An exploration of the way in which values and valuing processes might strengthen social learning in water stewardship practices in South Africa

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Abstract

This qualitative study, focussing on the way in which values and valuing processes might strengthen social learning in water stewardship practices in South Africa, is located within the broader global narrative that describes the scale of human impact on our Earth systems and that is setting humanity on a trajectory that threatens to place us beyond the safe operating spaces called planetary boundaries. For humanity to live within planetary boundaries – one of which is global freshwater use –will take a new way of relating to the environment called Earth stewardship, which calls for a new ethic of responsibility towards Earth systems.

It is at the local level of stewardship within a global approach to water resources management called integrated water resources management that this qualitative study is contextually bound. Two case studies, located in the catchment management forums (CMFs) of the Upper Vaal catchment of Gauteng, South Africa, are used in *an exploration of the way in which values and valuing processes might strengthen social learning in water stewardship practices in South Africa.* The meta-theory of critical realism is used to help explore this relationship between values, practice and social learning. The study uses document analysis, interviews and observation of selected water stewardship practices to identify held and assigned values, and valuing processes and their influence on social learning, and the framing and de-framing processes that occur in social learning oriented towards water stewardship practices.

The study differentiates between held and assigned values and identifies a strong altruistic-held values tendency that characterises forum participants who practice water stewardship in the two case study sites. Most water stewardship practice, identified in the case study sites, manifests as compliance activities in the public – or forum – space, while private-sphere environmentalism is mostly left to the confines of the individual's private household. Lastly, the CMFs seem to have the potential to provide a space for social learning that is not yet maximised.

Drawing from these key findings, the study's major recommendation is that forums that facilitate learning, either using the current CMF structure or creating new opportunities, need to be provided as a conduit for social learning and reflexivity to make the existing boundaries between private and public forms of water stewardship more porous. This social learning may expand social practice and thus strengthen social change processes that expand water stewardship practices.

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I thank both of my supervisors, Professor Carolyn (Tally) Palmer and Professor Heila Lotz-Sisitka profusely for giving me their critical insights, gentle encouragement, patience and most of all, their precious time. I would also like to thank Professor Palmer for her belief in me as a worthy contributor to her vision of a different future for integrated water resources management in South Africa; and the concomitant funding from The South Africa Netherlands research Programme on Alternatives in Development (SANPAD).

It is true that very few theses are the product of one person's efforts and this one is no exception. Therefore, I would like to thank my fellow researchers from the 2011 M.Ed (EE) class and from the Rhodes/Unilever Institute of Water Research; the lecturers and support staff of the 2011 M.Ed (EE) class and Professor Rob O'Donoghue for his challenging comments.

I am also most appreciative of the understanding and support of my work colleagues at the Wildlife and Environment Society of South Africa especially that of Mr Mike Ward, whose approach to the deep disciplinary benefit of post-graduate study to experiential work enabled this study.

My deep appreciation and gratitude is extended to my wife, Keryn. Without her enduring patience, understanding and practical support, I would not have completed this study as confidently as I have. I must also extend a 'thank you', to my family for their understanding.

Finally, this study is dedicated to my Triune God, YHWH, without Whom I would not have the wherewithal to complete this journey of privilege.

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CHAPTER 1: INTRODUCTION TO THE STUDY

1.1 Introduction

This chapter introduces a global environmental context that influences the key objects of the study, viz. integrated water resource management (IWRM), environmental ethics and values, water stewardship, and social learning theory. This broad discussion leads to a description of the research aim and goals, which includes a description of the research question. Following this, an overview of the study is provided.

1.2 The broader context of anthropogenic changes to the Earth system

Rockström and other scientists confirm that we are living on a people-dominated planet (Rockström et al., 2009). They cite population growth and concomitant development pressure, together with the anthropogenic climate crisis, the anthropogenic ecosystem crisis and the risk of potentially disastrous tipping points in the Earth system, as comprising what has come to be known as the "quadruple squeeze" (Rockström & Karlberg, 2010, p. 257).

There is emerging evidence that the scale of anthropogenic impacts is affecting environmental change on a global scale (Rockström et al., 2009). Not only has the scale of human impacts changed but so has the way we view the functioning of the Earth's systems: with an emerging understanding of non-linearity in complex systems, characterised by feedback dynamics (Stirzaker, Biggs, Roux & Cilliers, 2010). These feedback dynamics affect livelihoods of people. This is evident in the experience of changes in climate the world over (International Panel on Climate Change (IPPC), 2013). It cannot be said, any longer, that human actions can be separated from the global commons like climate, global nutrient cycles and the freshwater cycle (Rockström & Karlberg, 2010).

It is said further that if human societies do not learn to deal with the complexity and instability which are characteristics of dynamic ecosystems that are changing rapidly

as a result of our anthropogenic influences, then the conventional technicist paradigms will not succeed (Moberg & Galaz, 2005). Earlier perceptions of ecosystems being stable in nature and thus open to control are proving to be false (Moberg & Galaz, 2005). In fact, the emerging evidence is of a world which is complex in nature, and when stressed, can shift, quickly, from a seemingly steady state to one of instability, which, of course would be difficult to control (Moberg & Galaz, 2005). Thus, the days of living with predictable and resilient ecosystems that self-repair after stresses are over (Moberg & Galaz, 2005). As this complexity intensifies, social resilience to these changes becomes eroded too, thus increasing the vulnerability of society to external shocks (Steffen, 2011). This trajectory is leading us into a period of time termed the Anthropocene, where human activity constitutes the dominant driver of change to the Earth system, rivalling global geophysical processes (Rockström et al., 2009; Steffen et al., 2011).

However, it is important for humanity to note what Rockström et al. (2009, p. 3) call the “non-negotiable planetary preconditions” that humanity must learn to live within if we are to avoid catastrophic global environmental change. These “planetary preconditions” or safe operating spaces are termed planetary boundaries by Rockström et al. (2009).The planetary boundaries approach focuses on the biophysical processes of the Earth system that determine the self-regulating capacity of the planet. If the boundaries are transgressed, non-linear changes in the functioning of the Earth system at a global scale may be triggered (Rockström et al., 2009). Rockström et al. (2009) argue that, irrespective of people’s preferences and values, the thresholds in key Earth system processes exist. However, it can also be said that our choices and actions, driven by values amongst other elements, will determine how close we are to the critical thresholds involved, or even drive us to cross them.

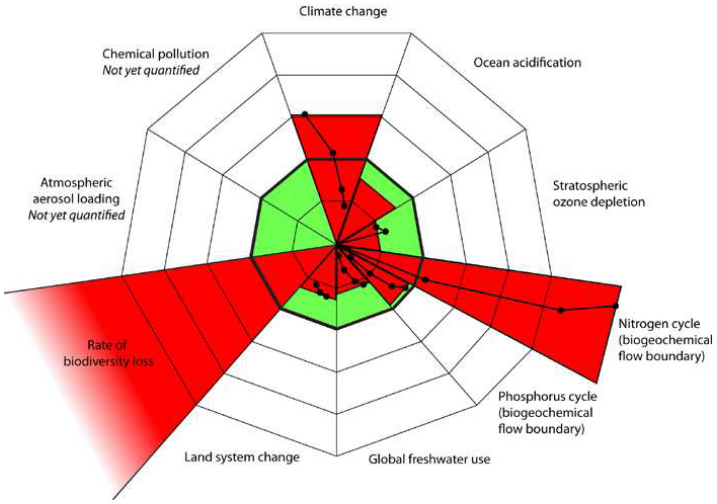

Diagram 1.2. The Earth system's Planetary Boundaries (Rockström et al., 2009)

One of the nine identified planetary boundaries is global freshwater use.

What does it mean to learn to live within what is said to be "non-negotiable planetary preconditions"? Chapin et al. (2011, p. 45) suggest that we need "a dramatic change in society's relationship with the environment to avoid irreparable damage to Earth's life-support systems". This change is suggested to take different forms, from more technicist interventions that try to manipulate parts of geophysical processes, to "becoming active stewards of our life-support system" (Steffen et al., 2011, p. 739). With the knowledge of our impact (potential and realised) comes a responsibility to change our relationship with the Earth system to ensure that humanity develops in a respectful and humane manner in a global environment that supports human development. Steffen et al. (2011) attach this responsibility to a concept they term planetary stewardship, whereas Chapin et al. (2011, p. 49) attach "an ethic of responsibility for planetary life support systems" to a concept they term Earth stewardship. The authors (Chapin et al., 2011; Steffen et al., 2011) deem stewardship a necessary intervention to keep humanity within those planetary boundaries. Like Rockström et al. (2009), Chapin et al. (2011) bring stewardship down to the level of individuals in a social context and emphasise the importance of addressing not only values, but norms and their relationship with behaviour that aligns with Earth or planetary stewardship. It is also interesting to note that

stewardship is an important component of one of Future Earth's[1] focal research themes, *Global Development.*

This study is located at the level of stewardship, i.e., where values and stewardship are engaged in at the level of the individual, who is located within a broader community and social context.

This localised view of stewardship is of interest to me because a) I am an employee of a national, environmental non-government organisation (NGO) called the Wildlife and Environment Society of South Africa (WESSA) which *had* as its mission *promot[ing] public participation in caring for the Earth*, and a particular strength in environmental education; and b) I am a champion of water resource management in South Africa. WESSA's mission is essentially a stewardship mission in that it has been striving (and will continue to do so) to engender in the public a sense of responsibility, accountability and guardianship in their approach to environmental issues.

In the past (2005-2013) WESSA's staff participated in many of the country's catchment management forums (CMFs) enabling and catalysing integrated water resource management (IWRM) functions where appropriate and performing a watchdog function where necessary. Recently, however, this function has begun to change with the evolution of WESSA from a traditionally membership-based and managed organisation to a professionally-managed and project-focussed organisation that must ensure that all activities are paid for by project funding. Attendance at CMFs simply does not attract project funding.

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[1]Future Earth is the new international initiative on Earth system research for global sustainability conceived by an alliance of international research organizations(International Council for Science, the International Social Science Council, the Belmont Forum of funding agencies, the United Nations Educational, Scientific and Cultural Organisation (UNESCO), the United Nations Environment Programme (UNEP), the United Nations University (UNU) and the World MeteorologicalOrganisation as an observer). The goal of Future Earth is to develop the knowledge required for societies worldwide to face challenges posed by global environmental change and to identify and implement solutions and opportunities for a transition to global sustainability (Future Earth Research Framework, 2013).

However, WESSA is currently embarking on a citizen science approach to water resource management that would enable engagement with the CMFs through a project-orientated approach thereby a) enabling more focussed attendance, and b) engaging in yet another stewardship practice that also ensures a social learning component.

My own experience attending and chairing two forums influenced the manner in which I was trying to understand how people were engaging in IWRM and, then, trying to consider what motivated that engagement. While trying to understand this perspective, I was also asked to write a national water resource strategy for WESSA. This study was an attempt to deepen my understanding of IWRM activities so as to influence effective public participation and social learning of the public (*promote public participation in caring for the Earth*) in IWRM through a national environmental NGO's water resource strategy.

1.3 Introducing the study

This study is *an exploration of the way in which values and valuing processes might strengthen social learning in water stewardship practices in South Africa.*

Freshwater is crucial to the survival of both bio-physical and socio-economic systems. However, it is becoming increasingly difficult to manage because of the scale of impact humans have on water flow and water quality and because of the complexity of the ecosystems within which water is embedded (Moberg & Galaz, 2005). This complexity exhibits characteristics like non-linear interactions and feedbacks between components, which give the system a degree of unpredictability (Stirzaker et al., 2010).

The complexity spawns "wicked problems" (Rittel & Webber, 1973). Ackoff, in Rittel and Webber (1973), suggests that the term "wicked problems" can be defined when the boundaries of messes – clusters of interrelated or interdependent problems of organized complexity, which cannot be solved in relative isolation from one another – expand to include socio-political and moral-spiritual issues. They have been termed wicked because there is no real end to their solution (Shindler& Cramer,

1999).These problems are so variable and uncertain that they can lead to a number of legitimate outcomes and so there is no point at which the problem is finally "solved" (Palmer, 2010). For these wicked problems to be negotiated within the complexity of the water sector, a new relationship between science and society needs to be shaped (Rogers, 2006). This relationship and its consensus-driven decision-making must be collaborative, enhance participation, and embrace values in a continuous and adaptive cycle of planning, deciding, doing, and learning (Rogers, 2006).

The concepts of collaboration and participation find their home in the discourse of IWRM, an approach that seeks to ensure that the world's water resources are managed sustainably, while also taking the economic, social and environmental needs of what has come to be known as one interacting social-ecological system into account (Pollard, Biggs and du Toit, 2008). This integrated approach, as described in *A Handbook for Integrated Water Resources Management in Basins* (GWP, 2009),

> co-ordinates water resources management across sectors and interest groups, and at different scales, from local to international. It emphasises involvement in national policy and law making processes, establishing good governance and creating effective institutional and regulatory arrangements as routes to more equitable and sustainable decisions (p. 10).

Though much of the discourse on IWRM has been located within a northern hemisphere context where water infrastructure is developed (Merrey, 2008), it is also pertinent to South Africa where IWRM has been striving to gain traction since the mid- to late 1990s (Jonker, 2007).

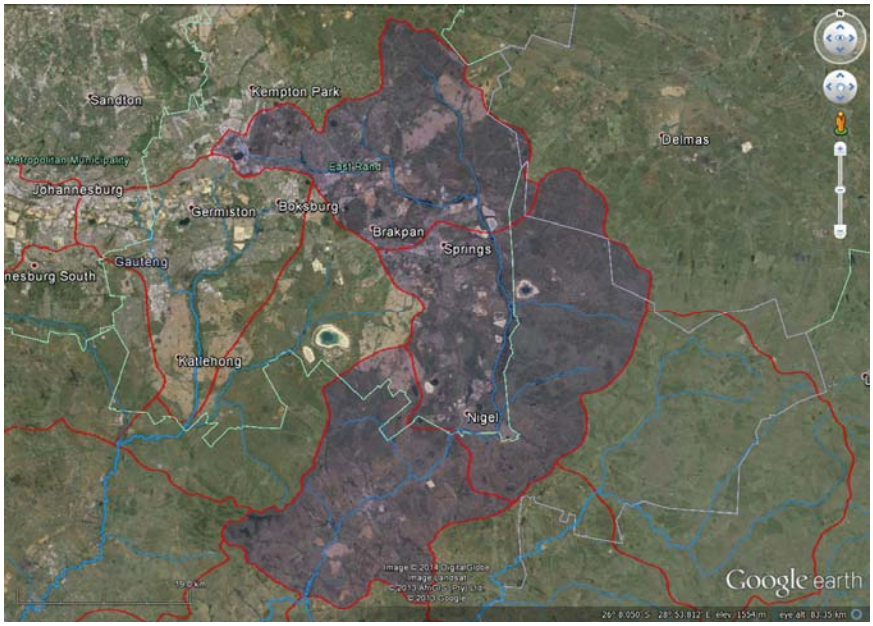
IWRM is given credence by, and provides the basis for, the legislative framework governing water management in South Africa. The legislative framework is embodied in the National Water Act (Act 36 of 1998) (Republic of South Africa, 1998) and the Water Services Act (Act 108 of 1997). However, for the purposes of this study, focus will be on the National Water Act (NWA) because this legislation is underpinned by

the principles of IWRM, and best describes the framework for the utilization, development and protection of South Africa's water resources.
Supported by this legislation is an *institutional* framework that consists of the Department of Water Affairs and its appointed Minister; the catchment management agencies which are responsible for the implementation of catchment management strategies on behalf of the Department, and water-user associations who "operate on a restricted localised level, and are in effect co-operative associations of individual water users who wish to undertake water-related activities for their mutual benefit."(Preamble of Chapter 8 of the NWA.) Attached to the development of the catchment management agencies are CMFs which play a critical role in the initiation of public participation processes for the formulation of a catchment management agency. These CMFs are non-statutory in nature and are comprised of voluntary stakeholders who have water-related interests in the catchment.

The valuing, doing and learning of this study is contextualised in two CMFs located in the upper Vaal Barrage Catchment.

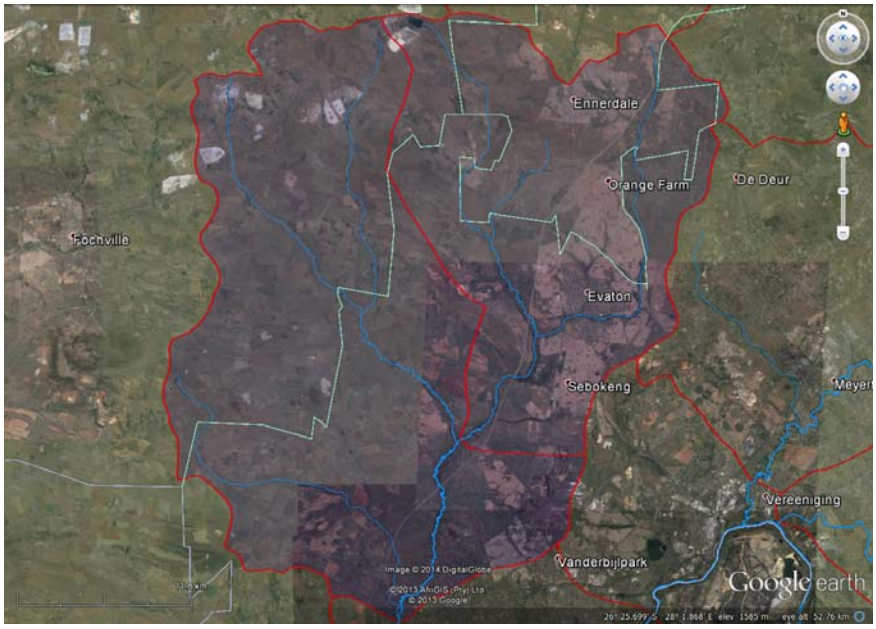
From very small beginnings with only a few people meeting to discuss catchment-specific water resource issues, the forums of the Vaal Barrage Catchment have evolved over 15 years into the current structures that exist today (Rand Water, 2010).

The Blesbokspruit Catchment Management Forum covers the eastern part (see Map 1.1) of the Vaal Barrage catchment. The northern part of the Blesbokspruit catchment is predominantly residential, industrial and mining in nature. The middle part of the catchment comprises the Ramsar wetland from Springs to Nigel whilst the southern part draining Nigel and Heidelberg is predominantly agricultural in nature.



Map 1.1.Blesbokspruit Catchment Management Forum location (shaded in purple)

The Rietspruit Catchment Management Forum covers the south-western part (see Map 1.2) of the Vaal Barrage catchment. The northern part of the Rietspruit catchment is predominantly agricultural in nature with some mining activities present; the formal and informal residential areas of Lenasia and Sebokeng in the central region with the large Vanderbijlpark industrial hub to the south. The towns of Vereeniging and Vanderbijlpark border the Vaal River Barrage to the south of the catchment.



Map 1.2.Rietspruit Catchment Management Forum location (shaded in purple)

These catchments are home to a number of stakeholders from a diversity of sectors. Different levels of government (local, provincial and national) participate in various ways, as do mining and industry, civil society, parastatals, consultants, water treatment experts, and non-governmental organisations.

Participation in the CMFs takes many forms, one of which is water management – quality and quantity – practice. Some of these practices could be defined as water stewardship practices where notions of responsibility, accountability in the duty of care, and sustainability (for future generations) are embedded in a certain implicit (or explicit) morality (Welchman, 2012). Underpinning this morally-orientated notion of stewardship are environmental ethics, which have helped shape the public and the academic community's understanding of environmental issues, including the nature and importance of values relating to the natural environment (Reser & Bentrupperbäumer, 2005).

There are many interpretations or definitions of the term "values" because of its association with the social sciences and with the economic perspectives of value or values. However, there are elements which seem common to most definitions of values: "Values are specific modes of conduct or guiding principles that influence our choices and actions and that are relatively enduring" (Seymour, Curtis, Pannell, Allan & Roberts, 2002, p. 142). It seems that different socialisation processes shape different types of values or the valuing process as they are assigned to specific objects (Kollmuss & Agyeman, 2002; Seymour et al., 2002). This notion of assigning values to specific objects provides a platform for the discussion of two particular types of values that are explored in this study: *Held values* are defined as "ideas or principles that people hold as important to them and are generally highly abstract, generic and conceptual, but guide personal action" (Seymour et al., 2002). For example, people may hold values about water as a generic concept.*Assigned values* are about a preference relationship between a person and an object, in respect of their held values, which results in different objects being of different importance or worth (Brown, 1984). For example, people may have held values about water in

general but may assign this value to a particular dam or lake that they were baptized in.

Kollmuss and Agyeman (2002) suggest that values, in addition to other internal factors such as motivation, environmental knowledge, awareness and attitudes, influence pro-environmental behaviour. There are several frameworks which attempt to explain pro-environmental behaviour and/or orientations (Dunlap, Van Liere, Mertig & Jones, 2000; Vaske, Donnelly, Williams & Jonker, 2001). The Value Belief Norm (VBN) theory takes values, and especially held values, strongly into account as it explores the relationship between values, beliefs, norms and pro-environmental behaviour (Reser & Bentrupperbäumer, 2005). The VBN framework offers a simple and useful way to categorise held values (biospheric, altruistic and egoistic) and is a framework which allows an analysis of how held values influence the formation of assigned values (Seymour et al., 2002).

Valuing processes and how values come to be shaped and formed in particular historical and societal contexts are not dealt with by the VBN framework, which is important in order to counter the critiques of values-based behaviour change theories being narrowly focussed on individual psychology. Therefore, it is important to investigate the role of social learning in the *valuing process* or in the *process of assigning values, which then come to be held,* and perhaps later, *change*.

Social learning can be defined broadly, but for the purposes of this study Wals' (2007) definition is used:

> [Social learning] takes place when divergent interests, norms, values and constructions of reality meet in an environment that is conducive to learning...[and] takes place at multiple levels i.e., at the level of a group or organisation or at the level of networks of actors and stakeholders [such as a catchment management forum]. (p. 18)

This study focusses on the element of "constructions of reality" where the notion of de-constructing and re-constructing (or de-framing and re-framing) values, norms and interests forms the first important step of a transformative social learning

process (Wals & Heymann, 2004). Framing and de-framing is suggested to enable a change of behaviour because of an acquisition of new information, or the exploitation of existing information, which allows testing of values, and if warranted, re-thinking of values and realignment of the concomitant behaviour (Wals, 2007).

