of written submissions also indicates that it was organised entities that dominated, with only a handful of individuals participating. This also indicates structuralist and material elements dominating the NWRS2. That written submission had been received shows that the DWS invited written submissions and that government is at the top of a hierarchy when consulting other non-state actors. It is therefore a case of the DWS governing and other societal actors benefiting or reacting to requests for submissions.

The ontology of the South African water sector is a bit more complicated than the structuralism and materialism influencing the NWRS2's knowledge and agency. Although equity and the environment are mentioned as priorities (DWA 2013), the

ontological complexity of these issues is downplayed. It is good that the water cycle is mentioned to bring about an advanced understanding of the country's water resources. The NWRS2 sketches a very objective reality that is separated from individuals. It becomes more complicated when people see themselves participating, in one way or another, in the water cycle. For instance, an engineer working at a power utility like Eskom has a certain view of where the utility's power stations are located in the water cycle and how it influences the cycle through the use of large volumes of water for power generation and cooling (e.g. thermodynamics). An individual from a rural community that is reliant on a river for drinking water, will view her place in the water cycle differently to that of the engineer. For her, the nature of her reality is different in that she would want a more reliable source of water to live a healthy life for her and her family. It is these subjective notions of reality that is lacking in the NWRS2. Even so, and in all fairness, the NWRS2 is a strategy and not a specific tactic to tackle a specific problem. In this vein, embeddedness is possible by linking with communities and the research/scientific structures that generate knowledge through alternative research paradigms and on issues that do not fit neatly positivism and the natural sciences.

This highlights the notion of collective beneficitation (Huntington 1991; Hobson 1997), where government structures engage with communal and natural and social scientific structures to widen the scope of issues impacting on the country's water resources. This beneficitation can be achieved through routine (formal and informal) negotiations with other social and economic structures as well.

This specific type of interaction raises the issue of leadership. The NWRS2 notes that the DWS is leading its implementation. The Department of Water Affairs (2013: 102, 1) notes that: 'This NWRS2 provides the Strategy for how the water sector and its key institutions will achieve the strategic objectives' with the Department as the 'water sector leader.' According to the ambiguity theory of leadership, leadership is not a specific and viable scientific construction (Calder 1977 in Alvesson and Spicer 2011). This means that people define leadership as they see fit and depending on their context (Alvesson and Spicer 2011). That said, individuals could view the DWS's leadership of the NWRS2 in different ways. During fieldtrips we undertook for our various research projects, it is not uncommon to hear people say that government should provide them with water. I have never encountered an individual saying an irrigation board, or water user association or traditional leader, for that matter, should provide water. This indicates government's leadership role being constructed as that of 'ultimate provider' of water. It is also not uncommon to hear NGOs and interest groups complaining that government is not doing enough to supply water and protect the environment. This construction is of government as 'absconder of water provision responsibilities' and 'irresponsible environmental custodian'. This indicates the ambiguity of government's perceived leadership roles in the water sector. In light of the NWRS2, and the DWS's agency, an awareness of the various meanings people attach to leadership roles could potentially erode the Department's agential power and reflexive governing capacity. Something also has to be said about followers in this regard. Followers, whoever they may be, use their different meanings of leadership as

levers to achieve or gain something (Alvesson and Spicer 2011). An interest group using a specific meaning of leadership might do so to increase its standing in society. Individuals could also use the meanings to vent their frustration to a situation or at the extreme mask ideological commitments such as contempt for a corrupt government and its entities. It will not be possible to correctly interpret why people construct certain meanings of leadership. Yet, it is important for DWS officials to know that there is not just one warranted meaning of leadership and that people's different meanings could hold real world consequences for governing capacity. With this, a deeper understanding of knowledge and agency is affected in the NWRS2, which could stand the DWS in good stead.

The NWRS2's knowledge is based on a research environment that is dominated by natural scientists and researchers that were in the past employed by the DWS. From an empathy perspective, positivism is dominant because of the natural sciences' huge influence on research in the South African water sector. Learning comes into play when we look closely at the theory underlying the NWRS2—rational choice theory. It is not entirely impossible that, due to the perceived scarcity of water in South Africa (in terms of the volume of the resource not being enough to cater for the population and the country's economic development), the DWS would approach the NWRS2 from a specific scientific perspective. In other words, the Department's agency is likely to be informed by this positivist type of knowledge generation approach. The agency perspective would be to get as much economic benefit from the scarce resource; rational choice and cost-benefit analysis would be the foundations of the Department's agency in implementing the NWRS2.

2.4 The UNDP's Water and Ocean Governance Focus Area

2.4.1 Introduction

This analysis focuses on the UNDP's Water and Ocean Governance focus area. This focus area falls under the UNDP's Environment and Energy programme (UNDP 2014a, b, c). I analysed the webcontent of 15 of the UNDP's Internet websites that make up the focus area. These websites are entitled: Energy and Environment, Focus Areas, Water and Ocean Governance, Integrated Water Resources Management, Adaptation to Climate Change, Gender and Water, Mainstreaming, Human Rights, Water Governance Facility, What is Water Governance?, Shared Waters Partnership, Transboundary River Basin Initiative, Why Shared Waters Matter, Transboundary Water Management, Transboundary Waters Programme and the Water Integrity Programme. The Transboundary Water Management webpage, is a document authored by Jägerskog (2013). His essay contains information on how the UNDP view transboundary water resources, why it is necessary for states to cooperate on these shared resources and how to facilitate cooperation.

I decided to analyse the UNDP's Water and Ocean Governance focus area because the content of the websites is in line with a number of governance themes found in the South African water discourse. For instance, the gender component found has been a topic in the South African water discourse for some time (e.g. Schreiner and Van Koppen 2001; Rust and Hanise 2009) and is alluded to in the NWRS2. In 2014, South Africa also hosted a conference that discussed the matter of gender, water and development (Karar 2014). The same can also be said for other topics, like transboundary water resources management. South African researchers have been avid investigators of transboundary water governance and politics (e.g. Kistin and Ashton 2008; Turton 2005; Jacobs and Nienaber 2011; Meissner and Jacobs 2014; Meissner and Ramasar 2015). The themes found on the UNDP's Water and Ocean Governance website is therefore relevant to the South and Southern African context, not only from a thematic point of view, but also from a scientific perspective. South African scientists have engaged with these topics for a number of years (Meissner 2016b) with a pool of knowledge that will stand the rest of this study in good stead.

2.4.2 Paradigm Assessment of the Focus Area

In this section, I will discuss the results of the paradigm assessment of the Water and Ocean Governance focus area's web content. The portion consists of two parts; the first deals with the research paradigmatic meta-theoretical assumptions regarding knowledge generation and the second part looks into the assumptions on agency. Throughout the discussion, I will use examples for the various webpages to illustrate the points raised during the discussion.