Most traditional concepts of learning are based on the assumption that learning takes place as an individual process, and is separated from our daily activities of living in the world (Glasser, 2007),whereas, social learning is viewed as learning that takes place in the context of us living in the world while participating in social practices with others. It therefore sees learning as a social experience reflecting the deeply social nature of human beings.

1.4 The research aim and goals

Because of the wicked problems (Rittel & Webber, 1973) presented in Section 1.3, science and society need to engage in new practices and knowledge generation so that we "leave enough and as good" for others (Brown, 1998). The exploration of a new relationship with the biophysical world, from the context of values, may prove meaningful to an environmental non-governmental organisation (NGO) seeking to improve water stewardship practices amongst members of the public. Thus, the aim of the study, through examining valuing processes, and expressions of these in held values, is to contribute to the understanding of social learning for social change within a broader IWRM framework so as to inform and, hopefully, influence the practice of water stewardship amongst the public of South Africa.

Therefore the research questions are:

1. **How do held and assigned values influence water stewardship practices of the public in two Vaal Barrage catchment management forums?**
2. **How is social learning embedded (or not) in the process of shaping values within water stewardship practices of people attending catchment management forums?**

The goals of the research, therefore, are to use specific case studies to:

1) understand the held and assigned values of selected members of the public in relation to water,

2) understand how held and assigned values (and the process of assigning values) influence water stewardship practices,

3) understand what social learning is embedded in the process of assigning values in water stewardship practices (e.g., what framing and re-framing processes occur, and what new knowledge is shared, or not), and

4) understand what social learning results from values-oriented water stewardship practices (e.g., is there evidence of changed practice and awareness at a community level?), if at all.

With a view to informing:

5) how more sustainable water stewardship practices can be supported by members of the public.

1.5 Overview of the chapters

The study comprises six chapters that are designed to be complementary and thus ensure a coherent narrative throughout the thesis. Several appendices and diagrams that relate to certain sections of the study have been included.

Chapter two provides a review of relevant literature pertaining to the key objects of this study: IWRM, environmental ethics and values, water stewardship, and social learning theory. The chapter provides both international and national perspectives of IWRM, with a description of the national institutional and legislative framework accompanying the latter. Understanding both the national perspective of IWRM and the accompanying legislative framework provides a comprehensive context for a discussion about water stewardship practice, the origins of the word, “stewardship” and the virtues attached. These virtues provide a springboard for a discussion of environmental ethics which describes two seemingly contradictory meta-ethical positions: anthropocentrism and non-anthropocentrism. This discussion leads into an exploration of values and how they relate to Value Belief Norm theory, which is pivotal to the study as it is used to explain pro-environmental behavior associated with water stewardship practice. The discussion about values introduces a broad

understanding of environmental education, acknowledging the great importance of values. Environmental education leads into the theory of social learning, which is described as fundamental to initiating a transformation of thinking needed to overcome the gap between sustainability that many in society are calling for, and what is actually happening in practice. The first step in this transformative process is to re-construct (or re-frame) and de-construct (or de-frame) specific values, interests or norms.

Chapter three begins by explaining the research orientation as a critical realist ontological and epistemological under-labourer guiding this study. From this base, the case study is presented as a research methodology employed to investigate a contemporary phenomenon within its real-life context. This articulation then leads to a description of the research methods employed to collect the data. The chapter is divided into a theoretical presentation of the research methods and then a practical presentation of the methods used. A presentation of the sequence of data analysis follows, which includes an exploration of the content analysis and categorising, displaying data and interpreting and drawing conclusions. The chapter concludes with a discussion about trustworthiness and ethics.

Chapter four presents the data in three major sections using the same sub-categories for each section. The first section presents the data associated with the Blesbokspruit Catchment Management Forum. The second section presents data associated with the Rietspruit Catchment Management Forum and the third section presents the data associated with a third group comprising people who are not participants of any CMF whatsoever.

Chapter five discusses the findings of the study with reference to the global and local context, drawing on literature where necessary. It focuses on the key objects of the study, namely, values, water stewardship practices and social learning. Chapter five also provides a deeper analysis of the findings presented in chapter four. The discussion is structured according to a series of analytic statements that address the research questions (see Section 1.4).

Chapter six contains a summary of the key findings and makes recommendations from the study. The recommendations point to the possibility of opening up social learning spaces utilizing a component of an existing institutional arrangement, established to foster water stewardship practices, which is the CMF. While the study does not claim to generalise, it may offer useful insights that can be used in other IWRM contexts in South Africa.

1.7 Conclusion

This chapter has provided a short global context of the growing environmental crisis as postulated by the theory of planetary boundaries, which is a theory that supports living within the safe operating space for humanity in respect of the functioning of the Earth system. This perspective was preceded by a short view on the complexity of these Earth systems that are characterised by non-linear responses and feedback dynamics; and it was succeeded by a proposal for a human intervention called planetary or Earth stewardship that challenges people to live within that safe operating space called planetary boundaries. This introduction to stewardship allowed me to position myself in this study as an employee of a national environmental NGO which has a stewardship-orientated mission, seeking to make a difference in water resources management.

This study was introduced by way of stewardship. The introduction presented a synoptic view of the study's key objects: IWRM, environmental ethics and values, water stewardship, and social learning, with particular emphasis on framing and de-framing as the first steps in the social learning process.

Two research questions followed with a number of research goals that this study endeavours to meet. The chapter concluded with a short overview of chapters' two to six.

CHAPTER 2: IWRM, STEWARDSHIP, ETHICS AND SOCIAL LEARNING

2.1 Introduction

This chapter provides the theoretical grounding for this study and begins with a short, contextual description of IWRM from an international perspective thus providing a framework for a more focussed explanation of South Africa's water resources management regime so as to underpin the first of this study's key objects: water stewardship practice (Section 2.3.2). Thereafter, the other important terms associated with values theory (Section 2.4.2) and social learning (Section 2.5.2) theory are appraised within the broader contexts of environmental ethics and environmental education, respectively. Finally, the chapter returns to water stewardship practice and how this practice is guided by components of environmental ethics and environmental education (Section 2.6). The theory in this chapter provides the grounding for the research methodology, data analysis and the lenses through which the data are analysed thus enabling the presentation of the key recommendations at the end of the study.

2.2 Integrated Water Resources Management

The water cycle, also known as the hydrological cycle, describes the continuous movement of water on, above and below the surface of the Earth. Water moves from one place to another by means of physical processes of evaporation, evapo-transpiration, condensation, precipitation, and infiltration, achieved through three phases: liquid, gas and solid (South Africa Environment Outlook, 2007). Water pervades all of life. Yet, according to Funke, Oelofse, Hattingh, Ashton and Turton (2007), our world's freshwater resources are becoming more and more pressurised because of increased demand from an expanding population, and industrialised economic activity which, increases the use of freshwater and causes water pollution. Moreover, little attention – until recently – has been paid to the social, economic and especially political nature of water resources management; instead a mainly technocratic approach has been most commonly applied.

2.2.1 A Global Overview

The poet Mazisi Kunene once said: “From water is born all peoples of the Earth” (DWAF, 1997, p. 1). So, from a human perspective, water can be viewed as a resource for livelihoods and from a broader ecological perspective, it can be viewed as a resource for a healthy, functioning ecosystem (South Africa Environment Outlook, 2007). These different perspectives need to be approached in an integrated manner to ensure that the world’s water resources are managed sustainably, as we take into account the economic, social and environmental needs of what has come to be known as “one interacting social-ecological system” (Pollard, Biggs and du Toit, 2008). This integrated approach, as described in *A Handbook for Integrated Water Resources Management in Basins* (GWP, 2009),

> co-ordinates water resources management across sectors and interest groups, and at different scales, from local to international. It emphasises involvement in national policy and law making processes, establishing good governance and creating effective institutional and regulatory arrangements as routes to more equitable and sustainable decisions (p. 10).

This approach is known as Integrated Water Resources Management (IWRM) and it *seems* to be a new and dominating discourse with regard to management of the world’s water resources (Orlove & Caton, 2010). However, Merrey (2008) paraphrases Molle’s historical overview to demonstrate that IWRM is by no means new and modern, but rather, it has been around, in some form or another, for centuries. It was only in the 1990s that it re-emerged as a dominant paradigm (Biswas, 2004; Merrey, 2008). Up until then, water development used a mainly single-sector approach (Merrey, 2008).

The current thinking with regard to an integrated approach to water resource management is well-articulated in the Global Water Partnership (2009) definition of IWRM:

> A process that promotes coordinated development and management of water, land, and related resources in order to not only maximise economic and social welfare but also ensure equity and sustainability (p. 18).

The principles inherent within this definition of IWRM originate from the International Conference on Water and the Environment held in Dublin in 1992, which later became known as the "Dublin Principles". According to Funke et al. (2007, p. 1239), the four water-related principles initiated a shift from a predominantly engineering approach to water to an integrated approach which takes into account water resource protection, and water resource use practices that include water conservation and water demand management measures. The four principles are:

1. Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment.
2. Water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels.
3. Women play a central part in the provision, management and safeguarding of water.
4. Water has an economic value in all its competing uses and should be recognised as an economic good.

While the "Dublin Principles" sound impressive and the Global Water Partnership's (2009) definition sounds all-encompassing, there are many (Biswas, 2004; Jonker, 2007; Funke et al., 2007; Merrey, 2008) who argue that it is the *lack* of a *clear* definition of IWRM that is one of the predominant causes of IWRM's failure to take traction. In fact, Biswas (2004) argues that the Global Water Partnership's (2009) definition is filled with "lofty phrases [which] have little practical resonance on the present, or on the future water management practices" (p. 249). Another reason suggested for the lack of IWRM traction is that the integration required by IWRM is difficult because the concept of integration does not take into account the political nature of water management: provision of water to one party means taking it away from another (Biswas, 2004; Merrey, 2008). Regardless of the dissenting voices that dispute IWRM, there are others, like Funke et al. (2007) and Van der Zaag (2005) who suggest that we should continue to strive towards the ideal of IWRM, even

though it is difficult to attain. Their reasoning is that IWRM leads to the management of water resources in a holistic way.

Though much of the discourse on IWRM has been located within a northern hemisphere context where water infrastructure is developed (Merrey (2008), it is pertinent to some of the southern hemisphere countries too; perhaps even more so.

2.2.2 IWRM in South Africa

The political transformation which occurred in the mid-1990s afforded the then Department of Water Affairs and Forestry an opportunity to transform the water sector in South Africa (Ashton et al., 2006; Jonker, 2007). In the space of two short years, the country adopted 28 water law principles contained within the White Paper on a National Water Policy for South Africa (Department of Water Affairs and Forestry, 1997); a water policy (National Water Policy for South Africa (Department of Water Affairs and Forestry, 1997)) was launched and the new water act (National Water Act (No. 36 of 1998)) was promulgated. Despite Jonker (2007) suggesting that IWRM provided the platform for this transformation, IWRM was not explicit in either the preceding water law principles or in the subsequent National Water Act. It was not until the publication of the National Water Resource Strategy in 2004 that the term “Integrated Water Resources Management” was used. (The definition of IWRM within this Strategy mirrors the GWP definition.)

Fifteen years on, in 2013, it seems as though South Africa is still coming to terms with the concept of IWRM, and certainly the practice of IWRM, which is defined by Lotz-Sisitka and Burt (2006) as a

> [M]anagement approach, which requires the active participation of multiple parties across multiple levels, in many different ways...IWRM requires a change from single-sector, centralised, delivery-orientated management to sector-integrated, locally focused management, which incorporates the interests of diverse stakeholders (p. 9).

Many of South Africa's difficulties with IWRM are mirrored in the international debate already mentioned, but some are more particular to this country, such as the fragmentation of land and water management in South Africa as indicated by Funke et al. (2007). It is likely that the divide created by separate environmental, water and land-use legislation and administration and their concomitant assignment of powers to national, provincial and local government structures will continue to have a negative impact on IWRM implementation. Funke et al. (2007) also suggest that if IWRM is not considered during planning there will be little hope of integrated management in practice. In fact, IWRM will have serious implementation problems if a lack of planning integration continues – especially if exacerbated by a high turnover of technical national, provincial and municipal staff, shortages of institutional memory and very little skills transfer or succession planning (Funke et al.,2007).

In conclusion, there is much work to be done to see IWRM successfully implemented within South Africa's water management areas (areas that follow catchment or sub-catchment boundaries and do not follow provincial boundaries (DWAF, 2012)), particularly as a result of its institutional arrangements.

2.3. The South African water sector: An institutional framework

2.3.1 The water sector's institutional arrangements

The legislative framework regarding water management is embodied in the National Water Act (Act 36 of 1998) and the Water Services Act (Act 108 of 1997). However, for the purposes of this study, focus will be on the National Water Act (NWA) because this legislation is underpinned by the principles of IWRM, and best describes the framework for the utilization, development and protection of South Africa's water resources.

A synoptic view of the institutional framework or arrangements of water resource management institutions is described as follows: At the first tier is the Department of Water Affairs and its appointed Minister who is responsible for the effective management of water resources, including the establishment of a national resource

strategy (DWAF, 1998); tier two involves the establishment of catchment management agencies which are responsible for the establishment and co-ordination of the implementation of catchment management strategies within water management areas (DWAF, 1998); and tier three is the establishment of water user associations who "operate on a restricted localised level, and are in effect co-operative associations of individual water users who wish to undertake water-related activities for their mutual benefit" (RSA, 1998, p. 98). The NWA makes provision for water management institutions, of which water user associations and catchment management agencies are examples, to enable the facilitation of stakeholders' participation to ensure the implementation of IWRM within designated water management areas (the boundaries of these water management areas have recently been amended so as to reduce their number from 19 to 9) (DWAF, 2012). However, there is evidence that broad stakeholder participation, envisioned to engage with the current institutional framework, is not occurring as it should be (Lotz-Sisitka &Burt, 2006).

Lastly, non-statutory bodies called CMFs play a critical role in the initiation of a public participation process for the formulation of catchment management agencies, and provide an "institutional mechanism to facilitate on-going participation of stakeholders with diverse interests." (Water Management Institutions Overview, undated, p. 23) These CMFs are defined by the Department of Water Affair's Final Report – phase one (2001), as follows:

> [they] are voluntary, non-statutory associations of various stakeholders with an interest in a particular water resource-related concern or a particular sub-catchment area. They:
>
> 1) provide an important mechanism for stakeholder communication, participation and consultation with DWAF and/or a catchment management agencies
> 2) are critical during the process of establishment of catchment management agencies
> 3) provide an important mechanism for stakeholder involvement after the catchment management agency has been established.(p. 25)

In theory, the institutional arrangements seem aligned but in reality there is misalignment and complication (e.g., the Department of Water Affairs' decision to reduce Water Management Areas from 19 to 9), which doesn't serve water resources management in terms of equitable access, effective development, regulation and stakeholder accountability (DWAF, 2012). Regardless of the misalignment, CMFs have the potential to bring water resource management close to the people and so enable local knowledge to be mobilized around care of the catchment.

2.3.2 Water stewardship practice within an institutional framework – a catchment management forum approach

CMFs comprise stakeholders from many sectors and so it is important to view stakeholder involvement and participation in a CMF (of a sub-catchment) as part of an integrated whole, i.e., as part of the greater catchment. This notion of integration comes from the realisation that the different sectors, like agriculture, mining and industry, cannot manage the water in the sub-catchment independently of one another and that they are also all dependent on nature's processes (Jonker, 2007). However, it is important that each of the sectors practice IWRM in a way relevant to that sector but at the same time locating those practices within a common framework. Thus, Van der Zaag, cited in Jonker (2007), suggests that IWRM be used as a *framework* or an *approach* to guiding water management practice. The White Paper (Department of Water Affairs and Forestry, 1997) asserts three objectives of such a framework or approach, which appear to mirror some of the language of stewardship (see below). Jonker (2007) phrases these objectives as to:

> 1. ensure access to water for basic human needs, to the economic opportunity afforded by water, to water for spiritual and cultural needs.
> 2. enhance equity by taking special care to attend to the needs of the vulnerable in society.
> 3. achieve sustainability in three spheres namely, ecological, social and financial. (p. 1261)

Though integrated water management practice captures the notions of equity and sustainability in the aforementioned objectives, stewardship takes these notions further by relating these notions to future generations, thus adding another component called accountability (to future generations).

2.3.3 Stewardship

Stewardship has roots in both religious and secular beliefs that human beings do not own the Earth but hold it in trust (Faruqui, Biswas & Bino, 2001; Attfield, 2003), not least for the sake of future generations. The fact that stewardship has roots in religion is used as an argument by some that it is "speciesist", sexist and/or anthropocentric (Welchman, 2012), and thus it is rejected outright as a religious orientation to nature that has no bearing on secular environmental ethics. However, Brown (1998, p. 18) maintains that stewardship "welcomes believers, agnostics, atheists, economists, and even those who think the whole discussion about divinity is quaint, perhaps irrelevant." This appeal of stewardship, as suggested by Brown (1998), is consolidated by the word used to explore this concept: guardianship (Welchman, 2012), which denotes the pursuit of the constraints of personal interest; responsibility and accountability in the duty of care (Brown, 1998; Attfield, 2003) and the exercise of certain moral virtues (Welchman, 2012). These terms invite the use of another language to explain the human role in relation to the environment; a language that replaces "ownership" and "conquest", which were used as an excuse to dominate the Earth's resources (Welchman, 2012). This domineering approach is out of keeping with stewardship, which is about respecting what is held in trust (Attfield, 2003). Respect of what we hold in trust ensures an understanding and appreciation of the impacts of our actions, while at the same time searching for the best possible options to mitigate these impacts (Peachey, 2008).

Stewardship is also linked to landholdings in the Christian Bible, which speaks of the Earth as belonging to God (Bible, 1997, Psalm 24), while the land is described in Leviticus 25 (Bible, 1997) as leasehold. Similarly, secular writers deny that current generations can own the globe and so suggest that it is an inheritance for the next generations (Attfield, 2003). These notions of responsibility and answerability can be

relevant to a belief in God or, from a secular perspective, relevant to the present generation of humanity (Attfield, 2003).

2.3.4 Practice

The activities comprising stewardship – steeped in a value-laden discourse described by words such as guardianship, responsibility, accountability and answerability – are described by Schatzki (1996) as “teleoaffective structures” of practice. Kemmis and Mutton (2012, p. 197) elucidate this term by explaining that “‘teleo’ connotes ‘purpose’ and ‘affective’ connotes the ‘association of particular kinds of values, emotions and commitments with various practices of different kinds’”. One could say that this explanation of practice fits the Aristotelian definition of praxis which is “action that is morally committed, and oriented and informed by traditions in a field” (Kemmis, 2010, p. 9) or as Kemmis and Mutton (2012) explain it: “informed, committed action” (p. 188). Drawing from Dunne, Kemmis (2010) suggests that praxis is a process of self-formation, inseparable from the person conducting it, and that this self-formation occurs in both an individual and collective sense, i.e., praxis, says Kemmis (2010), "forms the person, the identity, of the one who acts and the communities of which they are part" (p. 21). This notion of community as "the site of the social" (the title of Schatzki’s 2002 book) is expanded by Kemmis (2010) when he says that being human is the participation in a communal social life that is rich in meaning and value because the individual has

> cultural-discursive terms in which to interpret themselves and their world, material-economic activities through which to meet physical and social needs and desires, and social-political commitments and obligations that provide social solidarities in which individuals exist for others as well as for themselves (p. 21).

In other words, Kemmis (2010) is saying that particular types of practices use particular language (sayings), particular kinds of activities (doings) and particular kinds of relationships between people and the natural world (relatings). All this, bundled together in particular ways, makes them particular practices that Kemmis calls practice architectures.

A question that arises then is, “what do stewardship practices look like in an IWRM context?” Peachey’s (2008) limited view of stewardship practice, based on the reduce, reuse and recycle framework, may assist an understanding of how stewardship practice applies to IWRM. For example, if we select “reduce” water use as our stewardship practice in a particular catchment context, then agriculture, for example, would need to engage in sayings, doings and relatings to investigate technologies like drip irrigation; industry would need to engage in sayings, doings and relatings to explore innovative, water-efficient production methods; national government would have to engage in sayings, doings and relatings to strengthen enforcement instruments to control water demand management; local government would need to engage in sayings, doings and relatings to identify and manage their municipal losses better; and civil society would engage in sayings, doings and relatings to mobilize civil society behaviour change with regard to water conservation methods. Even though, in this example, stewardship may have different levels of understanding (or sayings) of the stewardship discourse, different levels of doings (skill), and different kinds of relationships to each other and to different parts of the environment, the practice - stewardship - "still hangs together" (Kemmis & Mutton, 2012).This seems to demonstrate that the practice is not just individually but collectively produced (Kemmis & Mutton, 2012).Where these practices and their concomitant knowledge bases converge in “action that is morally-committed, and oriented and informed by traditions in a field”, there we have stewardship praxis. Otherwise our common practice continues under the guise of stewardship but devoid of the values fundamental to the definition of stewardship (Welchman, 2012).

2.4 Environmental ethics

2.4.1 Exploring environmental ethics

Supporting the notion of stewardship is a diversity of environmental ethics which Kronlid and Öhman (2013) categorise into two parts, reflecting developments in environmental ethics from the 1970s until now. These two parts are Value-orientated Environmental Ethics and Relation-orientated Environmental Ethics. Kronlid and Öhman (2013) make this distinction which reflects existing distinctions between the intrinsic value discourse and radical ecology. For the purposes of this study, Value-orientated Environmental Ethics was focused on, using the further sub-categories of

Value-orientated Anthropocentric Environmental Ethics and Value-orientated Non-anthropocentric Environmental Ethics.

Since the 1970s the environmental ethics field has seen a diverse range of research involving feminist and gender research, moral philosophy and ethics, ecotheology and ecocentrism to name but a few (Kronlid & Öhman, 2013). It was during this time that the intrinsic value (or Value-orientated Environmental Ethics) discourse came to the fore in prominent academic journals as *the* environmental ethics. The intrinsic value debate concerns the question of whether non-human nature can be said to have intrinsic as well as instrumental value. This intrinsic discourse led to environmental ethics being regarded as divided into two main and contradictive meta-ethical positions: anthropocentrism vs. non-anthropocentrism (Kronlid & Öhman, 2013). Within these two seemingly contradictory positions are a diversity of environmental ethical stances.

Ethics are deemed to be the standards by which behaviours are evaluated for their morality – their rightness or wrongness (Chippendale, 2001). In the context of environmentalism, a tenet of *environmental* ethics is "concerned with defining the human position and responsibilities to nature" (Holden, undated). Another definition of environmental ethics is: "...the discipline that studies the moral relationship of human beings to the environment and its nonhuman contents" (WESSA, 2011, p. 11).

Arguably, environmental ethics found its origin in public and academic debates (at least within modern forms of environmentalism) following the publication of Aldo Leopold's '*A Sand Country Almanac'* (1949). However, it is evident that the debate has initiated two seemingly contradictory meta-ethical positions mentioned above: anthropocentrism *versus* non-anthropocentrism (Kronlid & Öhman, 2013). Anthropocentrism generally posits that only humans have intrinsic value and thus, only humans are moral objects. It can, therefore, be deduced that non-human nature only has value if it has instrumental value for human beings (Kronlid & Öhman, 2013). Soon after this notion was presented, arguments surfaced that non-human nature has intrinsic value beyond the instrumental value for human well-being. This argument later came to be labeled "non-anthropocentrism" (Kronlid & Öhman, 2013).

However, Weston (as cited in Kronlid & Öhman, 2013) argues that one cannot simplify these notions into two distinct and divisive camps but rather environmental ethics should "recognize a world of multiple voices and beings that do not reduce to a single type and do not naturally fall into the orbit of one single sort of being's centre" (p. 13).Weston (2009) expands on this view by describing how many "centrisms" may exist to find an alternative to anthropocentrism and so ensure a "more than humans matter" perspective. These "centrisms" may focus on sentience and/or self-consciousness in many animal life forms; or biocentrism (life-centred ethics); or ecocentrism (ecosystem-centred ethics) or Gaian ethics where "the whole Earth moves in its own right into the great circle of moral consideration" (Weston, 2009, p. 11).

Weston's (2009) perspective opens up a space for the pluralism of environmental ethics, which, according to Olvitt (2012), is a "prerequisite to ethical process" (p. 85). Pluralism provides for a dissonance which, in turn, allows the recognition of hidden norms, values and constructions of reality. This, according to Olvitt (2012, p. 86), leads to "talking differently with others…and thus we can learn more and do more." Therefore ethics can be a process which is open-ended, and "invites individuals into an ongoing process of defining and redefining their own rules for individual and community conduct" (Jickling, 2004, p. 16).Jickling (2004) continues to expand on this notion of ethics being "an everyday activity". He sees ethics as part of our conversations and workplaces, helping to shape our daily practice and experience. This notion of ethics-based practice is similar to the point made above about engaging with a stewardship practice devoid of the virtues that are fundamental to its definition.

The discourse on environmental ethics has helped shape the public and the academic community's understanding of environmental issues, including the nature and importance of values relating to the natural environment (Reser & Bentrupperbäumer, 2005) and specifically, Integrated Water Resources Management.

2.4.2 Values theory

The concept of values (along with attitudes, beliefs, and opinions) has been a core construct of social psychology and other social sciences for most of the last century (Reser & Bentrupperbäumer, 2005). Values can refer to different phenomena from "individual human emotional response or judgment, to shared convictions of howthings should be, to a reading or calibration on a measuring instrument or scale." (Reser & Bentrupperbäumer, 2005, p. 127)

There are many interpretations or definitions of the term "values" because of its association with the social science's study of natural resources management and with the economic perspectives of value or values. Moreover, confusion reigns in terms of values and the *objects* of value. Bengston and Xu (1995, p. 6) define *objects* of value as the "things we care about or think are important", while values are "the ways in which we care about those things". They continue to say that values are "a conception of what is good about objects of value."

Though many definitions of values exist, according to Seymour, Curtis, Pannell, Allan and Roberts (2002, p. 142), there are elements which seem common to most definitions: "values are specific modes of conduct or guiding principles that influence our choices and actions and that are relatively enduring." It appears however, that this notion of enduring values is at odds with a perspective from social learning theory (see Section 2.5.2), which maintains that values can change. This seeming contradiction is perpetuated by Glasser (2007) and Kollmus and Agyeman (2002) who maintain that it is only through learning that we acquire (and assign) our values and that by acquiring new information, or exploiting existing information, we can test these values, and if warranted, rethink our values and realign the concomitant behaviour. This perspective is mirrored in a social constructivist paradigm which views values as the result of people interpreting social phenomena through negotiation and communication to "dynamically define and refine social meaning, shared beliefs, behavioural standards and rules ... values then become ... representations of social experience within a given social context." (Kuentzel, as cited in McIntyre et al., 2008, p. 659)

Social constructivism, which can be attributed to Lev Vygotsky (Stetsenko & Arievitch, 1997; Powell & Kalina, 2009), is an important theory that can provide perspective on values formation, and associated links to pro-environmental behaviour (see Section 2.4.3). Social constructivism, according to Stetsenko and Arievitch (1997), posits three major ideas that must be considered when understanding values and pro-environmental behaviour: The first major idea is that the individual is an *active* participant in shaping his/her developmental course by being in constant interaction with the world around him/her. The second idea is closely aligned with the first: The individual is not a "solitary, lonely cognizer who faces the world all by him- or herself" (Stetsenko & Arievitch, 1997, p. 161). Rather, the individual engages in shared activities and co-operates with others in a context of culture and history. Stetsenko and Arievitch (1997) present this as the fundamental tenet of social constructivism, i.e., that "living together in a society…is the nucleus…for all mental and personal development" (p. 161). The third idea is that because humans are embedded in a societal context comprised of culture and history, we need language to act as a mediator of this culture to regulate individual behaviour (Stetsenko & Arievitch, 1997; Powell & Kalina, 2009). Collectively, these ideas provide an understanding that human development is not only a natural, physiological process of development, but is also a "social co-creation of new reality of psychological processes by people acting together in a socio-cultural milieu" (Stetsenko & Arievitch, 1997, p. 161).

Different socialisation processes appear to shape held values or the valuing process as they are assigned to specific objects. In fact, the literature tells us how economic conditions, gender, age, place of residence, family upbringing, childhood experiences, knowledge and membership of an environmental organisation *can* all play a role in shaping values (Kollmuss & Agyeman, 2002; Seymour et al., 2002). Values, claim Kollmuss and Agyeman (2002), shape a lot of our internal motivation. However, there is a certain complexity in regard to what shapes values. Kollmuss and Agyeman (2002) maintain that values are mostly influenced by the immediate society, like family, peers and neighbours. Then to a lesser extent, by the "exosystem" (p. 251) like the media. Lastly, to the least degree, values are shaped by the "macrosystem" (p. 251) like the cultural context. Location of the object and its proximity to the person valuing it will also have an influence on how that object is

valued. This is because an increased *familiarity* of an object due to an improved *accessibility*, will lead to a great diversity of value being *assigned* to that object, whereas, those objects which are not easily accessible have *held* values (see below for a definition) attributed to them(Seymour et al., 2002).

The work of Brown (1984) on values in natural resource management has provided much of the basis for the common understanding of the concept of values. Brown (1984) distinguishes between two major types of values: *held* and *assigned*. Both these types of values also have a range of definitions. For the purposes of this study, Brown (1984), Seymour et al. (2002) and McIntyre et al. (2008) present the clearest definitions of these values. In Seymour et al. (2002, p. 143), *held values* are defined as "ideas or principles that people hold as important to them and are generally highly abstract, generic and conceptual, but guide personal action." Seymour et al. (2002) say that held values "are expressed in relation to environmental concern in a general sense…" while Brown (as cited in McIntyre et al., 2008, p. 658) defines held values as "an enduring concept of the preferable which influences choice and action."

With regard to assigned values, Brown (1984) claims that this preference relationship between a person and an object, in respect of their held values, results in different objects being of different importance or worth. This we call the object's assigned value. However, Brown (1984) goes on to say that this value assigning means "that the person is in some way expressing the importance or worth of the object relative to one or more other objects." This is essentially a deliberative *valuing process*. Furthermore, McIntyre et al. (2008) and Seymour et al. (2002) agree that assigned values speak to the relative valuation of particular natural places and attributes, which makes them particularly appropriate to site-specific valuing.

The distinction and use of held and assigned values is useful for this study because a) held and assigned values are accommodated within the Values Belief Norm Theory (see to Section 2.4.3.) which seeks to connect values to pro-environmental action, b) the relationship between held and assigned values allows the researcher to probe values attribution across conceptual scales i.e., held values makes space for the more abstract concept of the value of water, while assigned values research (in general) is helping to better understand community values for specific natural

places like rivers and how these come to be assigned (i.e., through the valuing process) (Seymour et al., 2002), and c) the site-specific nature of assigned values provides for a better focus for particular case studies.

2.4.3. Discovering Value Belief Norm (VBN) Theory

Kollmuss and Agyeman (2002) suggest that values, in addition to other internal factors such as motivation, environmental knowledge, awareness and attitudes, influence pro-environmental behaviour. They define pro-environmental behaviour as "behaviour that consciously seeks to minimise the negative impact of one's actions on the natural and built world" (p. 240). Reed et al. (2010) define pro-environmental behaviour as “behaviour that has a reduced impact on the environment” (p. 3).

Stern (2000) goes onto to describe several of these types of behaviours:

- **Environmental activism** which means active involvement in environmental organisations and demonstrations or virtual activism via websites such as Avaaz.
- **Non-activist behaviours in the public sphere** which comprise more active kinds of environmental citizenship (e.g. joining and contributing to environmental organisations) and support or acceptance of public policies (e.g. public approval of environmental regulations). The important characteristic of public-sphere behaviours, according to Stern (2000), is that people are aware of environmental concerns, and environmental concern is an important characteristic recognised in VBN Theory.
- **Private-sphere environmentalism** and its concomitant behaviour is where consumer researchers and psychologists have focussed. Private-sphere environmentalism is the purchase, use and disposal of personal and household products (Stern, 2000). This sort of behaviour has different determinants and unlike public-sphere environmentalism has a direct environmental impact. Even though that impact is small (because it’s normally enacted by an individual) it can have significant impact when enacted en masse.

There are several frameworks which attempt to explain pro-environmental behaviour and/or orientations. Amongst them are: The *New Environmental Paradigm (NEP) Scale*, which was a response to the challenge, implicit within environmentalism, of articulating views about nature and humans' relationship to it. Published in 1978, the NEP Scale became a widely used measure of environmental orientation which focussed on beliefs about humanity's ability to upset the balance of nature, the existence of limits to growth for human societies, and humanity's right to rule over the rest of nature (Dunlap et al., 2000). *Cognitive Hierarchy Theory* is based on the view that an individual's stance regarding the environment can be organised as a hierarchy of value orientations, attitudes, normative beliefs and behaviour, which is often posited as behavioural intention rather than actual behaviour (Vaske et al., 2001). The *Theory of Planned Behaviour* suggests that an individual's actual behaviour can be predicted by their intention to engage in those behaviours (Seymour et al., 2002). Intention, in turn, is influenced by attitudes, subjective norms and beliefs about perceived behavioural control. Though this framework has been used for many years to help explain pro-environmental behaviour, it omits a values component (Seymour et al., 2002). These frameworks isolate individual behaviour from broader structural and social conditions, and attribute change to the individual, rather than longer-term social contextual influences and processes (see Section 2.4.2).

A framework which has rarely been used to explore community values for specific natural places is the *Value Belief Norm (VBN) Theory* (see Fig.2.1). According to Reser and Bentrupperbäumer (2005) values are inherent in the VBN Theory postulated by Stern, Dietz, Abel, Guagnano and Kalof (1999). In Reser and Bentrupperbäumer's (2005) opinion, Stern and his colleagues' work makes up one of the "most focussed, system-relevant, and inter-disciplinary orientated psychological research and policy initiatives in the environmental domain" (p. 129).VBN Theory is a pro-environmental behaviour framework which posits a chain of elements, with one element of the chain influencing the next (see Fig.2.1). Elements within the chain are values, beliefs (including an ecological world view (NEP), awareness of consequences and ascribed responsibility), personal norms, and pro-environmental behaviour (Seymour et al., 2002) (see Fig.2.1).

The pro-environmental behaviour is activated when there is a perceived threat to something that may be valued (Bengston & Xu, 1995; Seymour et al., 2002). Each of the three elements – personal values, awareness of consequences, and ascribed responsibility – is a manipulation of Schwartz's moral norm-activation theory (Schwartz, 1977).Schwartz(cited in Stern et al., 1999) defines norms as “feelings of personal obligation that are linked to one’s self-expectations” (p. 83). So for example, the first element (personal values) talks to Schwartz's moral norm-activation theory that posits that norms emanate from altruistic values. In contrast, the VBN Theory claims that norms can have roots in other values too and that values differ across individuals. On the second element (awareness of consequences), the moral norm-activation theory talks to awareness of adverse consequences of events for *other* people because the theory pre-supposes altruistic value grounds. In contrast, the VBN Theory presupposes any value set, not just altruistic, is relevant to any threats to whatever objects that are a focus of those values. To illustrate this point, Stern et al. (1999) use threats to non-human species and the biosphere as objects that may cause concern. Then, lastly, in Schwartz's theory (1977), norm activation depends on ascription of responsibility to self for the undesirable consequences to others. This means that a person believes (or denies) that individual actions contribute to or can help alleviate those consequences for others because they operate from an altruistic value set, whereas the VBN Theory talks to the responsibility of causing or ability to alleviate threats to *any* objects. In other words, the VBN Theory advocates that values (especially altruistic values) inform beliefs that environmental conditions pose threats to other people, other species or the biosphere as a whole (this is called awareness of consequences). Those same values also inform beliefs that actions initiated could both support and/or avert consequences (ascription of responsibility to self, or AR). These beliefs in turn activate personal moral norms, which are then said to trigger pro-environmental action.

Seymour et al. (2002) go on to say that VBN Theory focuses on values and beliefs about environmental consequences based on three broad value orientations (or **held** values): biospheric values (concerns about the biosphere), altruistic values (concern for others), and egoistic values (concern for self). Stern (2000) refers to several studies that have shown that the values most likely to activate personal norms are altruistic and self-transcendent values (Karp, 1996; Stern, Dietz, Kalof, & Guagnano,

1995; Stern et al., 1999). He makes the distinction between these three value orientations and the negative correlation of self-enhancement (egotistic) values and "traditional" values (obedience, self-discipline and family security) to pro-environmental norms and action. Biospheric values may also provide a distinct (from altruistic values) basis for support of preserving endangered species and habitats. Importantly, the link between values and pro-environmental behaviour (or environmentalism) is the mediation effect that particular beliefs have.

While this framework – and the others mentioned – do not *specifically* consider **assigned** values, Seymour et al. (2002) propose that the VBN Theory "seems to offer a comprehensive framework for exploring the links between values, beliefs and norms, which [they] propose are a crucial influence on the formation of assigned values, and ultimately behaviour, regarding specific assets." (p. 145). Stern et al. (1999) argue that the base of general environmental movement support lies in the convergence of values, beliefs and norms that influence people to act to support the environmental movement's goals.

Though it is acknowledged that this framework falls short of locating the formation of such values and behaviours within societal and longer term historical contexts, it is interesting to note that in a later paper, Stern (2000), who is a member of the Society for Human Ecology and the Society for Personality and Social Psychology, does explore four causes of environmentally significant behaviour; one of which is contextual forces. He lists examples of these contextual forces, and then notably summarises this list with the following words: "and various features of the broad social, economic, and political context" (p. 417), which gives credence to our valuing and behaving in a broader sociocultural context. It should also be noted that values, and their concomitant shaping, have been located in a social constructivist perspective (see Section 2.4.2) that seeks to acknowledge the sociocultural context within which values and behaviour are located. This point is important because values form the basis of the *Value* Belief Norm Theory.

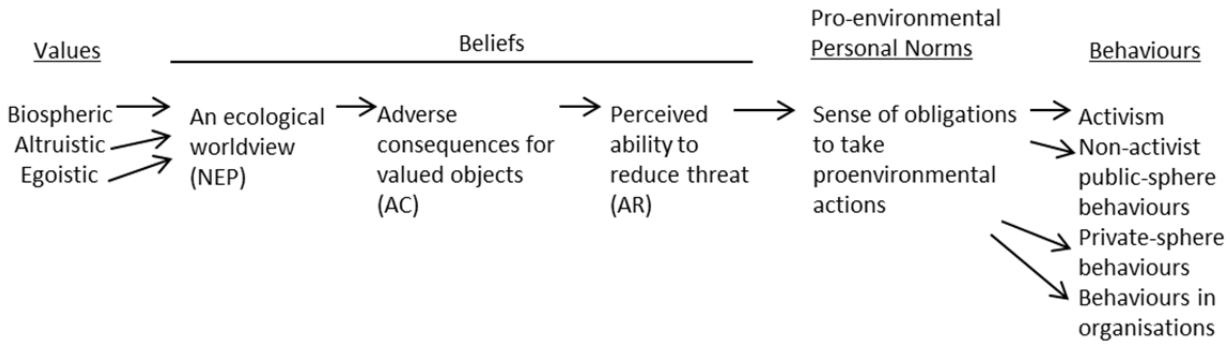


Fig.2.1:*A schematic representation of variables in the VBN theory of environmentalism*

The VBN Theory provides a useful framework with which to work within this study because it is based on strong evidence for a values–belief–pro-environmental action relationship (Stern et al., 1999). As such, it offers a simple yet useful way to categorise held values (biospheric, altruistic and egoistic) and is a framework which allows for held values to influence the formation of assigned values (Seymour et al., 2002). The framework itself, however, does not focus strongly on the valuing processes and how they come to be shaped and formed in particular historical and societal contexts, which as noted above, are important to counter the critiques of values-based behaviour change theories being narrowly focussed on individual psychology. Therefore, it is important to investigate the role of social learning in the *valuing process* or in the *process of assigning values, which then come to be held,* and perhaps later, change.

2.5 Environmental Education

2.5.1 Broadening perspectives on environmental education

Both social learning and values form a significant component of environmental education. However, it is important to begin with a broader understanding of environmental education.

The roots of the environmental education story seem to be deeply embedded in scientific rationality where the Earth was construed to have instrumental value for human beings only (Gough, 1993). However, a vision of an environmentally-responsible, socially-constructed society existed concurrently with this scientific rationality; and education was the instrument of change. This sentiment is

underscored by a quote that Gough (1993) draws from Otto Frankel speaking at the 1970 Australian Academy of Science Conference:

> …what is needed is not only a fuller understanding of the biosphere, but a new sense of values, a new perception of our own role and responsibilities in and for the biosphere…Our own hope is that this new understanding may develop through the education of old and young (p. 39).

Unlike Robottom (1991), who suggests that environmental education's roots do *not* lie exclusively in the field of science education, Gough (1993) contends that it was scientists calling for environmental education as a response to the perceived environmental crisis at the time (early 1970s) that gave birth to the scientifically-orientated environmental education agenda. This, maintains Gough (1993), can also be attributed to the writings of Rachel Carson and Paul Ehrlich in the 1960s and 1970s. Robottom (1991), however, argues that the need for environmental education originated from the concerns of developing countries. Robottom (1991) describes these concerns as being political in nature, involving vested interests across scale. It was only once environmental education was established and used within school curricula that it came to be co-opted by science education consequently losing its political edge and yet gaining a perception that environmental problems were technical problems. This marked the dominance of natural science over environmental education where systematic knowledge from the disciplines of biology, geography and geology, was emphasised. This progressive trend of environmental education becoming an applied science began to influence thinking from a technocratic perspective which perpetuated a blind faith in the capacities of science thereby disabling the ability to deal effectively with complex socio-political environmental problems (Robottom, 1991). This "technocratic rationality" (Robottom, 1991, p. 20) expedites a didactic teaching of existing knowledge that expounds environment as something that "exists out there" (p. 21) and that separates ecology from personal, political and social values. This notion of a value-free environment is juxtaposed with more subjective views of environment where views of ecology are seen to be social constructs comprised through societal practices and structures which have an effect on individuals and groups alike (Robottom, 1993; Hart et al., 1999). In fact, Hart et al. (1999) suggest that environmental education should

include community-based, participatory and interdisciplinary concepts, among others.

However, this technocratic, modernistic rationality weakened. In 1990, a seminal symposium entitled “Contesting Paradigms in Environmental Education Research” was hosted as part of the North American Association for Environmental Education (NAAEE) conference. It was here that the dominant modernistic approach to educational research was critically scrutinized and challenged.

This symposium became the precursor of an exploration of alternatives to technocratic rationality where ideas about whether environmental education should be about, in and/or for the environment began to be debated, even though Arthur Lucas had coined these phrases some year’s earlier (Jickling & Spork, 1998). Fien (1993) and Robottom (1991) suggest that ideology guides the distinction of different forms of environmental education, viz. education *about* the environment, education *through* the environment and education *for* the environment.

Education *about* the environment seems to be the most common form of environmental education. While its objectives are to know about natural and social systems, Fien (1993) claims that the integration of this knowledge is often neglected within education about the environment. Drawing from Robottom, Fien (1993) suggests that what has happened is that there is a tendency for science and geography, the two subjects traditionally associated with education about the environment, to focus on the ecological concepts and the technical solutions required to solve the environmental problems at the expense of understanding the human causes and the necessary changes to the social systems.

Education *through* the environment is a learner-centred approach to environmental education. It uses the learner’s experience in the environment as a tool for education. This approach fosters an appreciation, and perhaps some concern for the environment through direct contact with it.