2.4.2.1 Knowledge Generation

The research paradigm assessment indicates that the content of the UNDP's Water and Ocean Governance focus area is steeped in positivism (see Fig. 2.4). The metatheoretical assumption that scores the highest is the research object (14), followed by epistemology (13), ontology (11) and then the theory of truth (11). Validity, reliability, and training got scores of nine, seven, and four, respectively. A possible reason for the high score for the research object is the nature of the resource under consideration. As already indicated in the section on the NWRS2, water is one of the most abundant resources in the biophysical environment and considered an important building block of life on earth. Water is a chemical compound that is necessary for the production of goods and services in all spheres of the economy and it is also considered to have 'great power' for human beings; water is considered a magical force since it shapes, renews and nourishes earth, and life on it. We see water as the planet's lifeblood that pumps through it continuously (Gillings 2010). Said differently, water is something real that we can

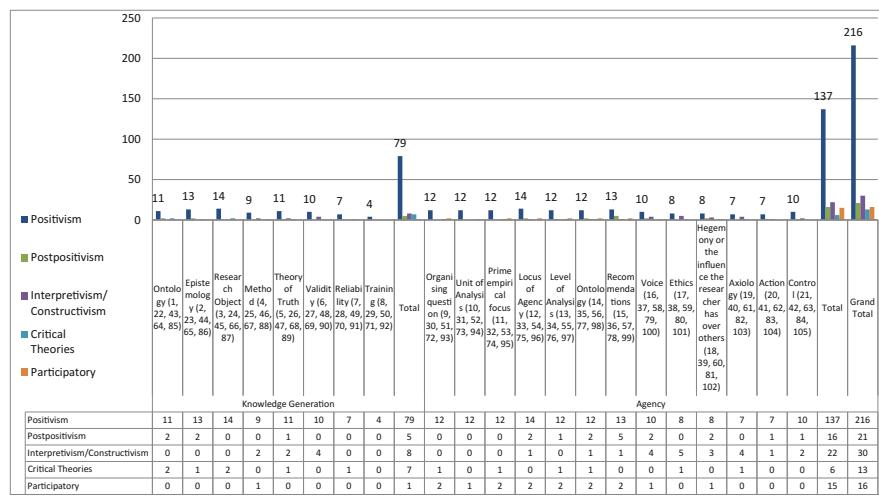


Fig. 2.4 Paradigm assessment of the UNDP's water and ocean governance focus area

sense through touch and taste. It is a concrete entity that can be measured, manipulated, predicted and, to a certain extent, controlled. We can have an independent relationship with water when we study and manipulate it. What follows from our interaction with water is that our epistemology is characterised by an objective reality when we research water as a substance and the effects a surfeit or scarcity of water have on society. When we research water and its multiple influences, we can separate it from us enabling us to control and predict it, and its ‘power’. Said differently, water’s biophysical properties translate into a positivist meaning for humans.

This positivism materialises in the focus area (UNDP 2014c) when it uses the global water cycle as the foundation to show the importance of freshwater and ocean resources. The UNDP (2014c) notes that these two domains are ‘inextricably linked’. When describing the water cycle and the volume of water found therein, the UNDP uses facts such as; 97 % of the earth’s water is in the ocean, and; 900 million people lack access to safe water with more than 2.7 billion people not having basic sanitation (UNDP 2014c). In the transboundary water domain, Jägerskog (2013) states that: ‘Globally, about 2 billion people depend on groundwater, which includes well over 300 transboundary aquifer systems.’ These figures are very close to certainty and objectivism. Another indication of the positivist paradigm found on the website is: ‘Climate change, which is already altering the global water cycle at an unprecedented rate, adds further complexity to...challenges [faced by transboundary water resources] through its impacts on the timing, intensity and variability of rainfall, droughts and floods’ (UNDP 2014d). Cause and effect relationships are put forward by the UNDP through these statements with absolute certainty with the causal narrative coached in empiricism using regularities

and facts. Regarding this, the UNDP (2014e) notes that competition for ‘available water resources’ is growing at a rapid rate because of ‘ever-increasing and conflicting demands from agriculture, industry, and urban water supply and energy production.’ Statements like these do not only show that the UNDP perceives water in concrete terms, but also the direct and linear links between elements of the biophysical environment and how a lack of water impacts on the human population. Cause is depicted in a strict Humean way in that the regular pattern of competition over water will result in ever-increasing conflict over water.

One of the entries on the website that has a critical theory paradigm profile, is the Gender and Water section. The UNDP notes that women and girls are the ones responsible for collecting and using water for household purposes in developing countries. It also notes that: ‘Prevailing inequalities mean women typically have less means and capacity to cope and adapt and consequently bear a disproportional burden of increased competition and climate change induced consequences on water.’ Because of this inequality, water managers need to take gender matters into consideration, according to the UNDP (2014f). The critical theories paradigm acknowledges power struggles in society as the nature of reality (ontology). The research paradigm also recognises and studies social struggles, freedom and oppression as well as power and control as an epistemological focus (Cox and Sinclair 1996; Lincoln et al. 2011). Even so, it would appear that when it comes to validity (the certainty that data truly measures reality) (Weber 2004), the UNDP falls back on positivism. For the critical theory paradigm validity is created when research creates action or participatory research creating positive social change (Lincoln et al. 2011). This social alteration is put in the court of water managers as the top-down agents of gender mainstreaming.

The UNDP invokes integrated water resources management, benefit sharing, adaptive management and resilience; some of which I already discussed in the previous two case studies. Regarding climate change, and despite the lack of reliable regional and basin specific data and uncertainty in predictions, the UNDP (2014e) seems to know how to tackle the problem through resilience and adaptation. Both these concepts are put forward as having the potential of impacting positively on the Millennium Development Goals² (MDGs). For instance, the UNDP states that, by strengthening resilience, is an appropriate response to climate change threats (UNDP 2014g). The positivist theories of resilience and adaptive management are here guiding the appropriate measures needed to deal with not only the uncertainty inherent to climate change but also the attainment of the MDGs. This is irrespective of the uncertain action that needs to be taken.

²The MDGs are targets set in 2000 by 191 countries to eradicate poverty and other sources of human deprivation and to promote sustainable development. The target for achieving the MDGs is 2015. The goals are: eradicate extreme poverty and hunger; achieve universal primary education; promote gender equality and empower women; reduce child mortality; improve maternal health; combat HIV/Aids, malaria and other diseases; ensure environmental sustainability and develop a global partnership for development (UNDP 2003; Meissner 2004b).

A scholar that appears to have an influence on the way the UNDP generates knowledge, especially around the issue of transboundary water resources, is Anders Jägerskog. For Jägerskog (2003) there is a link between science and policy, or issues related to the management of water resources. He is of the opinion that the knowledge generated by scientists in the water politics discourse '...does not reflect an objective reality but rather a constructed reality' (Jägerskog 2003: 35). If this is the case, and the UNDP is referring to a large extent to Jägerskog's work, why is the UNDP's Water and Governance programme influenced more by positivism than by interpretivism/constructivism? After all, Jägerskog puts forward a constructivist argument to highlight the linkage between science and policy. Part of the answer is given by Jägerskog (2003), when he says that a state or nation is sometimes treated by International Relations as a singular and unproblematic unit, which is off-course, an oversimplification. Jägerskog's (2003) argument about states can also apply to an organisation like the UNDP; the UNDP is, after all, a creation of states.