Education *for* the environment unashamedly presents a values-orientated, social-change approach to environmental education. A certain set of values are fostered

through the exploration and resolution of environmental issues, while ensuring that lifestyles promote the sustainable and equitable use of resources. Fien (1993) continues to say that education *for* the environment uses or builds on education *about* and *through* the environment to develop a concern for the environment, an environmental ethic and skills for participating in activities for the environment's protection and improvement. While on the surface of things the classification of education *for* the environment may seem acceptable, Jickling and Spork (1998, p. 315) argue that there is a risk that the literal interpretation and historical description of the classification "employs the language of activists, not educators." They continue to say that it is not for educators to "coerce" students into a prescribed value set but rather the role of educators is to engage learners in a balanced and fair-minded approach to the evolutionary process of environmental ethics or values (Jickling & Spork, 1998). The thinking here is that prescribed values suppose a valuer who is external to the environment and who is capable of deciding and doing what is good for the environment.

A similar argument is presented about education for sustainable development (ESD) – the current shift from environmental education because of the growing focus on sustainability and sustainable development that recognises the link between environmental and social equity – in that the prescription of a particular paradigm, i.e., sustainability, is in conflict with autonomous thinking that is purported to engender discourse, debate and reflection (Wals, 2010).

It is in this discourse and debate that, according to Wals (2007), people can reflect and question and if necessary break away from existing paradigms and ways of doing things and thus provide a learning space for making choices and taking responsibility for particular action (Wals & Heymann, 2004). A better articulation of this sentiment is Wals and Heymann's (2004) definition of learning:

> [Learning] can be viewed as a change process resulting from a critical analysis of one's own norms, values, interests and constructions of reality (deconstruction), exposure to alternative ones and the construction of new ones (reconstruction) (p.10).

This definition is fundamental to social learning; the concepts of which are, according to Wals and Heymann (2004), noticeably absent from the literature on environmental education or education for sustainability.

2.5.2 What is social learning?

Though today's work on social learning theory can be traced to that of Lev Vygotsky in the 1920s and 1930s, and the work of Albert Bandura in the 1970s (Lotz-Sisitka, 2012), the definition of social learning has no broad consensus. In fact, definitions are so broad they could encompass almost any social process. However, some authors of the literature try to define social learning. For example, Reed et al. (2010, p.6) define social learning as "a change in understanding that goes beyond the individual to become situated within wider social units or communities of practice through social interactions between actors within social networks." Pahl-Wostl et al. 2007, p. 5) define social learning in terms of multi-scale processes or "multiparty collaboration processes", whereas Wals (2007) posits that social learning

> takes place when divergent interests, norms, values and constructions of reality meet in an environment that is conducive to learning...[and] takes place at multiple levels i.e., at the level of a group or organisation or at the level of networks of actors and stakeholders [such as a CMF, see case studies below]. (p. 18)

Wals' definition of social learning supports the notion of a society that engages issues with a plethora of voices that come from many different values and interests. As described in Section 2.4.1 (p. 11), "pluralism provides for a dissonance which, in turn, allows the recognition of hidden norms, values and constructions of reality."

However, it is argued that bringing people (with different values, knowledge and related skills) together by using various approaches is not easy (Dyball, Brown & Keen, 2007). In fact, it will take some negotiation. However, Dyball et al. (2007) do support Wals' definition by suggesting that reflexive processes that critically consider

actions, assumptions and values are integral to all social learning processes in environmental management, and thus by extrapolation, IWRM.

The notion of “constructions of reality” is particularly important because it aligns with the concepts of deconstruction (de-framing) and re-construction (re-framing)(described in Section 2.5.3) which *can* be fundamental to transformative social learning, as defined by Wals (2007) and supported by Pahl-Wostl (2007). The word” can” is used because it suggests that the success of social learning may lie in the individual’s ability to transcend their own “frames”, in which they may become entrapped (see Section 2.5.3). This thought integrates well with the two criteria that Reed et al. (2010) argue should define social learning i.e., that of recognizing a change of learning at the level of the individual; and that that learning is then embedded into a broader social unit through social interactions of actors within a social network.

The first step in the social learning perspective presented by Wals (2007) is becoming aware of one’s own frames, because only then can de-framing begin. This de-framing process is seen as a continuation of one’s self-awareness of hidden assumptions and their ideological base, and the potential for reorientation that it brings. It is also very much a part of the notion of values being held individually and influenced socially but changing internally in relation to other factors.

This ideological base, according to Dyball et al. (2007), is based on existing ethics and values about how the world should be. Glasser (2007) takes the idea of values further by saying that it is only through learning that we acquire (and assign) our values and that by the acquisition of new information, or the exploitation of existing information, we can test these values, and if warranted, rethink our values and realign concomitant behaviour and associated practices.

This relationship between values and social learning is underscored by the vision of the United Nation’s Decade of Education for Sustainable Development which seeks to foreground how all forms of education can be a “vector to bring about change in values, attitudes and lifestyles to ensure a sustainable future and the evolution of just societies” (Lotz-Sisitka & Lupele, 2012, p. 5).Where does this exposure of norms,

values, interests and constructions (or deconstruction) of reality begin? One possibility explored here is with the analysis of one's own norms and values. As one is exposed to alternative norms and values and the process of reconstruction of new ones begins, learning often occurs. However, it is prudent to note that not all (potential) learners are open, mindful and respectful of other perspectives. But as social relationships and the associated respect and trust (social capital) grow, people may become more receptive to alternative ideas. Moreover, it is important to be aware of people's "dissonance thresholds" and thus where the edge of people's comfort zones are because there will be no learning with too much dissonance, but equally no learning without dissonance (Wals, 2007).Thus conflict, which is a pre-requisite for sustainable solutions rather than a barrier, is found within this dissonance (Wals & Heymann, 2004). In fact, according to Dyball et al. (2007), conflict should not be avoided but should rather be well facilitated within a social learning framework. The notion of conflict will be elucidated in the context of framing theory in Section 2.5.3.

2.5.3 The framing process

Though the concept of frames has been used in many different fields of study over the years (Shmueli & Ben-Gal, 2003), it has gained traction in the social and environmental fields since Erving Goffman's seminal work, *Frame Analysis: An Essay on the Organisation of Experience (1974)*. Goffman (1974) defines frames as "schemata of interpretation" that enable individuals "to locate, perceive, identify, and label" occurrences within their life space and the world at large (p. 21).

However, there appears to be no common definition of the term "frames" in the literature. Kaufman and Smith (1999) define frames as "shortcut devices people use to characterize situations, problems or adversaries" (p. 2), which can "colour" the way people interpret a situation and their choices regarding it. Shmueli and Ben-Gal (2003) define them as "cognitive structures held in memory and used to guide interpretation of new experience" (p. 212), while Gray (2004) defines frames as "lenses that stakeholders use to make sense of the conflict" (p. 167). Though all are

different, there is a sense of commonality in that they are devices, or structures or lenses used to make sense of reality.

Because of the complexity of the environmental sector people may interpret (or frame) circumstances differently and thus will introduce the potential for dispute or conflict that Gray's definition alludes to (Shmueli & Ben-Gal, 2003). The concept of multi-party conflict is located within the context of the environmental field, where physical change is often the cause of dispute. Conflict, which often includes past grievances and issues of process and relationships, may result in distrust, broken communication and cynical attitudes towards change. Gray (2004) proposes that stakeholders not only hold frames about particular issues but also about the *process* of conflict i.e., interpretations of what the conflict is about, why it is happening, the motivations of the disputants and how it should be dealt with. Shmueli et al. (2006) describes the role of frames in conflict as follows: People in conflict (disputants) diverge on the level of interests, beliefs, and values as well as in perceptions of the situation on a conscious and "preconscious level" (p. 209). This divergence can lead to various forms of strife which in turn leads to communication break-down and the polarization of the disputants. The polarization becomes self-reinforcing as disputants' frames are fed with a sense of self-righteousness and thus an unwavering stance on change. Frames are social constructions that capture individual and shared sense-making about the conflict; and often convey our ethical stance about a particular problem.

Various scholars (Kaufman & Smith, 1999; Gray, 2004; Shmueli et al., 2006) suggest that frames are used in different ways. According to Kaufman and Smith (1999), frames are used purely for "strategic purposes" (p. 3) for the benefit of a negotiation or a specific audience or public, whereas Shmueli et al. (2006) suggest that disputants use frames in a strategic *and* an interpretive way. Shmueli et al. (2006) suggest that frames, as interpretive lenses, "help us make sense of complex situations in ways internally consistent with our worldviews, giving meaning to events in the context of life experience and understandings" (p. 208).These interpretive lenses or frames can lead to error because they are founded on instructive past experience (our social constructions) that then may be applied erroneously to present experience. Moreover, these interpretive frames may be set in place for

decades (Shmueli et al., 2006) and so filtering may become untenable as decision-making deteriorates on the basis of a poor assessment of reality, hence the need for reframing (see below)

Kaufman and Smith (1999) and Shmueli et al. (2006) identified several frames as part of their research. Some examples are described below:

- **Fixed pie (zero-sum) frames:** this type of frame makes it difficult for someone to imagine alternatives that would be beneficial for all parties involved because of our competitive culture which, primarily, tends to reduce stakeholders to winners and losers.
- **Loss/gain frames:** this type of frame represents uncertain consequences of a stakeholder's choice as either a loss or a gain. People may tend to work harder to prevent a loss than to capture a commensurate gain.
- **Characterization frames:** these frames are labels, associating positive or negative characteristics with individuals or groups of people. They are often stereotypical evaluations of others' behaviour, attitudes, motives or trustworthiness. They develop from direct experience but are reinforced through media and existing beliefs and experience.
- **Identity frames:** foregrounding oneself or one's own role or own group's role in the conflict in a positive or negative way.

Awareness of other's frames can assist in mutual understanding and thus re-framing because frames are not unchangeable (they are social constructions) – though Kaufman and Smith (1999) argue that some frames may be institutionally held and so stable over time – but some are *more* amenable to change than others. These frame changes occur when new information or direct experience manages to overwhelm filters (Kaufman &Smith, 1999; Shmueli et al., 2006). For example, characterization frames – reductionist labels, associating positive or negative characteristics with individuals or groups – could be reframed through positive, empathetic experiences. It seems that more research is needed with regard to how information influences different frames under different circumstances and this research does not appear to draw on knowledge of social construction. Current

research, according to Kaufman and Smith (1999),appears to suggest that, in general, experience affects both the susceptibility of frames to information and concomitant level of involvement in conflicts. Another example, described by Johnson and Eagly (in Kaufman & Smith (1999)) is that of the values orientation frame, which is more resistant to argument or information than other frames. Kaufman and Smith (1999) argue that changing more stable frames linked to values may require other strategies. This point raises ethical questions about attempts to change stakeholders' values in order to resolve disputes. However, the change of values spoken of in the social learning literature is part of a trusted, facilitated process that has social learning as its goal. This, however, is a very good reason why it is argued that practitioners of framing need to be aware of their own frames before they can begin to work in an interventionist role with others (Kaufman &Smith, 1999; Wals, 2007).

However, Shmueli et al. (2006) suggest that more is known about the nature and impact of frames than how to manage or change frames. They maintain that it is not yet known whether particular interventions cause specific changes in frames or how these changes, if they do occur, change the course of disputes. Wals (2007) however, argues that de- and re-framing can occur in a trusted, facilitated context of dialogue. In fact, exposure to each other's frames and the resultant exploration of meaning of each other's frames may contribute to re-framing (Wals & Heymann, 2004; Shmueli et al., 2006). It is important to note that re-framing is difficult. Re-framing, essentially, means taking on new perspectives and some risk. Therefore spaces of constructive, trusting dialogue need to be created where the aforementioned frame exposure can occur with minimal risk involved. Alternatively, the context of the dispute would have to change so as to create incentives for new perspectives to be considered (Wals & Heymann, 2004; Shmueli et al., 2006).

2.5.4 Social Learning and practice

There seems to be a large gap between the sustainability that many in society are calling for, and what is actually happening in practice (Kollmuss & Agyeman, 2002; Glasser, 2007). Glasser (2007) says that despite the massive awareness of our unsustainable lifestyles, ample evidence of the impact of it, and even a concern to do something about it, we still do not see sufficient action being taken to work towards what he terms “ecocultural sustainability”. Wals (2007) agrees, and recognises that conventional methods of reducing the issues that confront the world into “bite size” manageable problems are certainly not resulting in a move towards sustainability. Both believe that we need unprecedented social change to occur in a world that is ever changing and complex. Therefore, if we are to overcome this gap and support social change effectively, future problem-solving approaches will require a more systemic and reflexive way of thinking. Both Glasser and Wals promote active social learning as a process that can play an important role in achieving this, as Glasser confidently estimates that “active social learning can be used with great advantage in our learning environments and decision-making processes to promote societal shift towards ecocultural sustainability” (Glasser, 2007, p. 52). Most traditional learning is based on the assumption that learning takes place as an individual process, and is separated from our daily activities of living in the world. Broadly speaking, social learning is based on learning that takes place in the context of us living in the world while participating with others. It therefore sees learning as a social experience reflecting the deeply social nature of being human.

2.6 Conclusion

Chapter two sought to understand the global context of IWRM so as to contextualise an understanding of the South African approach to IWRM and its traction in this country.

Institutional arrangements within the South African context of IWRM have evolved since the change of national governmental in 1994 (Pollard, 2002). This evolution has both given rise to, and stymied efforts in mainstreaming IWRM in South Africa

(Jonker, 2007). The chapter presented a synopsis of these institutional arrangements, which ranged from the role of the Minister of the Department of Water Affairs to the lowest rung in the institutional hierarchy, the CMF, which is the unit of analysis in which this study's cases are situated (see chapter three).

It has been assumed that a concept called "water stewardship practice" is expressed through a myriad of water management activities which seek to further the notion of IWRM. However, this chapter warns that unless such water stewardship practices are steeped in the major tenets of stewardship, viz. responsibility, accountability and trusteeship, our common practice will continue under the guise of stewardship but devoid of the virtues fundamental to the definition of stewardship (Welchman, 2012).

Giving expression to this virtuous notion of stewardship are environmental ethics, which are broadly explained in Section 2.4.1 as comprising anthropocentric and non-anthropocentric views. Inherent to environmental ethics are values, and Section 2.4.2 provides an overview of values theory with specific reference to Value Belief Norm Theory (VBN), which is the selected framework through which values will be studied in this thesis, as it provides a broader view of values theory.

Values are fundamental to VBN Theory because of the role they play within a chain of elements that together are eventually claimed to influence pro-environmental behaviour. Pro-environmental behaviour is also posited to be socially shaped hence a focus on social learning theory (Wals, 2007), which is comprised framing and re-framing processes. Processes of de-framing and re-framing, can occur in well-facilitated, trusted spaces as Wals (2007) argues.

Stakeholders in the CMFs who practice water stewardship, are influenced by certain values. Moreover, it is assumed that those values can change or are changing (or being de-framed and re-framed) as stakeholders engage in water stewardship practice alone and together. Learning accompanies change in individuals and groups in community. This, then, could potentially lead to a virtuous circle of pro-environmental practicing, learning and valuing that can potentially strengthen or contribute to water stewardship.

In chapter three, I explain how the study of values and their influence on practice can be located in a broader research paradigm or philosophy called critical realism (Archer et al., 2004). Critical realism provides a philosophical and methodological orientation to the study.

CHAPTER 3: METHODOLOGY: RESEARCH DESIGN DECISIONS

3.1 Introduction

In this chapter the research process and activities that were used to investigate the primary research questions are described. The research questions are: *"How do held and assigned values influence water stewardship practices of the public in two Vaal Barrage catchment management forums?"* and *"How is social learning embedded (or not) in the process of shaping values within water stewardship practices of people attending catchment management forums?"*

This chapter begins with a description of how the research orientation – critical realism – was used to generate data and strengthen the research process (Section 3.2.1), followed by a description of the applicability of the case study as an appropriate methodology (Section 3.2.2). Section 3.3 outlines the research methods selected, initially presenting them from a theoretical perspective. Section 3.4 describes the practical application of these methods to the research questions. A description of how data was organised, interpreted and analysed follows (Section 3.5). Finally, issues of trustworthiness and ethics, which ensure data quality and research process integrity, are presented.

3.2 Research Methodology

3.2.1 Research Orientation

Selecting the research orientation was important to help support and guide the collection of data with regard to the key objects of the study, which emanate from the research questions. Chapter two described values as one of the key objects and explained how they relate to beliefs and norms to influence pro-environmental behaviour, which, for the purposes of this study, is expressed as water stewardship practice (another key object). The final key object is social learning and its role in shaping values within water stewardship practice. This study investigated these key objects and the research questions by drawing on the underlying philosophy of critical realism.

The meta-theory of critical realism provides an ontological framework for understanding how generative or causative mechanisms, like values, which though unseen, influence the natural and social world by producing events that are either experienced or not.

Critical realism is frequently associated with British philosopher, Roy Bhaskar, who is also credited with giving critical realism a coherent philosophical language and who has developed parts of the philosophy (Danermark, Ekström, Jakobsen & Karlsson, 2002). Bhaskar, though, was strongly influenced by his teacher, Rom Harrè, one of whose main arguments was that there had to be underlying generative mechanisms if the world was to be analysed in terms of cause and effect (Danermark et al., 2002).

The notion of mechanisms and their links to events – effects – is an ontology that is one of the distinguishing features of critical realism. A focus on mechanisms means focussing on the processes that produce events and experiences thereof. This opens up a space to consider values and their role in influencing people to act on the world to produce events, like outcomes of water stewardship practice. When these events are experienced they become empirical. Critical realism thus assumes that reality is comprised of the underlying mechanisms, the events and the experience (or not) of those events. Thus, reality is assumed to consist of these different domains, which are structured, differentiated, changing and stratified (Danermark et al., 2002).

Any explanation of reality begins with our concepts of it. Critical realism states that the focus of the research process is the relationship between the real world and the concepts that are formed of it. If defined in the context of this study, it may be the relationship between expressions of pro-environmental behaviour, associated actions and practices, and values. Thus, Danermark et al. (2002) maintain that though our knowledge of reality is conceptually-mediated – facts are theory dependent but not theory determined – reality has an objective existence. Therefore, like Sayer (2000), Danermark et al. (2002) suggests that all knowledge is fallible and can be adjusted. The objective existence of reality is proven, according to Danermark et al. (2002) and Sayer (2000), by the fact that we make mistakes. This means that our attempts to live out our own reality in both a social and physical

manner would mean that we would soon find ourselves in trouble with social laws and/or physical laws that govern our Earth.

Danermark et al. (2002) elucidate the nature of reality and knowledge by introducing the perspective of reality and the way it behaves, as not always accessible to immediate observation. They argue that if “everything that is” was open to observation then there would be no need for science. Though one could probe the observation of people’s values in action, values themselves are not immediately observable. Rather, as is explained later, values may be more noticeable in the everyday discourse that people use, or in their practices. These characteristics of values, as interpreted through the lens of critical realism, enabled the selection of the data collection methods used in this study. Danermark et al. (2002) conclude that another important property of reality is that it is not transparent. They say that reality has mechanisms which often are unobservable but which we can experience indirectly, or infer, by their ability to cause, that is, to make things happen in the world.

These concepts – a reality independent of our concepts and knowledge of it, and a reality that is not transparent – indicate that reality has a deep dimension. Danermark et al. (2002) draw on Bhaskar when they describe this deep dimension as a domain called the “real”. This domain is where the so-called “generative mechanisms” or the drivers, e.g. values, beliefs or norms, which can produce events, e.g. outcomes of particular water stewardship practice in the world, are to be found. Emanating from the domain of the real is the actual domain. This domain is where events happen, whether we experience them or not. The third domain is that of the empirical. This domain consists of what we can experience, directly or indirectly (see Fig.3.1).

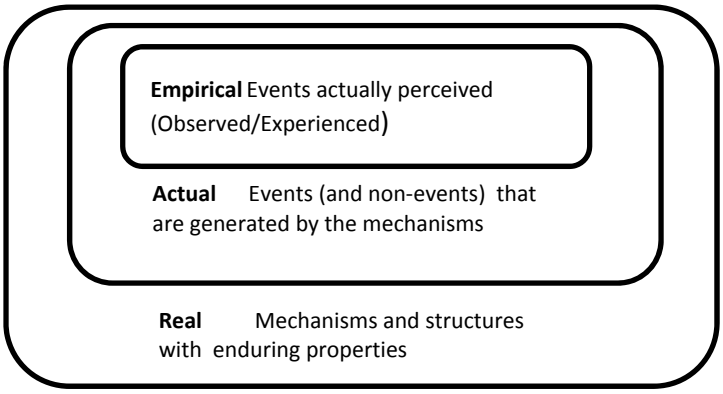


Fig.3.1: *The three domains of the real (stratified ontology of critical realism) (Johnston & Smith, 2010)*

The linkages between the real, the actual and the empirical are particularly pertinent within the scope of this study as the structural mechanisms that shape the formation of values are looked at from the perspective of the *real*; stewardship practices (which are expressions of held and assigned values) as the realm of the *actual*; and the empirical are the traces of these events which people experience (people's views on their values and how they are / ought to be practiced).These three domains are what comprise the critical realist's "stratified ontology" where each new stratum is formed by powers and mechanisms of the underlying one.

However, we find that these three domains are often conflated or reduced to one domain: what is, to what we know about it. This is called the "epistemic fallacy". In contrast to the epistemic fallacy, Danermark et al. (2002) argue that

> Scientific work is instead to investigate and identify relationships and non-relationships, respectively, between what we experience, what actually happens, and the underlying mechanisms that produce the events in the world. (p. 21)

Science, thus, deals with things that are independent of empirical science representations and thus acknowledges that scientific knowledge may be fallible at any time. This means that science has two dimensions: an intransitive and a transitive dimension.

The intransitive dimension comprises the dimension of reality that is independent of theory. This means that, regardless of scientific practice, generative mechanisms exist independently of science, which, according to Danermark et al. (2002) means that “an ontological gap is always present.” The transitive dimension comprises theories, which are the transitive objects or representations of science knowledge used by scientists to constantly try and transform these theories into a deeper understanding of reality thereby indirectly attempting to connect science to the deeper reality (Danermark et al., 2002).

One of the most important tools used to search for understanding of reality is language. Danermark et al. (2002) maintain that language has the important role of conveying and exchanging meaning in society. However, it is important to note that meaning is never fixed. It is not fixed because we reflect on and communicate the outcomes of another intervention in the material world: our practice. We may then change various things in our practice, make new experiences and then re-communicate those new experiences. This cycle of practice, communication and experience is continually conceptualised as meaningful knowledge of reality. However, we understand from critical realism that what is cannot be reduced to what we know. We need a starting point however, and, according to Danermark et al. (2002), that starting point is the concepts of our language world. According to Sayer (2000), language, discourses and values are included in the domain of the real.

Sayer (2000) argues that compared to both positivism and interpretivism, critical realism can under-labour any particular research method and that specific choices of method should depend on the nature of the object of study and what one wants to learn about it. In this study I use case study methodology, under-laboured by critical realism, and a range of methods appropriate to case study research.

3.2.2 Case Study Approach

According to Yin’s (1989) definition,

> A case study is an empirical inquiry that: a) investigates a contemporary phenomenon within its real-life context; when b) the boundaries between phenomenon and context are not clearly evident; and in which c) multiple sources of evidence are used. (p. 23)

Similarly, Nisbet and Watt, cited in Cohen, Manion and Morrison (2007), define a case study as a "specific instance that is frequently designed to illustrate a more general principle" (p. 253). Cohen et al. (2007) explain that a "specific instance" means working within a pre-ordained boundary set within an open system. This boundary characteristic is as a result of the case study being set in temporal, organisational, social, institutional and geographic contexts and is illustrated by these examples: a case can be an individual, a group or an institution such as business; and it can be a large community or a profession. These are all examples of single case studies but one can also study multiple case studies like three different businesses or four different professions (Gillham, 2000).

Cohen et al. (2007) elaborate on the case study approach in a way that offers a synergy with the tenets of critical realism. Case studies, they argue, can infer cause and effect. In fact, case studies exhibit the strength of observing effects in real-life contexts. It is argued further that these contexts (the realm of the real) are powerful determinants of cause and effect (the realm of the actual) as they are unique and dynamic, and comprise unfolding human interactions and events. Another way to look at context is through a particular lens of subjectivity, which the case study approach is concerned with (Gillham, 2000). Subjectivity means that the approach takes into consideration the underlying reasons or the 'what' behind the objective or empirical evidence. This discourse is reminiscent of critical realism's approach to generative mechanisms that cause effects or events in the world. However, cause and effect inferences may be difficult to draw, argue Shaughnessy et al. (in Cohen, et al. (2007)), because case studies lack a high-degree of control in both treatments and extraneous variables. Shaughnessy et al., however, are using positivist research logic to make this point. Critical realists argue for open system views of causal mechanisms that are generative and interactive (Sayer, 2000).

Other characteristics of case studies are explored by Cohen et al. (2007), Flyvbjerg (2006) and Gillham (2000). One of those is the potential for bias. The reason, posit Cohen et al. (2007), is that case studies frequently follow the interpretivist tradition of "seeing the situation through the eyes of participants" which may lead to an over- or under-stating of the case. Critical realists refer to this problem as "methodological individualism" (Danermark et al., 2002, p. 156) and address it through stratified ontology. "Participant observer" status, in case study research, means that the researcher is not detached but rather a person that acknowledges his/her role in the research.

Another weakness is generalizability. Gillham (2000) argues that natural sciences' research has had as its goal generalizability whereas in human behaviour, generalization is "suspect". He maintains that there are just too many elements that are specific to a group or institution to allow for generalizability. In contrast, Flyvbjerg (2006) argues that the belief that one cannot generalize from a single case is a common misunderstanding. He suggests that the generalization depends on the case itself and how it is selected; that the strategic choice of case may "greatly add to the generalizability of a case study" (p. 226). He illustrates this point by describing how Galileo's selection of a "critical case" led to the rejection of Aristotle's law of gravity, and continues to underscore this by saying that the development of the physics of Newton, Einstein and Bohr was based on carefully selected cases and experiments. Yin (1989) seems to add voice to Flyvbjerg's (2006) argument by saying that cases, while being contextually bound, may be generalizable to a theoretical *proposition*, if not to populations or universes. Generalising from case study to theory is known as "analytic generalization" and Yin (1989) goes on to explain its machinations as how a "previously developed theory is used as a template with which to compare the empirical results of the case study."Danermark et al. (2002) argue that in critical realism, it is possible to generalise from the level of the mechanism, as mechanisms are likely to be generative in more than one event and/or empirical context or case.

Considering the limitations and arguments of when and how case studies are best used, two case studies were selected for the purposes of this study. According to Yin (1989), this case study design is a *multiple embedded* case study where the case

studies are a) comparable, that is, *multiple,* and b) where the case study involves "more than one unit of analysis" (p. 49), that is, *embedded*. They are also critical realist, as the analysis includes the level of the real, actual and empirical.

Two CMFs were selected as case studies for the following reasons:
Firstly, both CMFs are located within the institutional landscape of current South African IWRM practice as described in Section 2.3. This means that the case studies are nested in a broader institutional arrangement bounded by a real-life context and are thus embedded in the wider water sector. Secondly, they are located within an economic landscape – Gauteng province, South Africa – that has tremendous impact on the river systems within that province (and further afield due to inter-basin transfers and return water flows). This province is engaged in mining, agriculture, significant industrial growth and experiences great population pressures. Thirdly, members of these CMFs exhibit a diverse demographic profile that reflects diversity in the country's population. Therefore, the people that comprise the CMFs include a diversity of cultures, religions, backgrounds and racial groupings, thereby providing a rich opportunity to explore values and social learning in relation to stewardship practice. Lastly, they comprise members of the public who appear to practice one or more forms of water stewardship in both their professional and private capacities. This institutionally-bound space allows for the investigation of a "contemporary phenomenon" (Yin, 1989, p. 23), where the "boundaries between phenomenon and context are not clearly evident" (Yin, 1989, p. 23). The CMF provides a unit of analysis in which the phenomena of values and social learning in the context of water stewardship practice can be investigated.

It is important to note that these case studies, and thus the individuals embedded therein, are shaped by the contextual forces of legislation, resultant institutional structure and its accompanying practices. These forces may be construed as the mechanisms that influence the stewardship practices of the people that operate within these case studies.

3.3. Research Methods

Within this case study approach different methods have been applied to collect data on a related set of values, social learning and water stewardship. These methods are document analysis (Cohen et al., 2007; Bowen, 2009), semi-structured interviews (Gillham 2000; Cohen et al., 2007) and observation (Angrosino & Mays de Pèrez, 2000; Cohen et al., 2007). All of these data collection methods have different strengths and weaknesses which will be explored. However, a fundamental point to note is that if the methods yield consistent perspectives then we can be reasonably confident that a substantiated picture will emerge; if not, then caution must be exercised in inferring from any one set of data.

The provision of multiple sources of evidence or multiple data collection methods is widely practiced in case study research and is called triangulation (Yin, 1989). Using the language of quantitative, experimental research, Neuman (1994) defines triangulation as “using different types of measures, or data collection techniques, in order to examine the same variable” (p. 141). The premise here is that insight improves when a diversity of methods are used, and this in turn ensures a greater validity, the meaning of which will be described later in this chapter (Section 3.6).

3.3.1 Document Analysis

Document or content analysis is defined by Bowen (2009) as “a systematic procedure for reviewing or evaluating documents- both printed and electronic material” (p. 47). Cohen et al. (2007) define document analysis as “[T]he process of summarising and reporting written data – the main contents of data and their messages”. They maintain that it is also a “strict and systematic set of procedures for the rigorous analysis, examination and verification of the contents of written data” (p. 475).

Though document analysis was derived from the analysis of mass media and public speeches, it is now used to study any form of communication material – structured and unstructured (Cohen et al., 2007). In fact, document analysis can be done with

any written material, from all sorts of documents to media products, from interview transcriptions to maps and charts (Cohen et al., 2007; Bowen, 2009).

In relation to other qualitative research methods, document analysis has both advantages and disadvantages, which are described by Cohen et al. (2007) and Bowen (2009) as summarised here.

The advantages are that it is a more efficient means of collecting data because it really is about data selection rather than collection; there are usually many documents within easy access of the qualitative researcher, and many of these documents can be retrieved without the authors' permission; it is un-obtrusive and documents are non-reactive, and thus stable, and the researcher's presence does not affect them. Documents provide details of events (albeit with varying degrees of accuracy), and cover a range of time and circumstance, which may provide a rich data source. However, there are many disadvantages inherent in documents: often they provide insufficient detail because they are usually produced for some purpose other than the research; documentation can be difficult to retrieve despite their abundance, that is, access to documents may be blocked. Biased selectivity may be introduced because of an incomplete selection or because the documents may be written with a certain bias depending on their source and intention (this may be an issue of validity and reliability); words, in text, can be ambiguous which may lead to inadequate capture of meaning; and then, finally, document analysis reduces and interrogates text into summary form through the use of categories and emergent themes in order to generate or test a theory, which may reflect the researcher's agenda as the researcher imposes unintended meaning on the text.

3.3.2 Semi-structured Interviews

Interviews are essentially a process for collecting data about life where participants share their interpretations of the world in which they live. In this sense, interviews are not just about life but are situated, or embedded, within life itself (Fontana & Frey, 2000; Cohen et al., 2007). This characteristic of interviews makes them ideal sources of case study evidence because case studies, themselves, are usually about human affairs (Yin, 1989). However, interviews are not about everyday

conversations because an interview is normally a contrived situation that has a specific purpose determined by a question-based (usually directed by the interviewer) framework that is dependent on explicit and detailed answers (Cohen et al., 2007). Cannell and Kahn, as cited in Cohen et al. (2007), define it more formally as a research technique or a

> two-person conversation initiated by the interviewer for the specific purpose of obtaining research-relevant information, and focussed by him on content specified by research objectives of systematic description, prediction, or explanation. (p. 351)

The interview as a research technique has constraints like being time intensive, exposed to interviewer bias, inconvenient to the respondent and exposing people to confidentiality issues. It does, however, have benefits such as being flexible for data collection, making space for both verbal and non-verbal communication, and enabling the interviewer to probe respondents about deeper, more complex issues (Collins et al., 2000; Gillham, 2000; Cohen et al., 2007). Another strength of the interview is that subjective meanings behind insights, feelings and statements can be probed (Neuman, 1994). This is useful for discerning the mechanisms that, for example, shape and influence values, which are embedded in everyday, impassioned talk about empirical experiences.

The interview, as a research technique, serves three purposes according to Cohen et al. (2007): 1) it may be the principal means of gathering data in relation to the research goals; 2) it may be used to explain variables and relationships and/or to test hypotheses; and 3) it may be used as part of a strategy of triangulation to validate other methods or to follow up unexpected results. In critical realist research, the interview provides direct insight into empirical experiences. The interview, as a research technique, ranges in type from the informal, (or unstructured, where the technique can be likened to a type of verbal observation) right through to the formal, (or structured, where the technique involves the use of specific, closed questions) (Fontana & Frey, 2000; Gillham, 2000).

For the purposes of this study, the semi-structured interview was selected. This particular type of interview is defined by Cohen et al. (2007) as follows: “[W]here topics and open-ended questions are written but the exact sequence and wording does not have to be followed with each respondent” (p. 361). According to Gillham (2000), this type of interview is the “most important form of interviewing in case study research…it can be the richest single source of data” (p. 65).

3.3.3 Observation

Observation as a method of data collection offers the unique characteristic of gathering data live in naturally-occurring, social situations. This unique characteristic of *in-situ* – rather than second-hand – data collection has the potential to produce authentic data (Cohen et al., 2007). However, Angrosino and Mays de Pèrez (2000) contest the idea of “natural” settings particularly when these “natural” settings are often influenced by “unnatural” cultural circumstances like inner-city sites. In critical realist research the “natural” site provides empirical evidence, as well as insights into events and the real. For example, one can “see” water pollution in a river, deduce the events that cause it and retroduce causal mechanisms for the pollution by observing industrialisation patterns.

Various entities can be observed: from facts to events to behaviours and qualities. Observations can range from unstructured to structured or “responsive to pre-ordinate” (Cohen et al., 2007, p. 397). This means that the observer in an unstructured observation will not have a clear indication of what is being looked at; the semi-structured observation will be placed in the context of an issue but will provide data that allow issues to be highlighted in a far less systematic manner; and the structured observation will allow the observer to know in advance what to observe and thus will have his/her categories worked out in advance in a context that is known.

For the purposes of this study, behaviours and associated doings, and sayings were observed from a semi-structured perspective.

Like all data collection methods, observation has both advantages and disadvantages. Though, traditionally, observation has been touted as non-interventionist in nature, Cohen et al. (2007), argue that this perspective is not as clear as it seems because observers inhabit the world that is being researched and so their influence on the world being researched cannot be neutral. This point speaks to bias, which may be introduced in the observation and that needs to be acknowledged. Other limitations of observation are that it may take a long time to capture the required doings, sayings and relatings; it can be costly because of the time and effort required, and it may influence the practice of the person being observed. However, the advantage of observation is it provides a reality-check on the congruence between what people say and what they do, i.e. people's sayings, relatings and doings (Kemmis, 2010); it enables researchers to look at everyday behaviour from a new perspective, which otherwise may have been taken for granted, and some respondents may prefer being observed to being interviewed or having to fill out a questionnaire.

3.4 Data Collection

This section describes the application of each of the three data collection methods to the data collection process. While it is important to have a theoretical understanding of each method, it is only in their application that the rigours of data collection become evident.

The determinants guiding the selection of methods are neatly summed up in the following heuristic which was reproduced from Johnston & Smith's (2010) earlier diagram (see Fig.3.2) explaining critical realism's stratified ontology:

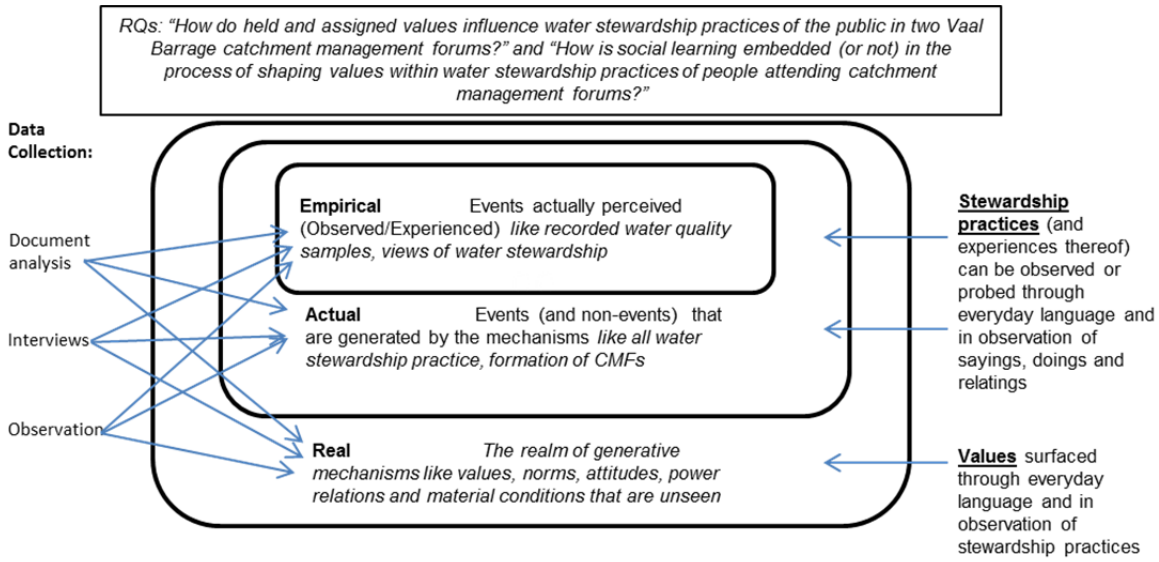


Fig.3.2: *Adapted from Johnston & Smith (2010) to show gathering data on values and stewardship which relate to the research question*

As described in Section 3.2.1, Sayer (2000) suggests that both language and values are included in the domain of the real, a stratum which includes the unseen. However, language, according to Danermark et al. (2002), plays an important role in understanding reality and exchanging meaning in society. This meaning may be transient because we experience other interventions in the world. Thus practice provides results which we reflect on, and communicate to others. This cycle of practice, communication and experience is continually conceptualised as learning and developing meaningful knowledge of reality. In order to explore the depths of the real and to better understand this knowledge of reality, it was determined that document analysis, semi-structured interviews and observation would be best suited to explore values, practice and learning, through language.

3.4.1 Document Analysis

"Documents of all types can help the researcher uncover meaning, develop understanding and discover insights relevant to the research problem." (Merriam as cited in Bowen, 2009, p. 29)

The point about "uncovering meaning" is particularly relevant in the selection of this method, and how, because of its unobtrusive nature, it can help uncover meaning in everyday value-laden language. Therefore, it was decided that document analysis

would provide the opportunity to analyse for value-laden language and to explore how that was linked to water stewardship practice (if at all). Moreover, it provided the opportunity to seek evidence of social learning, particularly with regard to de- and re-framing (see Section 2.5.3).

A second reason for selecting this method was to gain some understanding of the history of the CMFs. Although I had been a participant in both forums for a number of years, I wanted to understand the forums' historical roots.

Another reason for selecting this tool was to identify any change in valuing the participants of the CMFs may have exhibited over time. This specific use is confirmed by Bowen (2009) who maintains that documents may provide "a means of tracking change and development" (p. 30). In order to discover a substantial picture of values changing (or not) over time, the 42 sets of minutes covering both CMFs were analysed over a seven-year period – 2005 to 2011. Each set of minutes were indexed by giving them a descriptor that followed a consistent pattern, i.e. Forum, Mins (for Minutes), month and year.

A fourth reason for selecting document analysis is that it can be used to "corroborate evidence from other sources" (Bowen, 2009, p. 30). In other words, it is used as one third of the triangulation strategy to build confidence levels in the data.

While the minutes of the meetings did provide an abundance of text and thus a source of evidence for valuing, social learning and stewardship, many of the minutes were poorly recorded in that some of the content seemed to be copied and pasted over from one meeting to the next, or the sentences were not constructed properly and so did not make sense thereby losing meaning. There were also instances where minutes were either not recorded or not provided to Rand Water for collation and storage.

3.4.2 Semi-structured Interviews

For reasons mentioned in Section 3.3.2, the semi-structured interview was selected as a second research data collection method.

During the design of the interview process, the research question was reflected upon. The original research question made reference to the South African public as the target population. However, after considering the size of the initial target population and then the fact that the sample (two Vaal Barrage forums) could never be representative of that population, it was decided to revise the research question to refer to a narrower population, viz., the public in two Vaal Barrage catchment areas represented by the two CMFs. As a result of this revision, a purposive sampling approach, now representative of the redefined population, was taken. Purposive (or judgemental) sampling is defined by Collins et al. (2000) as "when the researcher selects a sample that can be judged to be representative of the total population" (p. 159).

A purposive sample framework was developed for each forum (as well as for the public who do not participate in forums). This was done by selecting potential respondents who are representative of various sectors, which, in turn, are representative of the forum's constituency. Two such lists – one for each forum – were drawn up and potential respondents were clustered within representative categories such as mining, local government and civil society (amongst others). These lists shaped the semi-structured interview planning schedules (and later the observation planning schedules). These respondents were given an index code that begins with a forum descriptor (e.g. RSF), then the type of data collection (Int for interview), followed by the month and day that the interview was held and finally the sector respondent code (see Table3.1).

Approximately six months after starting the semi-structured interviews within the forums, questions emerged about whether the forum participants' values and water stewardship practice were being shaped by their (and others) presence in the forums, and so would their values and practices differ from those who were not involved in a forum? It therefore proved interesting to explore whether similar

values, water stewardship practices and learning were evident in non-forum participants. This exercise also sought to broaden the perspectives of values, water stewardship practices and learning outside of a water-related forum. Thus, a list of respondents was drawn up that mirrored the sector representatives selected from the forums (see Table3.1).

Table 3.1: A list of forum and non-forum respondents and their index codes

Blesbokspruit Catchment Management Forum respondents	**Indexing code**
Private sector respondent	BBFIntDATEPrivSec
Provincial government respondent	BBFIntDATEPG
Paper industry respondent	BBFIntDATEInd
Metal-refinery industry respondent	BBFIntDATEInd (2)
Local government respondent	BBFIntDATELG
National government respondent	BBFIntDATENG
NGO respondent	BBFIntDATENGO
Rietspruit Catchment Management Forum respondents	**Indexing code**
Academic respondent	RSFIntDATEAC
Academic respondent	RSFIntDATEAC(2)
Ceramic industry respondent	RSFIntDATEInd
Mining respondent	RSFIntDATEMining
Metal producer respondent	RSFIntDATEInd(2)
Local government respondent	RSFIntDATELG
Parastatal respondent	RSFIntDATEParaS
Community-based organisation respondent	RSFIntDATECBO
National government respondent	RSFIntDATENG
Non-forum respondents	**Indexing code**
Provincial government respondent	NFIntDATEPG
Academic respondent	NFIntDATEAC
NGO respondent	NFIntDATENGO
Mining respondent	NFIntDATEMining
Industry respondent	NFIntDATEInd

Before contacting forum respondents, an interview schedule was compiled. Guidance was taken from Cohen et al. (2007), in developing the interview schedule by referring to the research questions and objectives and "translating the research objectives into the questions that, "…ma[d]e up the main body of the schedule" (p. 356). These questions (see Appendix 1) were later refined in light of the theory pertaining to values, social learning and practice, and as more interviews were conducted and learnt from. In the construction of the questions, guidance was taken from Cohen et al. (2007): The questions were designed to be "open-ended" and their "framing" was taken into consideration, i.e., ensuring that the easier and less threatening questions were asked first in order to allow respondents to settle with ease. The respondents who did not participate in forums were asked slightly different questions by virtue of the fact of their non-forum participation.