If this is the case, ideology, and discourses informed by a specific ideology, will likely play an important role in the UNDP's identity and how the organisation views reality. The UNDP is, after all a political actor on the global stage populated by humans that work towards goals and aspirations. In other words, it is possible that the UNDP has a discernable collective ideology. One of the major initiatives under the custodianship of the UNDP is (at the time of writing) the MDGs, which has since 2015 been transformed into the sustainable development goals (SDGs). The MDGs had measurable (and thereby positivist-informed) targets. For instance, goal 7, target 10 was to 'halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation' (UNDP 2003; Meissner 2004b). Also, measuring progress towards the targets, including the SDGs, is done by measuring a country's economic performance by using positivist methods, such as statistics and surveys (e.g. Meissner 2004c). This positivist agenda might account for the overtly positivist way of knowledge generation by the UNDP that are likely to continue with the SDGs.

What is also interesting to note, from an analytic eclecticism perspective, is that Jägerskog (2003)—in his earlier study of water negotiations in the Jordan River basin—only considered the agent/structure divide found in International Relations. He did not consider the material/ideational divide. He uses the agent/structure divide as a framework for his thesis and as a tool '...in dissecting the negotiation process' (Jägerskog 2003: 54). Jägerskog (2003) leans on the theory of critical realism when he argues for a fusion between the agent and structure divide. A premise of critical realism utilised by Jägerskog (2003: 60) is that '[h]uman agency acquires meaning and occurs only in relation to already structured settings, which simultaneously constrain and enable actors since structures determine the range of possible action.' For him, agency is dependent on already established structures that constitute the potential for action. In line with Hay (1995), Jägerskog (2003) acknowledges that actors are partially able to transform structures through their actions. This implies that structures have a dominant influence over actors. Jägerskog's (2003) view of the agent-structure divide is in line with positivist prescriptions that treats the locus of agency in international affairs as a top-down

arrangement (Hobson and Seabrooke 2007), with structures at the top and agents at the bottom. What is also important to note is that Jägerskog's (2003) ontology is structuralist, which neatly fits the positivist paradigm (Hobson and Seabrooke 2007). This structuralist ontology can also be discerned in the Internet content of the Water and Ocean Governance focus area. For instance the topic of shared waters, the Stockholm International Water Institute (SIWI) in partnership with the UNDP states that: 'While a lot of progress has been made, 60 % of all transboundary basins still do not have any kind of cooperative management framework in place.' The Institute goes on to say that shared waters can be vehicles in promoting cooperation between countries (SIWI 2012). It is possible that the constitutive argument put forward by Jägerskog (2003) has had an influence on the idea that cooperative (i.e. agreements between countries) and biophysical structures (i.e. the river basin itself) will have a bearing on the conduct of countries' (i.e. actors) behaviour when sharing water resources. It is also no coincidence that, at the time of writing, Jägerskog is an employee at SIWI and the head of the Transboundary Water Management Unit (The World Justice Project 2014).

Even though positivism is dominant, there are also alternative paradigms visible in the UNDP's webcontent. I have already discussed the critical elements found in the Gender and Water component. There are interpretivist/constructivist metatheoretical assumptions regarding the method, theory of truth and validity contained in the arguments by Jägerskog (2014) on the importance of transboundary water management. For instance, regarding method, Jägerskog (2014) uses case studies from the Middle East and other parts of the world to substantiate his arguments. Although there are certain elements of interpretivism/constructivism, the arguments are grounded in positivism and specifically neoliberal institutionalism and neorealism. Regarding these two International Relations theories, Jägerskog (2014) notes that there are national bodies and legislative mechanisms to address conflicting demands for domestic water resources, but no institutional mechanisms exist to challenge transboundary problems. Neoliberal institutionalism argues that states prefer to cooperate rather than to seek relative gains. This cooperation takes the form of regime establishment to realise absolute gains rather than short-term individual achievements (Carranza 2014). By establishing a cooperative arrangement, like a river basin organisation that deals exclusively with a specific transboundary river, states could gain more than in the absence of such a body. In terms of neorealism, Jägerskog uses Earle et al.'s (2010) hegemonic politician's (Meissner and Jacobs 2016) model to explain the interaction among stakeholders in developing transboundary water management. According to the hegemonic politicians model, politicians are the most influential actors international rivers and determine the speed and direction of transboundary water management. All other actors are in a way subordinate to the wishes and preferences of politicians (Earle et al. 2010; Meissner and Jacobs 2016). Jägerskog (2014) developed the hegemonic politician's model together with Earle (Earle et al. 2010), and is therefore likely to adhere to the model's basic assumptions.

2.4.2.2 Agency

From the paradigm assessment (Fig. 2.4) we see that positivism also scored the highest regarding agency. The metatheoretical assumption with the highest score is locus of agency (14), followed by recommendations (13) and organising question, unit of analysis, prime empirical focus, level of analysis and ontology (scoring 12 each). Voice, ethics, hegemony, axiology, action and control scored the lowest, ranging in scores from seven to 10. In the case of Gender and Water, the UNDP utilises feminist theory to arrive at positivist prescriptions for the mainstreaming of gender in water resources development. The UNDP calls for the involvement of both women and men in integrated water resources management initiatives to increase a project's effectiveness. In addition, through a gender perspective, and involving women, sustainable development is possible. The MDGs will be difficult to attain without a gender perspective (UNDP 2014f). As mentioned above, these initiatives, or goals, are all within the UNDP's mandate. To a certain extent, a critical paradigm is used as a foundation to argue for reaching specific preferences attached to the UNDP's mandate. This is quite ironic since critical theory assumptions are utilised to put forward positivist prescriptions (e.g. recommendations).

Where the UNDP also uses alternative research paradigms and theories to inform achievable actions, is in the domain of human rights and water resources management. Here interpretivist meta-theoretical assumptions about the influence of knowledge types or the researcher, axiology, the products of research and control are quite visible. The UNDP states that it supports a human rights-based approach in sanitation, water supply and water management and governance. This is done by 'developing experience, lessons learned and guidance' and 'supporting the work of the Independent Expert [sic.] on the issue of human rights obligations related to access to safe drinking water and sanitation' (UNDP 2014h). The 'guidance' and 'support' of independent experts is transactional knowledge that is utilised to deliver water services. It is clear the research generated seeks to influence practices. Training can also be mandated translating into political action with knowledge shared between the researchers and participants (independent experts) (Lincoln et al. 2011). Even so, from the information at hand, it would appear as if the exchange of knowledge is more of a top-down affair from the UNDP's side than it is about the mutual exchange of knowledge.

Even so, through the description of a case study in Kenya, the UNDP's Water Governance Facility supports the capacity development of villagers in the Nyanza Region. This is to enable them to participate effectively in water sector reform and use anti-corruption and complaint redress tools. Villagers are also encouraged to report water mismanagement practices (UNDP 2014h). This case is, to a certain extent, an example of the participatory paradigm influencing the UNDPs activities. Be that as it may, the actions to improve governance are informed by positivist structures of governance (i.e. reform and anti-corruption). Benefit-sharing, which is neo-liberalist, is also used as a way to improve dialogue (UNDP 2014h). There is dialogue to bring about change to better the human condition. This seems to be the main organising issue that forms the foundation of the initiative and the prime

empirical focus is to supply order and welfare maximisation (Hobson and Seabrooke 2007) through dialogue with people from different spheres of society. It would appear as if the relationship between the villagers and the UNDP is horizontal, but the information being supplied to the villagers are western liberal notions of governance and management. There is a horizontal relationship in that dialogue is entered into by villagers, but the knowledge has a top-down western and liberal content.

Where the UNDP also base its agency on positivism is in its discussion of the concept and meaning of water governance.³ The international organisation notes that water governance can address issues of equity and efficiency, is catchment-based water administration, integrated water resources management approaches and the need to balance water between society and ecosystems (sustainable development). Water governance, as defined by the Water Governance Facility, is also an important ingredient for the formulation, establishment and implementation of water policies, legislation and institutions. Water governance also clarifies the role of government, civil society and the private sector as well as their responsibilities regarding the ownership, management and administration of water resources and services (UNDP and SIWI 2014a). It appears as if the UNDP and SIWI take an *a priori* stance when it comes to the effects of governance (i.e. equity, efficiency, better water administration and the necessity for integrated water resources management). The theoretical assumptions held by the two organisations are rooted in positivism since the unit of analysis focusses on structures of rule (Hobson and Seabrooke 2007) (e.g. water policies, legislation and treaties). The prime empirical focus of the concept is to supply order and welfare maximisation (Hobson and Seabrooke 2007) through water policies, legislation (read the political élite) and treaty institutions. The locus of agency is top down (Hobson and Seabrooke 2007), since the agency component of the concept ‘water governance’ focuses much more attention on governments than other societal actors, either implicitly (i.e. water administration based on catchments) or explicitly through policies, legislation, government and administration. There is a structuralist ontology in that ‘water governance’ constitutes actors’ actions through the ‘clarification of the roles of government, civil society and the private sector and their *responsibilities* regarding ownership, management and administration of water resources’ (emphasis added). Examples of these responsibilities are dialogue between sectors, stakeholder participation and conflict resolution, having women playing a role in water management, getting rid of bureaucratic obstacles and corruption, regulating prices and subsidies and creating tax incentives and credits (i.e. welfare maximisation) (UNDP and SIWI 2014a). These are also implicit recommendations founded on an exclusive positivist and problem solving approach. The agency component is presented

³Water governance is defined by the political, social, economic and administrative systems that are in place, and which directly or indirectly affect the use, development and management of water resources and the delivery of water at different levels of society. Importantly, the water sector is a part of broader social, political and economic developments and is thus also affected by decisions outside of the water sector’ (UNDP and SIWI 2014a, b).

in such a way that the constitutive relationship between water governance, and the various actors is 'true', and will become a reality should water governance, as outlined by the UNDP and SIWI, be implemented.

This positivist approach to agency is discernible in the case of the Shared Waters Partnership between the UNDP and SIWI. The purpose of the Partnership is to 'prevent conflict over shared waters by building trust and promoting cooperation' (UNDP and SIWI 2014b). The objective of the Partnership is to create a multi-stakeholder platform⁴ to increase political will and strengthen riparian commitment in regions where water carries hold the potential of becoming a source of conflict. Another mainstay of the Partnership is adaptive management with cooperation being fostered through opportunities to learn, codify, and exchange lessons to utilise water as a tool for cooperation (UNDP and SIWI 2014b). Again, positivism and problem solving theory play a functional role.

Technical studies on the link between water resources and conflict will support and facilitate agency within the Partnership. These technical studies are purely positivist in nature. As mentioned, the agency component of the Shared Waters Partnership is purely positivist. On this positivist plane, the UNDP and SIWI govern while riparian countries benefit. For instance, the partnership '[h]olds high level government events, such as parliamentary conferences, to build multi-country awareness of shared water body issues' and '[s]upports processes to enable and finalize regional frameworks' (UNDP and SIWI 2014b). Governmental structures therefore take centre stage in the technical assessments supporting the minimisation of perceived conflict in shared water resources.

The technical studies also raise the issue of ethics as a meta-theoretical assumption. Here ethics refer to the relationship and interaction the researcher has with the subject and the consequence of research on a population (Schwandt 2007 in Lincoln et al. 2011). The technical studies, it would appear, investigate the biophysical environment or the river basin and the associated biophysical characteristics that influence water scarcity and/or abundance. There also seem to be an interpretivist/constructivist and participatory paradigmatic element inherent in the

⁴Warner (2005) states that multi-stakeholder platforms have been adopted as a logical companion to integrated water resource management, since integrated water resource management is difficult to model and needs a different decompartmentalised institutional arrangement. Also of interest is that the uptake of multi-stakeholder platforms goes back to the United Nations Conference on Environment and Development (UNCED) World Summit in Rio de Janeiro in 1992, where calls were made for dialogue and co-management of common pool resources (Warner 2005) such as shared water bodies. Together with integrated water resource management, multi-stakeholder platforms are used as ways to deal with increasing degrees of variety and variability. By involving a diversity of perspectives in water management it 'is hoped to hold the key to more integrated and sustainable outcomes' (Warner 2005: 2). This promise appears to be used as an a priori knowledge construct that informs the UNDP's and SIWI's Shared Waters Partnership strategy. That the UNDP and SIWI use multi-stakeholder platforms in multiple contexts or shared water situations, indicates that the rationale behind multi-stakeholder platforms are regarded as a universal belief based on the experience of others and what is considered a justifiable belief (Bonjour 1999) coming from experts propagating multi-stakeholder platforms in an international organisational structure.

technical studies: to reveal special problems (Guba and Lincoln 2005; Lincoln et al. 2011). Since these are technical studies, it is not entirely impossible that they rely a lot on positivist methodologies. It would also appear as if the technical studies guide the potential influence researchers have over others or their hegemonic role when conducting the technical inquiries. The research, and not the researcher *per se*, is influential. There is also a postpositivist element in that decisions can be made from the analyses produced (Guba and Lincoln 2005; Lincoln et al. 2011). Even so, since cost-benefit calculations form part of the technical studies and the researchers are objective (Guba and Lincoln 2005; Lincoln et al. 2011), the actions will have to come from riparian countries and make an ‘informed’ decision based on the technical studies’ conclusions. This also implies that the technical studies produce law-like statements since the link between water resources, conflict and cost-benefit analysis should influence the riparian countries’ decision makers. The Shared Waters Partnership also develops scenario modelling tools as ways and means for riparians to better understand transboundary waters in the context of peace, security and economic development (UNDP and SIWI 2014b). The fact that economic development is included in the context, indicates that the prime empirical focus also rests on welfare maximisation (Hobson and Seabrooke 2007). The technical studies are also an indication of who governs and who benefits (Hobson and Seabrooke 2007)?

This particular positivist organising question gives rise to the unit of analysis, which are riparian countries the geographical area of shared aquifers and other shared river basins. The unit of analysis is the state or the structures of rule created by the state, while the prime empirical focus is the supply of order (Hobson and Seabrooke 2007) through cooperative agreements and regional initiatives on shared water resources. To be more specific, the Partnership ‘[b]uilds capacity of transboundary water institutions in dispute resolution, public participation and management’ (UNDP and SIWI 2014a, b). As already mentioned, this also indicates a bias towards the production of cooperative structures that will influence the behaviour of actors in shared water arrangements. This thinking is in line with Jägerskog’s (2003) treatment of the agent/structure divide discussed earlier.