Thereafter, informed consent was acquired at the forum meeting, from both the forum and its Chairman to conduct interviews with selected respondents, many of whom were present at the time of the request. This consent was requested yet again of the selected respondents in a carefully drafted email that described the purpose and nature of a semi-structured interview (see Appendix 2). Confidentiality was also stressed.

Over a period of approximately seven months, 16 interviews were conducted with people who participate in the forums and who represent different organisations that are representative of various sectors. Five other people who do not attend forums were also interviewed. Before each interview, permission was obtained to record the interview, and the respondent's confidentiality and time were respected. Each interview was conducted for a maximum duration of 45 minutes. The probing nature of the questions necessitated reassurance that any question could remain unanswered. Once the interview was transcribed, the full transcribed interview was sent to the respondent for review and comment. This was done to secure credibility and confirmability (see Section 3.6).

3.4.2.1 Reflections on the interview process and potential limitations to data collection

A pause to reflect: During the literature review I was reading and writing about the variables of the VBN Theory. One of those variables is awareness of consequences. While reading about awareness of *consequences* I read about concerns playing a role in awareness of consequences and so made up my mind that AC stood for awareness of *concerns*, which I subsequently and erroneously interviewed for. Only later, when analysing my data, did I realise that I should have interviewed for awareness of consequences and not awareness of concerns. As a result, I compiled a short questionnaire (see Appendix 3) which I sent to all respondents of the forums only (because I corrected my mistake in time for the interviews with the non-forum participants) to probe for awareness of consequences.

A pause to reflect: Being privy to a deeper part of people's life experience left me in awe of their stories and by hearing these stories, I felt exposed to a deeper, richer understanding of people's humanity. On many occasions, I felt privileged as I was able to share in a small part of my "colleague's" private lives. This sentiment was reinforced when, after one particular interview, I received an email articulating the respondent's reflections on some of the content of the interview: "I'm trying to work out why it was hard to talk about values and what I have so far is that I think the way I value things is based on an intrinsic connection to something and that is something actually quite difficult to talk about…I have also never reflected on how my underlying values of nature or the environment have affected my work and what I do;I guess because I have never really acknowledged them, they have just been something that have existed in my inner self (they have never been expressed before)."

A pause to reflect: This interview process and the nature of the questions challenged my own values with regard to environmental management practice. This happened because I came face to face with people who truly lived out their values in almost every sphere of their lives; exploring ways in which they could continue to engage with or expand their practice. This compelled me to question the depth of my own values and concomitant practice. This questioning led me to wonder about my own

commitment to the protection of the environment, which in turn evoked questions about my own sense of calling or vocation within this field.

A pause to reflect: Lastly, a realisation dawned upon completion of the interview process: because people were interviewed in a work-place environment (and respondents were usually managers), I assumed a cultural and intellectual parity. Thus, I have not acknowledged potential cultural "gaps" in the understanding of values and what is important to people. With regard to the intellectual understanding of what I was asking questions about, I soon realised that many people do not understand the concept of water stewardship, and yet it forms part of my every day, professional discourse. My theoretical understanding of the concept had to be explained to many of the respondents.

3.4.3 Observation

After some deliberation between the efficacy of focus groups and observation as the third data collection method in the study's triangulation strategy, I decided to observe forum participants engaging in different water stewardship practices.

This decision was guided by critical realism's stratified ontology. It was important to understand whether the real, i.e., values, were manifested in the actual or empirical strata as water stewardship practice. This enabled the observation of everyday behaviour from a new perspective (Cohen et al., 2007).Because a characteristic of observation is to provide an *in-situ* opportunity to gather data from a social situation (Cohen et al., 2007), I had the opportunity to explore the proposed link between values, beliefs, norms and pro-environmental behaviour and practices, as discussed in chapter two (see Section 2.4.3).

A list of all the water stewardship practices that were identified in both the document analysis and the semi-structured interviews was drawn up (see Table 3.2).

Table3.2: A list of all the water stewardship practices identified in the data collection

Water stewardship practices	**Source**
"Zeroscaping" gardens	RSFAC2
Planting indigenous plants	RSFAC2
Using less water to flush	RSFAC2
Rainwater harvesting using JoJo tanks	RSFInd2; BBFNG
Reverse osmosis at work	BBFInd2
School water education	RSFLG; BBFPG
Law enforcement	RSFLG; BBFNG
Water quality testing	RSFParaS; BBFLG; BBFNG
Shower not bath at home	BBFInd
Borehole water use for gardening	BBFInd
Replace leaking taps	BBFInd
School council representation	BBFInd
Water use licence compliance	BBFInd(2)
Community education	BBFNG; BBFPG
Community baptism	BBFNG; RSFCBO
Being an example	BBFPG
Presentations on various water-related topics	BBFPrivSec
Development of water-related training courses	BBFPrivSec

Four different water stewardship practices were selected from this list, two from each CMF. A person from each forum, who engaged in these practices, was selected for observation. The water stewardship practices of 1) school water education, 2) water use licence compliance, 3) water quality testing and 4) rainwater harvesting were observed. With regard to school water education, the observation was done during a

Department of Water Affairs' Adopt-a-River launch alongside a local stream in the eastern suburbs of Johannesburg. In many ways, this once-off observation was not well chosen for the following reasons: It was the Department of Water Affairs' first educational initiative of this nature in that area which meant that time was pressured, people were pressured and the equipment for the initiative was poorly organised. With regard to water use licence compliance, the observation was conducted in a less pressurised environment than observation one. The water use licence compliance observation was done at the metal refinery plant, partly in the office of the metal-refinery industry respondent, and partly on site. The nature of the observation was such that I had much time (approximately three hours) to observe the person's work station, documents used during the process and some of the monitoring points she used to conduct the compliance process. This observation was done once. With regard to water quality testing, the observation was also a once-off event done on the banks of the Klip River, which is a tributary of the Vaal River. This observation was a simulation of the actual practice done on the Rietspruit. The simulation was done because it was only after I had interviewed this person, and set up the observation that I realised that the person was not the person who did the testing on the Rietspruit. However, this person simulated the water quality testing practice which, apparently, is standard practice in the catchment. This practice was observed and probed for approximately one and a half hours. The practice of rainwater harvesting was observed at the home of the metal producer respondent. This observation occurred once for a period of approximately two hours. This time limit was because I arrived at her house late in the afternoon, and because it was winter, it began to get cold and dark quickly.

From an ethics perspective, all respondents were emailed with a request for and an explanation of observation as a data collection method (see Section 3.6). Once consent was gained by the selected respondents, a time and date for observation was set with each respondent. From the list in Table 3.2, two practices from each forum were selected on the basis of easy accessibility and a good provision of an opportunity for observation Before the observation, a list of five questions was drawn up to help probe what was being observed (see Table3.3). These questions were merely used as the central facilitator for other probing and questions.

Table3.3: A list of five questions used to probe observation

Have you always worked like this?
Would you like to change the way you practice?
How are your values changing as you practice, if at all?
Are you learning as you practice?

The four people were observed engaging in water stewardship practices in a manner congruent with the definition that Cohen et al. (2007) provide. In other words, the observation was semi-structured in that there was an agenda of issues to be explored but the data was gathered in a far less systematic way than a structured observation. All the observations were direct in that the presence of the researcher was known. All the observations were recorded with audio and photographic equipment (see Appendix 4). This data was then indexed and coded for further analysis. The data was indexed using a similar system to semi-structured interviews (see Section 3.4.2) in that the forum descriptor, type of data collection method (Obs), sector respondent code and date of data collection was used. The data analysis was complemented by field notes (Cohen et al., 2007) recorded in a journal (see Appendix 5). Once the audio was transcribed, it was sent back to each respondent for a member check (see Section 3.6). Only three respondents replied. One respondent replied with no amendments and the other two replied with suggested amendments.

A pause to reflect: The decision to engage with observation rather than focus groups was a good one. The opportunity to probe into the connection between values and practice was vital to trying to understand the VBN Theory and the relationship between practice and social learning. Though there was some frustration in the shared experience during the observation, it was heartening to observe how people opened up to reveal the domain of the real in their ontology and how it related to their practice. It was heartening because it was surprising to learn how much people are prepared to reveal about their values and the values influence on practice; for example, the metal-producer respondent opened up her home to me so that I might observe the rain-water harvesting practice she engages in. During that observation

she revealed thoughts about her private life that enabled me to understand some of her values and her practice and how they relate to her worldview.

3.5 Data Analysis

Huberman and Miles (cited in Denzin & Lincoln, 1994) define data analysis by incorporating three processes, viz. data reduction, data display and drawing conclusions. Data reduction and display comprise the first stage of data analysis while the drawing of conclusions comprises the second stage of the analysis. For the purposes of this chapter, I will engage in a description of the data reduction process (see Section 3.5.1) and merely refer to the data display and conclusion drawing, which will be covered more comprehensively in chapters four, five and six.

Freeman and Richards (1996) and Danermark et al. (2002) describe five categories of analysis that enable the answering of the research question. The categories are as follows:

- Grounded Analysis (categories and analysis that emerge from the data with minimal *a priori* (beforehand) expectation).
- Negotiated Analysis (categories and analysis developed by the researcher with the input of the participants).
- Guided Analysis (categories developed *a priori*: subsequent analysis guided and categories are modified through interaction with the data).
- *A Priori* Analysis (categories determined in advance of the data collection: analysis according to those categories).
- Retroductive Analysis ("from a description and analysis of concrete phenomena, reconstruct the basic conditions for these phenomena to be what they are" (Danermark et al., 2002, p. 80)).

Grounded and negotiated analyses are similar in concept to the Danermark et al. (2002) theory of inductive analyses. Guided and *a priori* analyses are similar in concept to the Danermark et al. (2002) theory of abductive analyses.

The data reduction process engaged with in this study began with *guided analysis*, because a) the key objects of my study, values, water stewardship and social learning were clearly integral to the research questions; and b) the framework of the Values Belief Norm Theory enabled the identification of core and sub-categories from which I could reduce the data. However, interaction with the data did allow some modification of the categories and any information which emerged from the data not easily captured in the *a priori* categories was placed in new categories. The integration of both types of analyses – guided and *a priori* – enabled both inductive and abductive analysis. Inductive analysis allows the identification of emergent themes as the analysis unfolds, while abductive analysis allows a re-contextualisation or re-interpretation of the data using "wider lenses" provided by theory (Danermark et al., 2002).Retroductive analysis was used to interpret and discuss causal mechanisms at the level of the real.

3.5.1 Sequence of Data Analysis

According to Maxwell (2008), a basic principle of qualitative research is to ensure that data analysis is conducted at the same time as data collection. The reality of this study was that both collection and analysis occurred in a staggered fashion, with data collection occurring for a length of time and then some analysis thereafter, and then data collection again.

Step 1: Content analysis and categorising

Initially, a table was drawn up describing the core and sub-categories using the key theoretical objects of the study (see Table3.4), which reflects the use of abductive analysis. However, as interaction with the data proceeded (the content of the CMF minutes were analysed first), the core and sub-categories were amended and added to (see Table3.5), which reflects an inductive approach to analysis. As the content of the CMF's minutes were analysed, coded and indexed, the semi-structured interviews were transcribed by a Rhodes Journalism student. Once the interviews were transcribed, their content was analysed, indexed and coded (see Appendix 6) just as the observations began. Eventually the content of the observations as also studied, coded and indexed and, like the analysis of the two preceding data

collection methods, systematically transferred to corresponding analytical memos (see Appendix 7)that contained these core and sub-categories.

Table 3.4: The core and sub-categories of this study's theoretical objects

Table 3.5: The amended core and sub-categories of this study's theoretical objects during data interaction

A. Values	**Values**
1. Biospheric Values	Biospheric Values
2. Altruistic Values	Altruistic Values
3. Egotistic Values	Egotistic Values
B. Beliefs	**Beliefs**
1. New Environmental Paradigm (NEP)	New Environmental Paradigm (NEP)
2. Awareness of Consequences (AC)	Awareness of Consequences (AC)
3. Ascription of Responsibility (AR)	Ascription of Responsibility (AR)
C. Norms	**Norms**
1. Obligation to take Action	Obligation to take Action
D. Social Learning	**Social Learning**
1. Framing (re-framing and de-framing)	Framing (re-framing and de-framing)
E. Water Stewardship Practice	Other learning
1. Water stewardship	**Water Stewardship Practice**
2. Practice (doings, sayings and relatings)	Water stewardship
	Practice (doings, sayings and relatings)
	Other
	Non practice
	Non-compliance
	Non-involvement
	Public participation
	Values definition
	Values formation

Step 2: Displaying the data: Abductiveand inductive analysis

The display of the data in chapter four shares narratives of water stewardship practice, value orientations and social learning. The chapter attempts to ensure the

data “belongs somewhere to some time and to some actions” (Lotz-Sisitka, H. pers. comm). This was done by using carefully structured analytical memos compiled from the data collected (see Appendix 7), and by using the method of thick description to create the narrative. Thick description allows for a rich, extensive and detailed description with regard to the issues and cases under study (Merriam, 1995) so that the original “voices”, and thus meaning, do not get lost in the data. The information was presented in a way that ensured that readers saw that the data were generated in the real world among people, and so were “not de-contextualised from the spaces where it [was] generated” (Lotz-Sisitka, H. pers. comm). The data was presented by forum (and non-forum, where applicable) using the categories and sub-categories as described in Table 3.5, above. This effectively provided insight into the empirical data, as experienced by people in the case study sites, as well as insights into events and aspects of the real.

Step 3: Interpreting and discussing the data (drawing conclusions): Abductiveand retroductive analysis

Guidance for constructing chapter five was taken from Bassey (1999) to ensure that interpretation and explanation was brought to bear on the data so that an “understanding of the way things are” (in terms of data) was provided (Bassey, 1999, p. 71). In chapter five, the data is condensed using analytical statements, which are based on the raw data. Through a process of testing these statements against the data, the contextual profile and the theory presented in chapters one and two, respectively, they are shaped into a form that is trustworthy (Bassey, 1999) and that also reflects the abductive and retroductive analysis processes used. In chapter five, six major analytical statements are presented with discussion coalescing around abductive and retroductive perspectives on the actual and the real for each of the analytical statements, which are constructed from context, theory and data.

3.6 Trustworthiness and Ethics

Tobin and Begley (2004) suggest that those using a qualitative approach to research have questioned the use of the concepts of validity, reliability and generalizability, and argue the inappropriateness of using terms across the paradigms of a qualitative

approach and a quantitative approach. However, Morse, as cited in Tobin and Begley (2004) cautions an outright rejection of validity and reliability because, she argues, to reject validity and reliability is to reject rigour, which is foundational to science. Tobin and Begley (2004) defend the need for rigour because they argue that it is "the means by which we show integrity and competence…regardless of the paradigm." (p. 390)

Thus dawned the use of a new language for research with the introduction of Lincoln and Guba's ideas on trustworthiness as cited in Tobin and Begley, 2004. The concept of trustworthiness provided a new way for qualitative researchers to explore validity, reliability and generalizability. Lincoln and Guba (as cited in Tobin & Begley, 2004) refined the concept by introducing the criteria of credibility, transferability, dependability and confirmability.

Credibility is comparable with internal validity which addresses the issue of "fit" between the respondent's views and the researcher's representation of them. Credibility, in this study, was demonstrated by the practice of accurate transcriptions, member checks and audit trails in attempts to ensure rigorous analysis. Every interview was transcribed and sent back to the relevant respondent. Only four respondents replied with amendments. Then, as described in Table 3.1, indexing ensured that a verifiable audit trail was established.

Transferability is comparable with external validity which refers to the characteristic of generalizability. Despite arguing for generalizability (transferability) in Section 3.2.2, it is worthwhile noting that Tobin and Begley (2004) urge qualitative researchers to "recognise that…'external validity' is substantially different in qualitative inquiry, as there is no single correct or 'true' interpretation in the naturalistic paradigm" (p. 392). However, it is interesting to note that Danermark et al. (2002) argue that the "transfactual conditions" (p. 78) or the generative mechanisms which sit at the level of the real, can be "more or less general" (p. 78).

Dependability is synonymous with reliability and was achieved in this study by the practice of establishing an audit trail of the data, the use of thick description and rigorous abductive and retroductive analysis. This audit trail was established by

accurate indexing of all minutes of meetings, all interviews and observations. The indexing was carried over into the analytical memos, which formed the basis of the research evidence, interpretations and reporting.

Finally, confirmability, which is akin to objectivity or neutrality, is concerned with ensuring that the data and its interpretations are derived from the data itself and are not just a figment of the researcher's imagination while allowing for rigorous abduction and retroduction. The abductive, *or a priori,* analysis was engaged in by developing categories from the theoretical frameworks (described in chapter two) but expanded to include other categories once data analysis began. Retroductive analysis was used to infer the relationship between the causal mechanisms (values) and the empirical (water stewardship practice). Furthermore, the use of audit trail and member checks helped confirm the integrity of this study.

Ethical considerations should be prominent in every aspect of research design (Maxwell, 2008). Collins et al. (2000) define research ethics as "[Fundamentally]…collecting, analyzing, and interpreting data in a way that respects the rights of our participants and respondents" (p. 118).

Collins et al. (2000) go on to mention that, integral to the research, is the practice of doing no harm to people with whom one conducts research. Costley and Gibbs (2006) take this notion further by positing that not only should we do no harm, but we should do good. This is what they deem a "virtuous researcher" (p. 93).

Included in this notion of doing good is the practice of obtaining informed consent for research to be carried out. With regard to this study and as mentioned above, informed consent was obtained by giving a presentation to each forum at the beginning of the data collection process. This was followed up with an email to each of the respective Chairpersons, requesting written permission (see Appendix 8). Then, each selected respondent was asked individually for permission to interview them.

More important, however, is the recognition that with that informed consent comes the transformation of colleagues into research subjects (Costley & Gibbs, 2006). This

transformation ushered in a new tension that needed to be recognized, respected and handled with an “ethic of caring” (Costley & Gibbs, 2006, p. 93). This transformation became quite real to me as I began to tread on the “sacred ground” of deeply felt values with regard to the questions I was asking of “colleagues”. The questions often probed into deep, personal spaces that the respondents themselves had probably not asked of themselves, nor had closest friends and family (see Section 3.4.2.1). Therefore, I was always reflexive and thus aware of respecting the respondent’s privacy. This process led to an understanding that the research process is a mutual activity, which has personal consequences and its own legitimacy (Costley & Gibbs, 2006). Essentially what I was engaging with was the right to people’s privacy. Cohen et al. (2007) define the right to privacy in different ways but one which is pertinent to this example is that people have the right not to participate in the research and not to answer questions. On two occasions the interview was declined due to a) time constraints and b) a deferring to a more senior person. One request for an interview went unanswered. By offering people the right not to participate in the research and/or answer questions, I endeavoured to respect the respondent’s privacy.

An extension of the right to privacy is managing two other aspects of it: confidentiality and anonymity. Collins et al. (2000) defines confidentiality as “a researcher undertaking not to publicly link a specific response or behavior with a particular research participant” (p. 112). Cohen et al. (2007) point out that anonymity is assured by confirming that “information provided by participants should in no way reveal their identity.” In this case study, it was possible to ensure partial anonymity by protecting the respondent’s anonymity in reporting but impossible for me to guarantee full anonymity because I was sitting face to face with the respondent. Full confidentiality was offered, however. This confidentiality was protected by deleting any trace to the respondent’s identity in the transcription of interviews and in the coding and indexing of the data. However, it must be said that the “deletion of identifiers” (Cohen et al., 2007, p. 65) was only done after the transcribed interview was sent to the respondent for member checking. This was an error in ensuring confidentiality was protected. In future, it would be better to delete identifiers *before* sending the transcribed interview to the respondent for member checking.

3.7 Conclusion

In this chapter, a detailed description of the meta-theory for this study, critical realism, has been provided. It was important to note how critical realism helps explain unseen mechanisms like values by providing the framework of “stratified ontology” and its composition of the “real”, the “actual” and the “empirical”. Thereafter, the rationale of working with two case studies, the Blesbokspruit and Rietspruit CMFs, was given with particular emphasis placed on how the case study integrated with the framework of critical realism by “observing effects in real-life contexts”. Then, the theory underpinning the choice of data collection methods – document analysis, semi-structured interviews and semi-structured observation – was presented. This was followed by a description of the application of those methods in the two CMFs. After the methods of data collection, came a detailed account of data reduction, while data presentation and conclusion are merely referred to in anticipation of chapters four, five and six. Lastly, the chapter delves into the importance of ethics and trustworthiness.

CHAPTER 4: PRESENTATION OF VALUES, WATER STEWARDSHIP PRACTICE AND SOCIAL LEARNING IN TWO CATCHMENT MANAGEMENT FORUMS

4.1 Introduction

Chapter four presents the data based on the analytical process described in Section 3.5. This chapter begins with a brief history of the relevant CMFs (Section 4.2). Sections 4.3and 4.4then present the data pertinent to each catchment management forum respectively, while Section 4.5presents data collected from people who do not participate in CMFs.

As described in chapter three (Section 3.4) the following methods were used to collect data for analysis:

- Document analysis (of seven years' of minutes for both CMFs)
- Semi-structured interviews (of 16 members of both CMFs, representative of different sectors of the public and 5 members of the public, representative of similar sectors to that of the forum representatives, but who do not participate in CMFs.)
- Observation (of four water stewardship practices – two from each CMF. See Section 3.4.3.)

Table4.1 provides an explanation of the use of the core categories used to analyse the data. The core categories form the basic structure of each section within this chapter. The chapter uses inductive and abductive approaches to analysis (see Section 3.5).