2.4.3 The UNDP’s Webcontent Through the Lens of Analytic Eclecticism

That positivism is dominant throughout the Water and Ocean Governance focus area is an indication that the focus area is characterised by paradigmatic limitation. That is not to say that we understand less about international water governance, the actors, their relationships with one another, the issues they address and the dynamics behind their actions. The research conducted by scientists over the years informing the knowledge and agency of the focus area have generated useful insights as well as pragmatic ideas on how to create opportunities and ameliorate problems. Yet, the

prior assumptions about the importance of certain actors (e.g. hegemonic politicians) and structures (e.g. cooperative arrangements in transboundary rivers), are the foundations on which knowledge is generated and agency affected. The problem with this arrangement of knowledge and agency is that, after a while, the assumptions are considered law-like principles by other researchers and practitioners. That said, the assumptions are not critically questioned or problematized and become dogma. The 'permanent' character of the website does not help either, in fostering a dogmatic character around the focus areas assumptions and statements. The UNDP also endorses the services of, and align its thinking, with scientists that uphold a positivist paradigm. It is not likely that they will question their own research paradigms and theories and consequently their beliefs about water management in various situations. This result in an increase in the sophistication of arguments within the positivist structure of knowledge generation that, in turn, influences structures constituting agent-bound research. Because of this, the UNDP and SIWI work towards the establishment of seemingly appropriate structures (e.g. regimes, treaties and good governance principles) in a bid to influence actors' behaviour. Looking at the content of the focus area it is clear that relationships between issues are laid out but not on a research paradigm level. Where critical theory and interpretivism/constructivism come to the fore, for instance, (e.g. in gender mainstreaming and human rights, respectively), it is used to explain a structural phenomenon (e.g. gender inequality in the political economy of water management) and not to change this structure and emancipate those suffering as a consequence of the existence of the structure (e.g. women). The explaining of the structure is used to inform the actions of the UNDP and that is to make gender part of integrated water resources management. The (gender inequality) structure, influencing agent-bound research, informs the UNDP's agency around gender mainstreaming.

The UNDP do not problematize the root cause of gender inequality, human rights and corruption's complexity. For instance, international organization does not question the very structures that should be put into place to address the matters the Programme is propagating. It is not entirely impossible that the structures the UNDP, and to a certain extent SIWI, are putting forward as solutions could be part of the problems' root cause the structures are trying to address.

That said, should we discard the research paradigmatic ways the UNDP goes about generating knowledge and developing and implementing agency? Not at all! What needs to happen, tough, is to investigate the relationship between alternative research paradigms and how these relate to the various issues the UNDP is tackling through the Water and Ocean Governance focus area. Here alternative theories could go a long way in discovering hidden relations between paradigm-bound theoretical elements. For this to happen, it will be necessary to balance *a priori* knowledge justifications with *a posteriori* knowledge generation. For instance, justifying knowledge claims based on research conducted in one region, like the Middle East, and then to argue that the knowledge is applicable to other regions with prevalent water scarcity, should be balanced with empirical investigations into the matter of water scarcity leading to conflict. To do this, the UNDP could problematize the various theories and concepts it puts forward to

generate knowledge (e.g. integrated water resources management, sustainable development and multi-stakeholder platforms). For this to happen, it might be necessary to ask what alternative theories are out there that could highlight the hidden problems inherent in the dominant theoretical stances, and how do we use these alternative theories to help explain the complexity of the issues being addressed by the UNDP and its partners? What could also be highlighted, is to investigate how material and ideational mechanisms, integrated with structural and agent mechanisms influence actors' behaviour and the structures they put in place. The UNDP could strike a more balanced approach between simplification (e.g. structures influencing agents, positivist theories explaining issues and a set of dominant actors involved in water management) with the problematization of the concepts, assumptions and analytical principles the UNDP is familiar with. Within the ambit of the focus area as it stands currently, the UNDP puts forward a simplified view water management's nature and extent and how to react to the problems besetting water management. This simplification rests on a reductionist notion that the implementation of structures will go a long way in addressing water management problems.

The analysis of the UNDP's Water and Ocean Governance focus area reveals the utilisation of a number of theories to highlight and explain the (paradigmatic) ways of tackling water and ocean governance. Two theories are implicit and two are explicit. The implicit theories are neoliberal institutionalism and the hegemonic politicians' model. The explicit theories are integrated water resources management and sustainable development. Neoliberal institutionalism and the hegemonic politicians' model are both grand problem-solving theories, while integrated water resources management and sustainable development are middle range problem solving theories.

For neoliberal institutionalists, economic interdependence and democracy reduce conflict (Oneal and Russett 1997). This is exemplified in the focus area through benefit sharing's promotion in transboundary river basins. A central tenet of neoliberal institutionalism, is that the reduction of conflict through the causal mechanisms of economic interdependence and democracy does not rest solely on the shoulders of states. As such, states are not the only important actors in world or regional political arrangements. Non-state entities are just as important in the scheme of things. These non-state entities include international organisations (Viotti and Kauppi 1999) (e.g. the UNDP, SIWI and the GWP) and (transnational) interest groups like Greenpeace and the WWF (Neme 1997; Meissner 1998; Finnemore and Sikkink 1998). This means that states are not the only actors with autonomous preferences (Stone 1994; Nel 1999). Autonomous preferences links with the decision making of political actors based on the choices available to them (Offe 1997). Also important, with respect to autonomous preferences, is that non-state entities can influence the actions of states and the political leadership of states and organs of state (Viotti and Kauppi 1999), like international organizations. What this influence from non-state actors means, is that states are open to external influences from non-state entities. Because of the erosion of the autonomous preferences and the 'solidity' of states, international affairs resembles a cobweb of interaction instead of

a billiard table on which actors clash and push each other out of the way when interacting. This spiderweb image implies that the relationships between actors are highly complex and interdependent (Heywood 1997; Stern 2000). An important norm in international affairs is autonomy, which replaces state sovereignty by neoliberal institutionalism. By emphasising autonomy, the theory is able to recognise non-state entities and their importance in world politics (Heywood 1997). This means that the theory highlights autonomous preferences and autonomy as key concepts instead of sovereignty. Non-state actors, states, and individual politicians are key actors for the theory.

Looking at states, neoliberal institutionalism notes that states are not everywhere the same; they are not 'like units' in terms of their societal set up and government apparatus. Despite these differences, cooperation between liberal democratic states is quite normal because the international order is seen as liberal (Stone 1994). It is for this reason that the theory propagates the spread of democracy through the international system as a means to ameliorate conflict even in transboundary river basins. This entails that liberalism is a causal mechanism for cooperation and liberal democratic states are key agents in the spread of liberalism.

Cooperation in the international system takes place through regimes. A regime is a 'form of institutionalised cooperation in the international system' (Stone 1994: 441). Regimes and norms go hand-in-hand. For Krasner (1982: 185) '[i]nternational regimes are defined as principles, norms, rules, and decision-making procedures around which actor expectations converge in a given issue area.' Put in another way, cooperation takes place through regimes meaning that regime formation bring about cooperation in political systems. For instance, the UNDP advocates gender mainstreaming as a type of procedure to bring about a gender inclusive environment that will lead to better water resources management.

The propagation of certain procedures to construct cooperation is also discernible with integrated water resources management and sustainable development. Integrated water resources management and sustainable development are used as procedures, and ideals, to bring about better water management and less conflict as well as more cooperation in transboundary river basins. Because of their procedural nature, integrated water resources management and sustainable development are middle range problem solving theories.

It is in the transboundary river domain that the hegemonic politicians model, as an understanding of stakeholder interaction (Jägerskog 2013) starts playing a role. The hegemonic politicians' model was developed by Earle et al. (2010) to indicate how stakeholders interact in a complex system. Jägerskog (2014: 50) argues that: 'Advances in transboundary water management are urgently needed and there is a range of ways to overcome the challenges. A key insight is to understand the various actors at play in the transboundary domain.'

The hegemonic politician's model rests on a number of basic assumptions. In transboundary water management three actor clusters play an important role: the water resource community, the research and academic community and politicians. The most important grouping is the politicians. The model is depicted as three interconnected and revolving gears (Earle et al. 2010; Meissner and Jacobs 2016).

Since the politicians are the most influential in a transboundary river basin, their represented gear is shown as the largest. The size of the politicians' gear is proportional to their role because they allocate values in the system with immense influence over domestic water management (Earle et al. 2010).

Why are politicians so influential? It is because state sovereignty and the rights that go with sovereignty resting on politicians' shoulders. If the 'politicians gear' should stop turning, the entire system would grind to a halt and collapse (Earle et al. 2010). The causal mechanism in this regard is politicians burdened with decisions influenced by state sovereignty and its rights that can bring about a move towards better cooperation or instigate conflict. This means that there is a powerful elite, with the national interest at heart, that governs in a top-down manner.

The water resource community include government and private sector businesses, water managers, water consumers, and civil society actors that implement transboundary strategies. Another function of this community is that it also develops solutions to water challenges. When and where politicians establish cooperative structures the water resource community steps in by utilising its understanding of transboundary water governance (Earle et al. 2010). Politicians act through the sovereignty norm to establish collaborative structures. The understanding of transboundary governance issues of the water resource community assists in the establishment of the collaborative structures. In addition, of importance is that the structures politicians formulate, depends on riparian state relations. These relations can limit the water community's role (Earle et al. 2010). The interacting politicians influence the structure's form and consequently the water resource community's role because the community does not have the same sovereign rights as the politicians. Therefore, the rights bestowed upon politicians limit non-state actor actions in transboundary river basins. The sovereignty rights place politicians in a privileged position relative to the water resource community that do not have these rights. The sovereignty rights, therefore, cause a hierarchical system with rules as to who can construct interactive structures and who cannot.

The third community consists of the researchers, which includes academics, international financial institutions, development partners, and donors. The members of this community develop theories and aim to explain, influence and improve governance based on observations from the water resource community (Earle et al. 2010). This means that theories are causal mechanisms according to the hegemonic politicians' model. Theories have a positive impact on transboundary water governance. Academics, as experts, with specialised knowledge are trusted to produce and deliver well observed theories, are well known in their field, and can, through theories, improve governance. This improvement is not a done deal. Researchers introduce their ideas to the water resource community hoping for a durable structure from the non-state level. Researchers as outsiders observe and comment on processes from a distance. Some researchers enjoy better insider status/access to the other two communities than other researchers. An example is the development partners that cooperate with the state (Earle et al. 2010), like SIWI and the GWP collaborating with the UNDP. Politicians will only adopt recommendations from researchers if these are in line with the politicians' pressures and goals. Of

importance, is that the political community is heterogeneous due to multiple realities and pressures at the national level (Earle et al. 2010).

Taking this heterogeneity of the political communities into further consideration together with the dominant role politician's play, it would appear as if the hegemonic politicians' model is a mix of neoliberal institutionalism and neorealism. This is significant for both are problem solving positivist theories. Because of this, the causal mechanisms and narratives are constructed along neat Humean cause and effect arguments. This is a visible complementarity between neoliberal institutionalism and the hegemonic politician's model. This complementarity means that states and their representatives are important in (transboundary) water governance, but will collaborate through stipulated structures and rules with non-state actors in the research and water resource community. The focus of both theories is on actors, their structures and the structural norm of state sovereignty and the rights it bestows on politicians (Table 2.3).

How do these theories understand the water problems they are confronting? From the analysis of the web content, it is clear that empirical analyses are utilised only in so far as to describe the extent of water problems faced by human populations. Said differently, the empirical evidence to describe the problem was to put the challenge into perspective as it manifests in reality and linked to the large number of individuals facing water scarcity in a degrading natural environment. What is therefore unpleasant about the water difficulties is that large numbers of, often poor people, face water scarcity on a daily basis. To ameliorate the problem, regimes among states, to be implemented by water managers, are necessary.

In short, the hegemonic politicians' model notes that change in transboundary water management strategies is dictated by hegemonic power relations. There are various degrees of collaboration and conflict evident in the relations. Again, politicians are the most important actors in bringing about strategies, because if all the gears engage at once, the system jams (Earle et al. 2010). This jamming of the system means that, in a transboundary context, neither the water community nor the research fraternity can bring about the consent of the politicians through autonomous preferences. There has to be a collaborative effort for strategies to be considered, let alone succeed. In the context of gender mainstreaming and other national or local-scale initiatives, the researchers play a more prominent role in the UNDP's efforts to confront water governance challenges. For instance, it is the theories of feminism, integrated water resources management, and sustainable development that inform the UNDP's practices.

Now that we know what the research paradigmatic and theoretical basis of the UNDP's Water and Ocean Governance focus area's webcontent is, it is possible to bring the contrastive space into play. One of the central features of the above theoretical analysis is the norm of state sovereignty and the rights it bestows on politicians to act in the water governance domain. The contrastive question should not be; why this particular norm on which to base our understanding, but why the norm of state sovereignty rather than norms that has a social inclination instead of a state-centric connotation? To ask this question brings into the fold the role of social norms, produced by a number of societal actors and not a norm that derives from

Table 2.3 Neoliberal institutionalism and the hegemonic politicians' model's ontological and epistemological structures

	Concepts	Actors	Independent variable	Interceding variables	Dependent variable	Causal mechanism
	Autonomy Politics as the allocation of values in society State sovereignty and its rights Collaborative structures Understanding transboundary governance issues Riparian state relations Theory Politicians' pressures and goals Heterogeneity	Non-state actors such as international organisations Individual politicians as allocators of values Liberal democratic states Water resource community Water research community	Politicians Water resource community Water research community	Sovereignty and its rights produce pressures and goals for politicians Understanding of transboundary governance issues Insider status of water researchers	Collaborative structures Influence of the water resource community Theories	Autonomous preferences Liberalism Politicians burdened with decisions influenced by state sovereignty and its rights Politicians acting through sovereignty to establish collaborative structures Interacting politicians influence the form of the structure Sovereignty limits the rights of the water resources community Insider status of researchers Politicians' interests constitute the uptake or acceptance of research recommendations Reality and pressures from various sources constitute heterogeneity
Connections	Autonomous preferences, sovereignty and politicians as allocators of values connect <i>positively</i> with collaborative structures and other regime principles like integrated water resources management and sustainable development to mitigate water scarcity problems.					
Complementarities	Liberal democratic principles of collaboration on a global or regional scale results in collaboration, integrated water resources management and sustainable development.					

the state-system, influencing the role and power of politicians. A theory that will assist in deepening our understanding is constructivism that emphasises the role and importance of social norms.