Table4.1: Core categories used to analyse the data for both case studies and the non-forum sample

	Values
Blesbokspruit Catchment	The values described below refer to "held values", which are differentiated from "assigned values" as described in Section 2.4.2 of chapter two. It is also important to note that these held values are

Management Forum AND	also referred to in Section 2.4.3 as components of the Value Belief Norm (VBN) theory. The key forms of "held values" that I will use for analytical purposes in this study are referred to as: Biospheric (concerns about the biosphere), altruistic (concern for others), and egoistic (concern for self).
	Beliefs
Rietspruit Catchment Management Forum AND Non-forum participants	The meaning of beliefs as used in this study relates to elements of the VBN framework as described in Section 2.4.3 and includes consideration of: An ecological world view (NEP), awareness of consequences (AC) and ascription of responsibility (AR). Stern et al. (1999) explain that beliefs here are beliefs that things (objects) important to those values are under threat (adverse consequences) and beliefs that actions initiated by the individual can help alleviate the threat and restore values (ascription of responsibility).
	Norms
	As shown in Section 2.4.3, Schwartz (cited in Stern et al. 1999), defines norms as "feelings of personal obligation that are linked to one's self- expectations". Norms were difficult to search for in the text. To help me in the search, I decided to look for the following words in all text in all the sources of data: Obligation, should, ought, must, important that, involve(d), needs to be as these are indicative of feelings of personal obligation as noted above.
	Social Learning
	For this phase of data analysis, the focus was placed on framing (re- and de-framing) as these are significant processes in social learning theory as described by Wals (2007) in Section 2.5.2 of this study. However, as the data analysis process progressed it was difficult to separate these from wider learning processes, and so another category, "Other Learning", was added to capture these broader "learning processes". Searching for evidence of social learning in the text was difficult. The following words and concepts were used as a filter for identifying evidence of re- and de-framing (as a component of the social

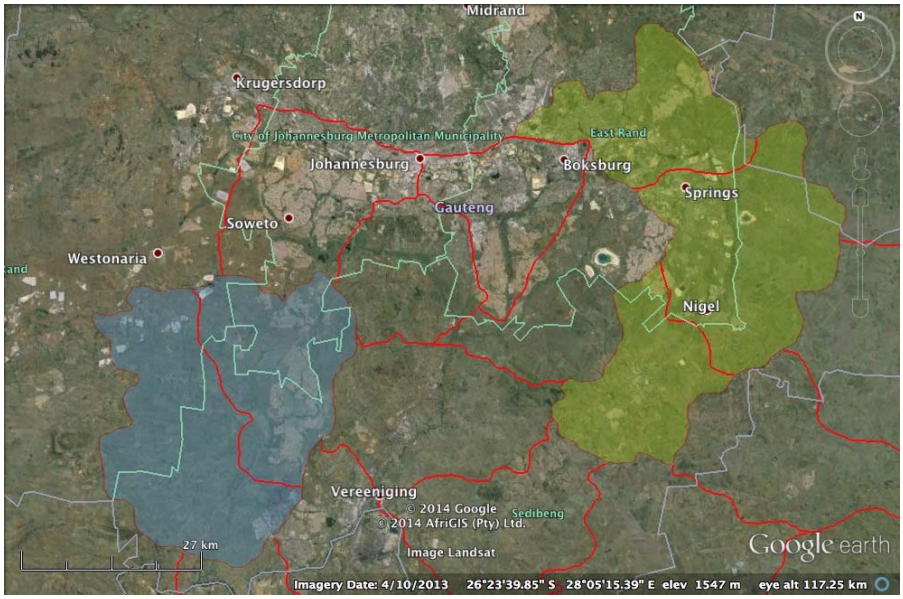
	learning process): Mind-set change, values have changed, “I have learnt”, light-bulb moments, Aha! moments, conflict (or potential for), paradigm shifts, and frames themselves as described in Section 2.5.3.
	Water Stewardship Practice
	The differentiation between water stewardship practice and practice was difficult to understand. This constant tension was recorded in a study journal and is exemplified by the following question I posed myself: “How do I know that practice – normal practice, which is what we have always done – is not (or is) water stewardship practice? In the end a decision was made to focus on evidence of the “values fundamental to the definition of stewardship” (see Section 2.3.2). The evidence was assumed to be reflected in the following words – either implicitly or explicitly – found in the text; or action that was assumed to hold these values: Responsibility, accountability, care, guardianship, stewardship, respect of nature and future generations.
	Other
	In keeping with the definition of guided analysis and the processes of induction and abduction that I was using in the analysis work (see Section 3.5), it was important to ensure that the *a priori* categories could make way for new categories as the data were interacted with. Through the interaction with the data, six new categories came to light that I felt had bearing on the research questions. These categories are: 1) Non practice, 2) Non-compliance, 3) Non-involvement, 4) Public participation, 5) Values definition, and 6) Values formation. One could say that the categories, 1-4 listed above, are a commentary on what Glasser (2007) and Kollmuss and Agyeman (2002) call the “gap” between the sustainability that many in society are calling for, and what is actually happening in practice (see Section 2.5.4).

4.2 History of the Catchment Management Forums

Before delving into the substance of chapter four it is important to be reminded of the history of the specific CMFs wherein this study is located.

From very small beginnings with only a few people meeting to discuss catchment-specific water resource issues, the forums of the Vaal Barrage Catchment have evolved over 17 years into the current structures that exist today (Rand Water, 2010). There are currently four active catchment forums that are operate within the Barrage Catchment, while the fifth – the Barrage Reservoir Forum – seems to be dormant. Rand Water is active in all of the four forums in the Vaal Barrage Catchment.

The Vaal Barrage Catchment is 1,349 hectares and forms part of the southern portion of Gauteng province and the northern portion of the Free State province, South Africa (see Map 4.1). The Vaal River Barrage Reservoir, which is central to the Vaal Barrage Catchment, was built by Rand Water downstream of the Vaal Dam in 1923. The reservoir is 64 kilometres long and has a surface area of 168 km^2. The rivers, more notably, the Rietspruit and Blesbokspruit that feed into the Vaal River Barrage Reservoir, flow from industrial and heavily populated areas such as Johannesburg, Vereeniging and Sasolburg. This reservoir was used to supply water to the Witwatersrand but no longer does so because the quality of its water is deteriorating due to pollution. The reservoir is used for many recreational activities, such as boating, skiing, fishing, swimming and many holiday resorts have grown up on its banks (Rand Water, 2013).



Map 4.1.The Vaal Barrage Catchment with the Rietspruit Catchment shaded in blue and the Blesbokspruit Catchment shaded in yellow

The Blesbokspruit Catchment Management Forum covers the eastern part of the Vaal Barrage catchment (see Map 4.1). The Blesbokspruit Catchment Management Forum was established in 1996 as a result of a gold mine called Grootvlei mine (now known as Aurora) that started to discharge (acid) mine water into the Marievale wetland because pumping of groundwater stopped as a result of impending mine closure. As a result, the mining licence was revoked by the then Minister of Water Affairs, Professor Kader Asmal. However, the licence was soon reinstated but with the condition that a forum of all stakeholders be formed for the Blesbokspruit catchment (Munnik et al. 2011). Since 2000 it has had a guiding Charter that sets out a vision that seeks to "promote a healthy, safe, sustainable environment that is fit for all uses through interactive stakeholder participation within the Blesbokspruit catchment" (Blesbokspruit Catchment Management Forum Charter, 2000). Records of the forum's minutes only stretch back to 2000, and since then, for most of those years, Rand Water has been chairing and leading the meetings which take place four times per annum. The key issue that has come to define this forum, according to Munnik et al. (2011), is the wetland and the threats that mining legacy and current operations pose to it.

The Rietspruit Catchment Management Forum covers the south-western part of the Vaal Barrage catchment (see Map 4.1). The Rietspruit Catchment Management Forum was established in 2001, due to a struggle over air pollution and water issues between the now ArcelorMittal (steel producer) and local communities protesting against its pollution. The forum regularly deals with water pollution issues caused by the three local, municipal-managed wastewater treatment works (Munnik et al. 2011)but there are other pollution issues from gold mines in the area that are also dealt with in the forum. The Charter was compiled in 2002 and describes a mission that "aims to actively involve all stakeholders in formulating an Integrated Water Management Strategy for the Rietspruit Catchment" (Rietspruit Catchment Management Forum Charter, 2002). Minutes of meetings are only recorded from 2002, and from them it is evident that the chair shifted from Rand Water to the Department of Water Affairs to the private sector and now to local government. Like the Blesbokspruit Catchment Management Forum, the Rietspruit Catchment Management Forum meets four times per year.

These catchments comprise stakeholders from a diversity of sectors. Participating to some degree or another is government – local, provincial and national; mining and industry; civil society; parastatals; consultants; water treatment experts and non-governmental organisations.

In the past (2005-2013) WESSA participated in many of the country's CMFs enabling and catalysing IWRM functions where appropriate and performing a watchdog function where necessary.

The first of the two CMFs will now be discussed.

4.3 The public in the Blesbokspruit Catchment Management Forum

The data presented forms a narrative round the six core analytical categories described in Table 4.1. I begin by sharing evidence found in the data on values, beliefs and norms as found in the discourse and practice of the CMF. This pertains to the interest in how held and assigned values influence water stewardship practices (research question one). After that I discuss the evidence for social

learning and how this is related to values embedded in the shaping of water stewardship practices (research question two), as well as other aspects that are of interest to the research questions. It is important to note that respondents' comments have been quoted verbatim to ensure adherence to accuracy.

4.3.1 Values

4.3.1.1 Biospheric values

Document analysis (CMF minutes)

Throughout the minutes analysed between 2005 and 2011, only 15 articulations of biospheric values were made, most of these (10) can be attributed to a private sector respondent, who is also a long-standing environmental activist, and a local NGO who help manage the Grootvaly Wetland Reserve and the Marievale Bird Sanctuary which are located on the Blesbokspruit in Gauteng. The biospheric values expressed by this group were in relation to birds in particular as expressed by this quote from one of the members: "The birdlife is excellent in this region at present" (BBFMins0508.11). However, if one reads the following quote from another of the NGO's respondents, in relation to the theory of "assigned values" described in Section 2.4.2, then one can see how the held, biospheric values pertaining to birdlife are playing a role in the valuing of birds in the particular natural places of Grootvaly and Marievale: "Results show an increase in the bird counts *at the Grootvaly Wetland Reserve and the Marievale Bird Sanctuary*." (BBFMins0207.15, italics added)

Semi-structured interviews

After analysis of five semi-structured interviews, the held biospheric (and concomitant assigned) values of the NGO that were expressed in the minutes (as described above) are congruent with the values expressed by a respondent of the same NGO in an interview. This relationship between held biospheric and assigned values is deftly illustrated by two succeeding quotes from the member's interview: "[I have] a great interest in the birdlife in the wetland" (BBFInt0915NGO.1) and "I want to protect what we've got here… particularly, when I say here, the Blesbokspruit" (BBFInt0915NGO.2). From this it is possible to see that data from the minutes and

the interview indicate that the held value of birdlife is assigned to the wetland in the Blesbokspruit.

Held biospheric values were also expressed by two respondents from the forum – one from industry and one from the private sector (who is also an activist for the environment). These values were expressed in terms of protecting the environment – particularly “fish, and the birds and the plants” – and the need to defend these “voiceless organisms” (BBFInt0712PrivSec.9). If one interprets this discourse drawing on environmental ethics perspective, as described in Section 2.4.1, then one could argue that these respondents are showing a strong non-anthropocentric environmental ethic. (At least whilst they were discussing these issues at the time of the research.)

A provincial government department respondent was clear about how his biospheric values of “conserving our natural resources” elicits a passion to “play a significant role” in “that” conservation (BBFInt0713PG.2).

Observation
The only biospheric perspective observed (out of two observations) belonged to the industry respondent after an hour long observation: When her water use licence (WUL) practice was probed, she expressed the notion that “[her] values would be more on protecting the environment than permitting them [her colleagues] to do whatever they do …” (BBFObsInd(2)0503.14). During this observation it was clear that this person’s biospheric values were motivating her to “do something more [to] help the environment” (BBFObsInd(2)0503.7) and to “be a voice of the environment” (BBFObsInd(2)0503.14).

4.3.1.2 Altruistic values

Document analysis (CMF minutes)
In the same set of documents analysed covering a six year window (as mentioned in Section 4.3.1.1 above), only two clear references to altruistic values (a concern for others) were made in minutes analysed from 2005-11. These were: 1) how fumes of

a recent spill were going to affect human health, and 2) how local communities were complaining about a bad smell due to a raw sludge dump on the Blesbokspruit.

Semi-structured interviews

All of the respondents (seven), except for the NGO respondent, expressed the importance of protecting water for "future generations" or "our children" or "our community". This point is reflected by the following quotes from different respondents:

> "Maybe not our generation, but the generations to come might sit with the problem" (BBFInt0712Ind.8).

> "[I am] trying to give something back to the community, so I think that's basically my biggest motivation in what I do is because it's community-based, it's for the people, for the country, for our children to come" (BBFInt0712LG.2).

> "So the value actually is to understand the importance of water to the community…" (BBFInt0812NG.4).

These altruistic values were communicated in three ways: 1) it is important to protect and/or conserve water (for future generations) for example, "you really need to protect, to conserve for the future generations" (BBFInt0713PG.3), 2) water use efficiency and care (for future generations), for example, "you use it but it needs to be recycled because somebody else has to re-use it somewhere else" (BBFInt0812NG.4), and 3) the importance of enabling an understanding of the importance of water and its usage within communities (for future generations), for example, "we need to teach the community about it [water], we need to teach each other" (BBFInt0713PG.3).

Observation

There were no direct references made to altruistic values during the observations.

4.3.1.3 Egotistic values

Document analysis (CMF minutes)
There was no direct evidence of egotistic values being expressed in the minutes of the meetings analysed over the same six year period.

Semi-structured interviews
Only two references to egotistic values were made during the interviews (total of seven interviews). The one reference suggests a *negative* egotistic value, i.e., the discourse was framed in economic terms and it was a complaint about payment for water. The person talking – a provincial government respondent – was juxtaposing the rural community and the requirement that they pay for what could be seen to be small volumes of water and the urban community and their disdain for the same. His point was that those in the urban communities selfishly dismiss payment because "they don't see the value of paying for water services" (BBFInt0713PG.5), whereas rural communities recognise water's value and are more prepared to pay for it. This issue was expressed as follows:

"You will find that each and everything, household, is contributing in the rural areas, when they say this is the R10" (BBFInt0713PG.5).

Then, another egotistic value was expressed by another catchment management forum participant, this time from the private sector, who reflected on the importance of water in terms of lifestyle. He stated that water provides our "…food, for the dinner we have, for the shower that we take, for washing cars, for bathing…" (BBFInt0712PrivSec.9).

Observation
No egotistic values were evident from the observations undertaken in this CMF.

4.3.2 Beliefs

4.3.2.1 New Environmental Paradigm (NEP)

Document analysis (CMF minutes)

The only reference to the New Environmental Paradigm throughout the six year period was from the NGO respondents. It was interesting to note that the NGO respondents, who expressed biospheric values pertaining to birds, also conveyed a belief that another component of the ecosystem – reeds – that support the bird population needs to be controlled. A metal-refinery respondent, historically involved in the Blesbokspruit wetland, supported this belief (BBFMins0505.17).

Semi-structured interviews

In two of the seven interviews, a question of striking the balance between development and conserving the environment emerged from an industry respondent and a private sector respondent. This question is reflected by the tension expressed by the industry respondent when she said: "You've got to look at what is environmentally right but … what is environmentally right [isn't] most cost effective to the company" (BBFInt0712Ind.10). The private sector respondent struggled with his perspective that while development and conservation can go hand in hand, the "one can't override the other" (BBFInt0712PrivSec.12).

One conceptualisation of NEP – humanity's right to rule over the rest of nature (Dunlap et al., 2000) – was expressed in religious terms by the local and provincial government respondents and the private sector respondent. The discourse used is couched in terms that could be associated with stewardship, i.e., "we must be custodians of the Earth" (BBFInt0713PG.9), "we have the responsibility to look after water…to take care…to use the water responsibly" (BBFInt0713PG.9), also "the Bible says that we were put on this planet to look after the environment that God created" (BBFInt0712PrivSec.9).

Observation

During the observation the industry respondent expressed a duty of care belief, motivating that because "we are environmental scientists or environmental officers" (BBFObsInd(2)0503.7) we need to care.

4.3.2.2 Awareness of Consequences (AC)

Document analysis (CMF minutes)

Compared with other categories analysed in the minutes, there seemed to be more evidence (45 separate issues) of concern in this catchment.

Many of the more frequent concerns could be traced back to wastewater treatment works, where various chemical and biological parameters, like dissolved oxygen, sulphates and faecal coliforms, were increasing or not being reported on. Moreover, there were concerns about human capacity constraints at the wastewater treatment works as well as the capacity constraints associated with the infrastructure of the wastewater treatment works.

Then, there were concerns that emerged less frequently that can be categorised as:

- *Governance*: About the lack of data sharing, mining activity and compliance, lack of eco-toxicity monitoring, the perceived lack of qualified government officials who are reviewing environmental documents and thus making perceived incorrect decisions on development applications, ineffective co-operative governance issues between the Department of Water Affairs and the provincial department, non-attendance at forums, the role of the press at forums.
- *Impact of development*: The extent of urban development and the impact of industry in the catchment, structures damming Blesbokspruit flow and thus impeding flow through the wetland.
- *Pollution issues*: Pollution at various point sources in the catchment, the perceived inaction of the Department of Water Affairs with regard to pollution issues, the spraying of reeds in the Blesbokspruit, sewage spills, manhole and pipeline mis-management, and the fires that started every year.

Semi-structured interviews

An analysis of the interview data shows that the issues of concern can be summed under one concept: There is a lack of water stewardship practice (as defined in Section 2.3.2) in the public sphere in the catchment. This is reflected in the responses of the industry respondent who spoke of the government's need to "regulate and enforce legislation" (BBFInt0912Ind(2).5);and in the local government

respondent's suggestion that there is not "honesty" in "what is happening" in the catchment, and that we only "react when there is a crisis" (BBFInt0712LG.12, 13). The national government respondent showed concern about "compliance to the permits for people who are using the water" and he subsequently warned that consequences will come when "monitoring and enforcement is implemented fully" (BBFInt0812NG.8, 9). The NGO respondent showed concern to "generate a sense of responsibility in government" and he complained that his NGO is "having a great problem trying to generate a sense of long-term dedication in management [in government]" (BBFInt0915NGO.10, 12).

Then, one respondent shared a concern that though the quality of the Blesbokspruit has improved over the time period he has been involved, it is "still not at the level [it] should be" (BBFInt0712Ind.12). Another respondent expressed concern about the preciousness of water and that if we don't look after it, "we are stuffed, we are doomed" (BBFInt0712PrivSec.9). He continued to share an insight into another concern that people don't show enough concern for the environment until it affects them (BBFInt0712PrivSec.18).

Questionnaires

In order to explore the concept of awareness of consequences (AC) – not concern, as I had erroneously probed for – a short questionnaire was sent to the relevant forum respondents. Of the eight questionnaires sent out, only five were returned. The findings follow.

All sector respondents communicated that there are certainly harmful consequences as a result of certain environmental conditions pertaining to water. The private sector respondent couched his answer in a discourse about water use licences being an "official approval to pollute" (BBFQuestion0708PrivSec). All of the respondents said that these consequences are for the "natural world at large" while the NGO respondent specifically identified "bird and animal life" (BBFQuestion0628NGO). Except for the industry respondent, all others interviewed said that people would also feel these consequences; and only the local government respondent and the private sector respondent said that they, personally, would feel these consequences (BBFQuestion0701.LG; BBFQuestion0708PrivSec).

Each sector respondent had a different reply for what they thought the consequences were. Some commonalities, however, were expressed: Both the national and local government respondents mentioned health impacts with regard to deteriorating water quality – the national government respondent in terms of recreation (BBFQuestion0621NG), and the local government respondent in terms of agriculture (BBFQuestion0701.LG). Another common consequence was detrimental impact on wetlands (BBFQuestion0621NG; BBFQuestion0628NGO).

Other consequences raised can be categorised as:

- *Water pollution*: The following consequences were raised by local and national government respondents. Impact of pollution on the natural environment, eutrophication of water bodies, problems with algae and other water plants, changing of biodiversity due to pollution, detrimental effects to aquatic life, cost implications to economic development (due to treatment requirements)
- *Human health*: The following harmful consequences as a result of certain environmental conditions pertaining to water were highlighted by the local government and private sector respondents. Risk to rural communities of using the water for domestic use, irrigation with polluted water changing the composition of the soil when high salinity or metal contents are present, all forms of toxicity (genotoxicity, mutagenicity, teratogenicity, etc.), which will (already are) impact on lifestyle, longevity and health.
- *Governance*: It is interesting to note that the following consequences were highlighted by the national government respondent. Illegal use of water (abstraction) resulting in less water available in the system, unaccounted water by the Department of Water Affairs.

4.3.2.3 Ascription of Responsibility (AR)

Document analysis (CMF minutes)

The minutes of the Blesbokspruit CMF (over the six year period) only reveal one example of an individual taking responsibility for a pollution event that she perceived would have consequences for nature at large. This individual works for local government and is represented in this study.

The other examples of ascription of responsibility are all corporate examples of how organisations or associations are *attempting* to take responsibility. These organisations are from the metal-refining and agro-forestry sector, national and local government, a private wastewater treatment facility and an association of wetland practitioners called the Gauteng Wetland Forum. The word "attempting" is used because responsibility only *seems* to be taken and outcomes are rarely reported. For example, "Erwat has observed a significant amount of oil being discharged into the sewage line however Ekurhuleni Municipality is investigating the matter" (BBFMins0507.13). Most of the perceived threats represented in the minutes have to do with pollution of the Blesbokspruit itself or threats to the adjoining wetland.

Throughout seven years of CMF discussion, as reflected in the minutes, there is very little evidence of beliefs that actions contribute to or can help alleviate the consequences as a result of certain environmental conditions posing threats to others.

Semi-structured interviews

It appears that this theme of weak ascription of responsibility runs through the semi-structured interviews because only two respondents articulated the belief that responsibility for protecting resources lies in their hands. One of the respondents defined that responsibility in terms of altruistic values as follows: "…we, and I include myself amongst them, are responsible for what is going to happen, we are responsible for preserving for on-going generations" (BBFInt0712PrivSec.15). The other respondent framed awareness of responsibility in the context of corporate "procedures that help us to conserve the environment" (BBFInt0912Ind(2).10).