2.4.4 Theory for Practice: Social Constructivism

To illustrate an alternative agenda, I will use an alternative theory from a research paradigm other than positivism as an example that could enrich explanations of real world problems around water governance in the UNDP's focus area. The theory is social constructivism. I will illustrate how this theory can give a richer explanation to the content of the focus area's website. I will, therefore, further analyse the content using social constructivism. Social constructivism can be seen as a middle ground explanation of world politics (Adler 1997; Weber 2014). Constructivist social theory rests on three principles. The first is that 'people act toward objects, including other actors, based on the meanings that the objects have for them' (Wendt 1999 cited in Jacobi et al. 2014). This is the principle of social knowledge. The second principle is that 'the meanings in terms of which action is organized arise out of interaction'; the principle of social practice. The third principle holds that 'identities [and interests] are produced in and through "situated activity"' or the principle of social identities and interests' (Weber 2014).

For social constructivism, actors do not have stable identities and interests but shape and construct these through intersubjective engagement with structures (Chandler 2013) and other actors. Ideational elements or intersubjective beliefs include ideas, concepts, and assumptions that are widely shared by people (Jackson and Sørensen 2003). The theory is the opposite of the conceptualisation of norms as shared, pre-formed and rational interests (Chandler 2013; Weber 2014). Here norms are defined 'as shared (thus social) understandings of standards of behaviour' (Klotz 1995: 14 cited in Meissner 2004a). According to Chandler (2013: 218): 'Neo-liberal theorists [take] a positivist perspective to the study of international regimes and institutions, which were thereby understood to develop as part of the pursuit of existing self-interest: as minimizing transaction costs, facilitating the spread of information, and overcoming uncertainties of international cooperation.' Social constructivism argues that there is too much emphasis on the materialist interests and motivations of actors, usually states. Said differently, positivist theories, like neo-liberalism, are too agent-centric in its approach to explaining international politics. According to neoliberalism and neorealism, agents are permeated with 'instrumental rationality'. This rationality means that states seek their power or interests (Hobson 2000). Social constructivism emphasises the social environment in which actors interact. It is also through this social environment that they construct their self-identities and their perceptions of policy and governance preferences or needs. This social environment contains norms, identity, and culture. Norms have a constitutive as well as regulative effect indicating the social expectations for proper behaviour (Chandler 2013). This means that through the lens of

social constructivism there is a shift in focus from absolute rational power and interest seeking behaviour to the interaction between all sorts of actors in a social environment where rationality plays a much smaller role.

What is more, social constructivism does not deny the importance of power and interests. According to Finnemore (1996: 157 cited in Chandler 2013) social constructivism ‘...asks a different and prior set of questions: it asks what interests *are*, and it investigates the ends to which and the means by which power will be used. The answers to these questions are not simply idiosyncratic and unique to each actor. The social nature of international politics creates normative understandings among actors that, in turn, coordinate values, expectations, and behaviour.’ In this, we see the constitutive influence of normative issues on politics as well as governance.

From this we can see that social constructivism tries to make sense of social relations by describing the construction of the socio-political world through human practice (Du Plessis 2000). Instead of seeking power or interests, states are constrained by social normative structures (Hobson 2000). Normative structures considers what the most appropriate or desirable form of a community or state might be (Hobson 2001). Norms play an important role in the construction of actors’ identities. Interests change as norms reconstruct identities, which constitute to changes in policies (Smith 1997; Price 1998). Not only do norms play an important role, non-state actors do too. Social constructivism believes that non-state actors operate in a transnational manner and exist as a community of political engagement in world politics. They impact meaningfully through networks and can teach governments what appropriate behaviour to follow (Price 1998). Norms make individuals and other non-state entities into agents and therefore give actors an opportunity to act in this world; and they use all means at their disposal to do so. Onuf (1998: 4) states that: ‘These means include material features of the world. Because the world is a social place...rules make the world’s material features into resources available for agents’ use.’

2.4.5 Discussion

If analytic eclecticism is setting its sights on addressing real world problems and there is a link between research paradigms and theories and practice, what is the issue that has to be problematised? This is a not an easy question to answer; the UNDP and its respective partners are, after all, tackling real world problems (e.g. gender inequality, water scarcity, the dearth of cooperation over transboundary water resources and so on). The UNDP also generates knowledge from multiple research paradigms, for instance positivism, critical theory and interpretivism/constructivism and more than one theory such as feminisms and neoliberal institutionalism. These research paradigms and theories also inform the UNDP’s and its partners’ actions or agency. So what needs to be questioned or problematised?

We now know that positivism is the dominant paradigm. The UNDP and its partners also use positivism to constitute and inform their agency. Most of the time the positivist ontology of reality is informed by material structuralism (e.g. measuring progress towards the MDGs is a case in point). It is this dependency on positivism or the scientific method that permeates thinking and practice that needs to be questioned and problematised. Science is, after all, based on the commitment of constant critique (Kurki and Wight 2013), and by critiquing the positivist ontology and epistemology through social constructivism could aid in a better understanding of why the UNDP and its partners think and act the way they do. Said differently, why is there this over reliance on positivism, and so what?

A logical answer to this question is that the UNDP is unaware of other research paradigms and theories that could be utilised to inform knowledge generation and subsequently agency. This could also be the case for SIWI. Another explanation is more deep seated and complex.

As already mentioned, people's actions are always in relation to objects. These objects include other actors as well (Wendt 1999). Actions are based on the foundation of the meanings that the objects have for people. The global water cycle is an important foundation for the UNDP to base assumptions upon regarding the importance of water resources. The water cycle is seen as the life blood of the planet and although this is the case, not every human has access to water and sanitation. This 'fact' shows that access to water is a practical problem that needs to be addressed to improve the collective human condition. Added to this meaning is the 'fact' that climate change is aggravating the situation. Climate change is a certainty and this necessitates further action to address the problem. The knowledge around the water cycle and climate change's influence, leads the UNDP towards specific actions. These activities rely on the interaction between the UNDP and scientific knowledge, and more specifically positivism or the scientific method. That said, the UNDP's social practice is based on an objective ontology (e.g. the water cycle and the absolute certainty of climate change) and the positivist epistemology (e.g. the scientific method). The UNDP's identity is that of a rational actor that uses rational science (albeit *a priori*) to inform its knowledge and practices. What this also means is that the UNDP constructs its identity through the intersubjective engagement of two biophysical structures—the water cycle and the earth's climate.

Since it takes a positivist position in generating knowledge, it is possible that the UNDP's identity and interests are informed by the rational scientific community, even those that are not natural scientists, like Jägerskog. This type of 'science' assists in constituting the UNDP's identity and interests. The UNDP's over reliance on positivism stems from the meaning it attaches to water and the global water cycle, climate change and an undesirable collective human condition as well as interaction with the ideas, concepts and assumptions generated by the natural scientific community (e.g. climatologists and meteorologists). That climate change has a negative influence in the water cycle is a widely held belief based on scientifically verifiable evidence (positivism). The UNDP therefore takes a deliberate causal analysis of the problems facing water resources. This analysis is a positivist or empiricist form of causal analysis. What is more, it is not impossible for the UNDP

and its partners to advocate this type of causality (Kurki 2006) where the number of people living without water are, for instance, taken as the foundation of causal analyses and not the causal stories of the circumstances under which they are without water.

According to the UNDP, the negative influence of climate change manifests in competition over water resources and an increasing demand on the resource. In this way, the UNDP constructs a global water governance structure that is inherently conflictual and anarchic,⁵ which is worsened by global climate change. To explain this further, the UNDP perceives the water cycle as the life blood of the planet, which is being negatively affected by climate change and this increases demand for, and competition over water that hampers order and welfare maximisation (e.g. Hobson and Seabrooke 2007). The structure constructed by the UNDP compels it to behave in a number of ways. Firstly, the UNDP acknowledges the real existence of the water cycle, an undesirable human condition, shared water systems and climate change, and its negative impacts on these systems. Secondly, the UNDP is certain about the facts it, and its partners, base their knowledge upon. Thirdly, competition over water in transboundary water systems is a real possibility. The norm for the UNDP is, therefore, to act as an actor that does not question the *real* existence of these phenomena. The UNDP behaves as if it is rational because it relies on *a priori* knowledge foundations and particularly scientific knowledge systems.

Other research paradigms and theories (e.g. critical theory and feminisms) play a role but only to inform or give credence to the undesirable human condition the UNDP explaining. It can be argued that feminist explanatory elements are informing the UNDP's positivist agential role and identity. The UNDP does not take an *a posteriori* stance towards feminism to change gender inequality and emancipate women. Instead, to get rid of gender inequality a positivist theory—integrated water resources management—is invoked to deal with gender inequality in the water sector. This indicates the 'epistemological superiority' of the positivist form of gaining knowledge (Kurki 2006: 197), in that critical perspectives are not the starting point of changing unequal social structures. The biophysical structures of the water cycle and the global climate are also linked to the gender discriminatory structure the UNDP is addressing. The UNDP uses integrated water resources management, linked with gender, as a mode of practice to exercise its power over water managers. It would appear as if the UNDP does not use feminisms as a means to form a participatory paradigm to guide and produce social change. The UNDP has instrumental rationality in that it utilises theories as a way to explain the exact nature of reality. The UNDP does not use these theories as a representation of reality, but as an exact copy of the world. Because of this 'exactness' attached to the social environment, the UNDP further strengthens its identity as a rational actor as well as an organisation compelled to work towards the

⁵Anarchy means the absence of a central authority over states in the international system (Viotti and Kauppi 1999).

betterment of the collective human condition. This is most probably the strongest expectation the UNDP has of itself, and the partners it is working with.

In terms of the interface between knowledge generation and agency, it would appear as if there is a mutually constitutive relationship between the UNDP's expectation of the type of knowledge generated by the epistemic community and the epistemic knowledge influencing the UNDP's instrumental rationality. It is clear that rational theories (e.g. integrated water resources management, adaptive management, resilience and benefit sharing) are influencing the UNDP's view of reality and agency because the theories are put forward by the UNDP and its partners as solutions to address problems confronting global water governance. This particular type of theory also constitute via the UNDP's promotion, the most desirable form of water governance. For the UNDP it would be against the norm to utilise research paradigms and theories other than positivism and integrated water resources management, resilience, adaptive management and benefit sharing. Incidentally, these are all research views and theories that originated from Western, and more specifically, European cultures. It is not harsh to say that through positivism and positivist theories, the global water governance community is informed to function along the lines of a European identity, even if the problems facing water resources and water governance are geographically distinct from the continent. This European epistemic cultural bias comes to the fore in the Kenyan case study where villagers are taught that good governance comes about when you blow the whistle on corrupt practices. In other words, the human practice of whistleblowing is bringing about a socio-political world that has a European blueprint. What is more, the norm of whistleblowing gives the UNDP agency to act in the developing world. Whistleblowing, and adoption thereof as a norm, is in effect a material feature of Europe that is being transplanted onto the developing world through the UNDP's activities.

Jägerskog's (2003) earlier theoretical approach can be described as structural constructivist. This was the case when he researched and reported on transboundary water negotiations in the Jordan River in the early 2000s. Since then, it would appear as if he has taken a more (structural) liberalist perspective (Jägerskog 2013), especially regarding the UNDP and SIWI partnership on transboundary water resources management. By referring to Jägerskog's work, the UNDP constructs knowledge from a specific community and ideational structure.

In my opinion, it is very likely that the UNDP and SIWI is reacting towards Jägerskog's (2003, 2014) neo-liberalist-based research to develop their respective mandates. It is also not impossible that Jägerskog (2014) acts towards the two organisations mandates and wrote from a neo-liberalist perspective. The UNDP and SIWI are, after all, neoliberal institutions. Put differently, the social knowledge generated in this way is informed just as much by the theoretical structure (mandate) of the UNDP and SIWI and Jägerskog's structural theoretical outlook. The social practices of the UNDP and SIWI and Jägerskog, as a social scientist, inform the meanings of the respective actions as well as their mutual interaction. In this interactive mode the actors' intersubjective engagement with their mandatory structure (UNDP and SIWI) and ideational structure (Jägerskog's (2003) knowledge of transboundary water negotiations and his (Jägerskog's 2014) treatment of

the constitutive effect structures can have on actors), inform the UNDP's and SIWI's identities and interests. It is interesting to note that Jägerskog (2003) moved from a structural constructivist approach in the early 2000s to a structuralist neoliberal and neorealist approach when interacting and informing the UNDP and SIWI on transboundary water matters. Be that as it may, the interaction between the three actors' ideational elements/intersubjective beliefs plays an important role in their relationship. These elements and beliefs manifest in a variety of forms such as mandates, concepts (e.g. regimes and hegemonic politicians model) and assumptions (e.g. neoliberalism and neorealism).

Not only does the UNDP have a relationship with a specific part of the epistemic community that informs its instrumental rationality. The emphasis it places on the attainment of the MDGs also gives the UNDP instrumental rationality informing the UNDP's activities to overcome uncertainties around international cooperation. Through measuring and classification, the UNDP reduces uncertainty around the MDGs, or at least their attainment. Uncertainty in the transboundary domain is also substantially reduced by taking on board the structure constituting agent behaviour put forward by Jägerskog (2014). The positivist constructed environment informs the UNDP's identity, perceptions of policy and governance needs (e.g. putting policies in place to reach the MDGs and regimes for transboundary cooperation). That said, positivism or positivist theories trump any other theory like the feminisms and political ecology in constructing the UNDP's identity and interests.

After all said and done, the UNDP and its partners are generating knowledge and operating from a positivist perspective of reality. There is an absolute certainty about the knowledge constituting reality and the actions being implemented to react to this specific reality. By using social constructivism and interpreting the way in which knowledge is generated and actions implemented, shows a mutually constitutive relationship between positivism and positivist theories, the outlook of the UNDP and its partners as well as a specific part of the epistemic community on water governance. Social constructivism showed that this absolute reliance on a single research paradigm and a limited set of positivist theories could be part of the problem the UNDP and its partners are addressing. It is not impossible that the positivist outlook is strengthening a certain top-down dynamic between the UNDP and its partners on developing countries to implement European practices that could be out of kilter with the reality of developing economies. Positivism is, after all, a top-down and structuralist research paradigm in the agency domain and it would appear as if the UNDP (implicitly) insists and relies on the claims made by positivism.

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