Questionnaire

When the question about ascription of responsibility was framed differently in a questionnaire (see Section 4.3.2.2), the responses were somewhat different: All but the private sector respondent felt that their water stewardship practices could begin to avert those consequences (see Appendix 3) to other people, themselves or the natural world at large. The private sector respondent felt that his "actions [are] being blocked around every corner" (BBFQuestion0708PrivSec). He said that he has "tried to bring across the message of serious and urgent change for improved water

resource management but [has] “come up against a brick wall time and time again” (BBFQuestion0708PrivSec).

How these water stewardship practices would avert those harmful consequences as a result of certain environmental conditions (see Appendix 3) was probed and different answers were given. The industry respondent said that decisions need to be decentralised to the affected stakeholders on the ground (BBFQuestion0628Ind). The local government respondent mentioned the need to measure and control direct and indirect water discharges (BBFQuestion0701.LG). The national government respondent stated a number of potential interventions: Issuing water use licences, compliance monitoring and enforcement, the Department of Water Affairs’ validation and verification project, water quality monitoring will provide information as to whether water quality is improving or not, and implementation of Waste Discharge Charge System(BBFQuestion0621NG). The NGO respondent said he would continue to lobby provincial government and spray reeds (BBFQuestion0628NGO). The private sector respondent said that he was undergoing a revival in his own religious belief system that was helping him to engage in a “God-based stewardship practice” and that he was teaching “in practical ways to people of all ages that are open to the ways of God” (BBFQuestion0708PrivSec).

4.3.3 Norms

4.3.3.1 Obligation to take Action

Document analysis (CMF minutes)
From 2005 to 2006 (until2011), a shift in the object of the norms discourse appears to occur. The shift moves from norms pertaining to “on-the-ground” compliance to norms pertaining to information sharing. The compliance issues dealt with seem to be process issues around rehabilitation (of a dam), disaster management, water quality measurement, testing and treatment and licensing. The information sharing issues that began to gain traction in 2006 and beyond deal with 1) licensing and water quality data being made available to the forum, 2) the report back from wastewater treatment works managers and other municipal workers, and 3) the writing of letters to the relevant municipality attempting to hold them accountable.

Semi-structured interviews

Norms pertaining to biospheric values were expressed in two interviews. This link between biospheric values and norms as "feelings of personal obligation that are linked to one's self- expectations" is best described by this quote from one of the respondents: "Unfortunately the environment… doesn't voice out its frustrations so somebody must voice out all the issues that it encounters" (BBFInt0912Ind(2).8).

4.3.4 Social Learning

4.3.4.1 Framing

Document analysis (CMF minutes)

For the most part, the social learning discourse was centred on multi-lateral discussions and negotiations that occurred outside of the forum. Many of these discussions and negotiations are assumed to have had some potential for conflict, and in fact, one of the negotiations seemed to have failed: "Negotiations between X and Y failed…" (BBFMins0806.20). The two questions that arise, as a result of the framing theory explored in chapter two, are: Were these potential spaces for conflict prepared in a manner that evoked trust amongst the participants? Were they well-facilitated spaces? The answers to these questions do not appear to be forthcoming from the texts.

The minutes identify only one example of a particular frame, from framing theory, the *characterisation frame* (see Section 2.5.3). This frame seems to be held by a private landowner for the local wastewater treatment works. This characterisation frame is reflected in the following quote: "S Lurie raised his concern that the WWTP [wastewater treatment plant] are the worst polluters" (BBFMins0507.5).

Semi-structured interviews

All of seven respondents were asked questions about learning in a CMF context. All of the respondents had much to say about learning in the CMF context and about learning in the water sector in general.

The paper industry respondent reflected a deeply held frame called an *identity* frame (see Section 2.5.3) when he said, “That industry is always seen as the soft target… and everybody else can actually get away with it” (BBFInt0712Ind.6). Later, another discussion ensued where the respondent evoked a characterisation frame (see Section 2.5.3) to describe public perceptions about his organisation, for example: “People are saying that I am (referring to his organisation) environmentally friendly; I’m a green company” (BBFInt0712Ind.12). He refutes this in further discussion when by saying that, “the driving factor at this stage is still money…we need to change our economic paradigm” (BBFInt0712Ind.13). This is an example of a *fixed-pie frame* (see Section 2.5.3).

The CMF context is described as a place of “who is to blame” by the paper industry respondent. But he moved swiftly to counter this frame by suggesting that the CMF could be used as a platform to resolve problems rather than using it as a platform to identify “who is to blame” (BBFInt0712Ind.18).

In terms of changing his perceptions of water, and water security, a “definitive eye-opener” for the paper industry respondent was when he saw a presentation some years ago about water deficit within South Africa’s catchments (BBFInt0712Ind.8). This moved him to understand that, “people need to know the effect of where we’re going if we carry on the way we do” (BBFInt0712Ind.8).

One respondent was clear that her paradigm shift, or realisation about “water-related problems in South Africa”, came as a result of working with a mentor (BBFInt0912Ind(2).3). The respondent also attributed her learning progression to her mentor, and, as a result of that learning progression, she maintained that her passion is growing and that change has been brought into her life (BBFInt0912Ind(2).8).

Another respondent used a characterization frame to describe how humans are “becoming very selfish” (BBFInt0712LG.4).The respondent continued to articulate how most of her learning did not come from books or out of a Technikon but with *people* she was working with (BBFInt0712LG.15). These people, she suggested,

guided her, gave her information, and taught her about the values needed to work for a local authority (BBFInt0712LG.8).

The local government respondent's comments about learning in the context of the CMF echo those of the paper industry respondent when the local government respondent described a strategy evoked in the forum called an "attack-type strategy or approach" (BBFInt0712LG.15). She described how trust needs to be instilled between members to make it a "safe space" but judged that difficult because "everybody that's in the forum is not there with the same agenda" (BBFInt0712LG.16).

One respondent's realisation for his passion for "natural and biodiversity issues" came as a result of his geography teaching (BBFInt0713PG.2). But it was his experience of growing up with the scarcity of water in Limpopo juxtaposed with his adult, urban experience of water that caused him to realise the distinct difference in value sets between rural dwellers and urban dwellers (BBFInt0713PG.4). This tangible experience has shaped the way he sees education of young people today. He believes that education should be experiential, because experience, not awareness, will influence change. To add credibility to this point, he related how field trips to wastewater treatment works for example, helped learners realise the value of water because their perception about the importance of water changed (BBFInt0713PG.6).

The provincial government respondent referred to learning in the CMF, using characterisation frames to label "the perpetrators" with whom the provincial government officials sit down to talk (BBFInt0713PG.7). He also described how "other people" might be withholding information that causes government officials to wonder, "What are they hiding? What do they not want to do?" (BBFInt0713PG.8). However, the positive element to his discourse about these "perpetrators" is that he is not allowing the characterisation frames to prevent a discussion and a resolution to the problems (BBFInt0713PG.7).

Unlike the local government respondent, the national government respondent perceives that the

> Continued discussion in these forums will get more understanding of their [other stakeholders in the catchment] issues, and understanding the issues will give us more light and some insight as to how to deal with those issues of pollution and issues of water quality and how we can prevent it(BBFInt0812NG.13).

He believes that the forum provides a space for learning because it is used as a platform for problem solving (BBFInt0812NG.13).

The private sector respondent used a characterisation frame to label “99% of the people”[stakeholders in the catchment] uncaring and “just in it for themselves” (BBFInt0712PrivSec.5). This comment was in response to his ascription of responsibility belief that “we were put on this planet to look after the environment that God created” (BBFInt0712PrivSec.4).

Observation

In the process of observing the provincial government respondent engaging in learners’ education using a water monitoring method called mini-SASS (South African Scoring System),it was probed how, if at all, he was learning during the practice. His responses indicated that he was learning, particularly as a result of the learner’s questions during the practice of educating school learners. He continued to say, “Your values change” because, as he said, “you are working with different kind of groups that you haven’t worked with before. Then as a result of their questions you realise there are things you need to learn”(BBFObsPG0502.2). It was discovered, after probing another water monitoring practice which he engages with daily, that he would like to change his practice by adding numbers to his usual group of scientists so that he could use their questions as indicators of what he still needs to learn (BBFObsPG0502.2).

The metal-refinery respondent’s value-orientated practice was observed and probed. The respondent expressed, during the observation, that her values would change because of the tension between the need to assist her colleagues to produce “whatever we are supposed to be producing” (BBFObsInd(2)0503.14) and the need to protect the environment. This perspective was reflected by a characterization

frame that was expressed that positioned her employer as the “capitalist” and she as the “voice of the environment” (BBFObsInd(2)0503.14). She mentioned how she has to “shift that guy’s mind” (BBFObsInd(2)0503.15) by educating and waiting for her employer to understand.

4.3.4.2 Other learning

Document analysis (CMF minutes)
Presentations given by numerous stakeholders throughout the years of the CMF seemed to be a very popular form of communication. The topics ranged from water quality, the most dominant topic, to mining practices; from presentations about water quality in wastewater treatment works to water management plans; and from wetlands to birds. Posters, maps, websites, a newsletter, an article and a video were other tools used for communication and learning. The only direct references to education was a formal wetland training course held late in 2004;a Water Research Commission research project and two environmental education initiatives run by a local community-based organisation.

Semi-structured interviews
One respondent appreciated the fact that the forum does play an information-sharing and a networking role (BBFInt0712Ind.15). Later, he seemed to contradict himself later by saying that “industry is not going to share information” in the forum (BBFInt0712Ind.16) that may harm the organisation that he works for.

Another respondent suggested that people don’t have values about water because “they don’t have background information about the water management” (BBFInt0912Ind(2).3). This respondent, therefore, takes it upon herself to inform people about environmental (and water) management. As a result, has seen “a lot of changes” (BBFInt0912Ind(2).4). This point was illustrated by an example she gave: “…at home you find that maybe somebody was just letting the tap run without conserving water and after talking to those people they will try by all means to conserve water” (BBFInt0912Ind(2).4).

Mentors and mentoring was an important component of the learning that the local government respondent experienced in the water sector. She maintained that these workplace-based mentors shared information, were helpful, and guided her in understanding right from wrong (BBFInt0712LG.7).

One respondent believed that learning occurred in the forum because it is in the forum that you "share experience, you share knowledge" (BBFInt0713PG.7). He suggested that the interaction in the forum had really helped him to "come up with a different intervention and management of the Blesbokspruit catchment" (BBFInt0713PG.8).

Water resource management experience allowed the national government respondent to understand, "how the government deals with… issues around the water resources" (BBFInt0812NG.3). In fact, this issue of experiential knowledge seemed to play an important role in developing learning within this person. The national government respondent supported the notion that learning occurred in the forum as a result of the sharing of problems and solutions by various members of the forum. "For example", the national government respondent said, "if we have the respondent from that industry they will tell us exactly what are the problems, where transgressions if there are any, how are they dealing with those kinds of issues…" ((BBFInt0812NG.13).

In a similar manner to the national government respondent, the NGO respondent places importance in practical experience rather than books (BBFInt0915NGO.13, 15), and as a result has come to be known as an expert in reed encroachment.

"Passion for the water environment just grew as I got to know more about it, I got to learn more about it, I got to see more about it, see how it is abused and mistreated" (BBFInt0712PrivSec.5). Another respondent explained how both practical experience and study enabled his learning about water. He explained how the forum provides a "platform for people to give information and others to take information" (BBFInt0712PrivSec.13).

Observation

Observation of the metal-refinery respondent's water use licence work showed that her practical experience is enabling her learning (BBFObsInd(2)0503.7). This is especially true when she seeks out information from others that she does not know much about (BBFObsInd(2)0503.11, 17). This type of learning is also supported by two other types of experience: 1) that she is constantly forced to educate her colleagues about the content of the water use licence to ensure compliance (BBFObsInd(2)0503.14), and 2) she took a water quality elective module as part of her Bachelors of Technology because she "did not have enough knowledge on water quality" (BBFObsInd(2)0503.18).

4.3.5 Water stewardship practice

4.3.5.1 Water stewardship

Document analysis (CMF minutes)

Much of the evidence for water stewardship practice pertained to compliance activities within the catchment. These compliance activities centred on water use licences for mining houses, agro-forestry activity, wastewater treatment works, and a ferro-chrome producer. It is noteworthy that most of these compliance practices were initiated by the organisations responsible without much evidence of the Department of Water Affairs reciprocating the practice of enforcement.

Other compliance activities were:

- Adherence to environmental management plans (*the outcome of the environmental assessment process that is a synthesis of all mitigation and monitoring actions set to a timeline and attributed to particular responsible persons*),
- Water quality monitoring (*regular grab samples performed by water users to measure chemical, biological and physical indicators of water at particular points in the stream or river*),
- Mining permit applications,
- Management of acid mine water in the Eastern Basin (*one of the underground aquifers on the eastern side of Johannesburg*),

- ISO 14001 certification (*provides practical tools for companies and organizations looking to identify and control their environmental impact and constantly improve their environmental performance*),
- Remediation projects,
- Green Drop Assessments (*rewards excellence in the management of wastewater from source, in sewer networks, its treatment at wastewater works and its final discharge to the receiving environment*),
- Effluent management and environmental impact assessments (*a legislated assessment of the possible impacts that a proposed project may have on the environment, consisting of the environmental, social and economic aspects*).

There were six mentions of water stewardship practice other than compliance; five of which were environmental education initiatives and one was a water recycling practice.

Semi-structured interviews

Two kinds of stewardship practice emerged from the interviews. The first is non-activist behaviour in the public sphere and the other is private-sphere environmentalism (see Section 2.4.3).

The majority of the water stewardship practices that reflect pro-environmental behaviour are those that can be categorised as non-activist behaviour in the public sphere. These practices are adherence to water use licence conditions (BBFInt0912Ind(2).9); spraying reeds to improve bird populations in the Blesbokspruit wetland (BBFInt0915NGO.13); reporting, monitoring and managing of pollution incidents as per the requirements of the National Water Act (Act 36 of 1998)(BBFInt0812NG.11); “educating the communities to see the values on the importance of water” (BBFInt0713PG.10) and a “number of courses and presentations and so forth to many forum meetings or any other meetings on these types of topics” (BBFInt0712PrivSec.17).

Two respondents linked their water stewardship practices to their work or career, explaining that “my work is water” (BBFInt0712LG.9) and that he “chose a career which will require [him] to take care of the water courses” (BBFInt0713PG.10).

Three respondents spoke of stewardship in religious terms. One of these three related stewardship to her own personal, religious belief that the word of God teaches her to “look after what He gave us” (BBFInt0712LG.7) and so guides her to “do the right thing” (BBFInt0712LG.10) with responsibility, ownership and trust (all the values inherent in stewardship as defined in Section 2.3.2). Another related his water stewardship practice in terms of spiritual values pertaining to baptism in rivers (BBFInt0812NG.10). One respondent described how important it is for him to educate people to “make sure that they don’t pollute the rivers [and so affect the baptism rituals]” (BBFInt0812NG.10) and that he encourages them to report any effluent incidences. However, this respondent described that baptism practice is changing inform rivers to swimming pools because of the growing pollution in the rivers. The last respondent referred to his “religious attachment” to the “way in which [he] deals with the responsibilities towards water” (BBFInt0713PG.9).

Three respondents appeared to engage with water stewardship practice from a private-sphere perspective. The paper industry respondent described how he and his family “seldom use a bath”, and “would rather shower”; that they use borehole water to irrigate the garden with and that they replace leaking taps very quickly (BBFInt0712Ind.11). Another respondent described using “JoJo tanks[2]” (BBFInt0812NG.11) at his family home in Limpopo to save water. One respondent articulated the importance of educating “the people outside of [his] working environment” and of setting an example of not littering or polluting the water (BBFInt0713PG.10).

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[2]JoJo tanks is the brand name for a plastic receptacle used to harvest and store rainwater from rooftops.

Observation

The metal-refinery respondent, who was observed, admitted that the water use licence process governed the "majority of [her] work". Thus, compliance to that process was integral to the accompanying discourse. For example, "We have to comply with the National Water Act because we are using the water…so under section 21 of the Water Act there are listed activities in which when you are about to conduct one of those activities you need to apply with the Department of Water Affairs to get an authorisation. So that authorisation is called water use licence" (BBFObsInd(2)0503.1). Not for the first time, though, she mentioned her effort to "go over and above the minimum requirement [of the authorisation]" (BBFObs(Ind)0503.6).

4.3.5.2 Practice

Document analysis (CMF minutes)

Once more, the difficulty in determining the difference between water stewardship practice and normal practice was evident. Even in the analysis of this (normal) practice category, some of the identified (normal) practice could be argued for water stewardship practice if I had followed the same train of thought as described in Table 4.1. In the process of selecting the data for presentation, I decided to follow the train of thought described in Table 4.1, and so categorised some of the (normal) practice as water stewardship practice. For example, if some of the water stewardship practice identified was compliance related, then the following text denotes water stewardship practice and not (normal) practice: "It was decided that Waterlab should continue with monitoring in the catchment for now" (BBFMins0506.12). If I use the values inherent in the definition of water stewardship practice then rehabilitation practices of opencast mining in Benoni (BBFMins0205.16) or of slimes dams (BBFMins1105.16) could be argued to have values of "responsibility, accountability, care, and guardianship" (see Section 2.3.3). Moreover, the upgrade of wastewater treatment works (BBFMins1109.6) and/or the submission of an environmental impact assessment for a residue facility (BBFMins0509.2) could also be argued for as water stewardship practices.

If this premise is true, then evidence of (normal) practice is whittled down to more technical aspects of practice, for example: Sample point identification, reporting processes, appointment of consultants, pipeline leak monitoring, easing of “ponding”, updating of water management plans, replacement of man-hole covers, bird counts, inspections of infrastructure, reed removal, national department studies, and GIS modelling of wetlands, although all of these are conducted within the wider ‘remit’ of the broader concept of water stewardship practices.

Semi-structured interviews

Two interviews highlighted two insights into practice. The metal-refinery respondent’s water stewardship practice follows her home where she clearly has influence as highlighted by this quote: “They [family and friends] will end up saying ‘eywena! You like practising what you do at work, at home’”(BBFInt0912Ind(2).8). Then, the private sector respondent articulated how he “loves doing [his] own sampling and standing in the mud and playing in the water” (BBFInt0712PrivSec.6).

Observation

When the provincial government respondent’s practice was observed, a question was used to probe his daily work practice of water quality monitoring, to which he replied, “So we are…in our group, we are normally more than three people [who visit the rivers for monitoring], from the Department” (BBFObsPG0502.1).

The metal-refinery respondent explained how her organisation did a ground water study to “understand the plume of contamination; where is it going to and how [they] can…clean up that pollution” (BBFObsInd(2)0503.16).

4.3.6 Other

4.3.6.1 Non practice

Document analysis (CMF minutes)

Of the nine, recorded pieces of evidence for non-practice, six references were made to national and/or local authorities not practising what they are supposed to practice. The remaining pieces of evidence point towards the lack of biomonitoring and the

reporting thereof. This evidence is reflected in two of the following excerpts: “Piet Muller reported that no biomonitoring could be done on the rivers due to all the rain” (BBFMins0206.15); “Upstream and downstream data from Erwat are not being reported on (biomonitoring being in their permit since 1999). Toxicity test, ground water monitoring and quality of storm water leaving the premises are also not being reported on” (BBFMins0806.24).

4.3.6.2 Non compliance

Document analysis (CMF minutes)

In addition to illegal industrial discharge (BBFMins0805.12), illegal access of quad bikers on tailings facilities (BBFMins1106.11), illegal dumping (BBFMins0507.13) and abattoirs operating illegally (BBFMins0206.19), waste water treatment works received the most attention from respondents attending the forum. This attention was either focussed on the municipality operating the works without a licence (BBF1105.27) or a waste water treatment works was not complying with water quality standards (BBFMins0806.23) because of stolen power cables or mechanical failure. Some of the discourse that formed around this issue involved questioning of the Department of Water Affairs’ role in relation to failed municipal systems. It was said that “the Department of Water Affairs and Forestry takes strong actions against mines/industries that are not complying with the required standards, but no action is taken against municipalities” (BBFMins0507.6).

4.3.6.3 Non involvement

Document analysis (CMF minutes)

The non-involvement (attendance) of many key, catchment stakeholders in the forum is very evident in the minutes (BBFMins0805, BBFMins0206, BBFMins0506, BBFMins0806, BBFMins1106). This is evident from peoples’ non-attendance recorded in the minutes of these forum meetings. Furthermore, there is evidence that this lack of attendance is a consistent pattern throughout a year of forum meetings, e.g. “It was noted that there has not been any representative from Western Platinum attending meetings” (BBFMins0206.20; BBFMins0506.19; BBFMins0806.22; BBFMins1106.19).

Moreover, there is evidence of municipal and national government non-accountability in some issues as reflected in these extracts from the minutes: “The Department of Water Affairs and Forestry is not doing enough to address the problems within Balfour Municipality” (BBFMins0805.15) and “the attitude of the local authorities responsible is deplorable and criminal. When will there be some form of accountability?” (BBFMins0208.11).

Semi-structured interviews
A respondent articulated some of the sentiment already expressed in the minutes about accountability when she said, “we have got the best plans on the table, but we have got nobody that walks out of that office and does it” (BBFInt0712LG.14).

4.3.6.4 Public participation

Document analysis (CMF minutes)
Though there is evidence that the relevant consultants planned to conduct public participation meetings as part of environmental impact assessment processes (BBMins0805.28, BBFMins0806.4, BBFMins0208.16) there is little evidence that the meetings went ahead *and* that the meetings were adequately attended. In relation to the forum, both industry participation, and civil society participation was poor (BBFMins1111.8).

Semi-structured interviews
During the interview, a similar sentiment with regard to participation is summed up in these pressing questions from the private sector respondent: “Where is the participation? Where is the public participation? Where is the pro-active participation in all of this?” (BBFInt0712PrivSec.12).

4.3.6.5 Values definition

Semi-structured interviews
All respondents were asked for their definition of values to ensure that people had a mutual understanding of the word *values*. The answers given were disparate in that there were many different definitions given. This is reflected in the following

examples from the interviews: “Well if I look at the word value for me is putting me somewhere, measuring something” (BBFLG0712.2); and, “Value, for me I associate …with attitude or something that you really, like your attitude towards something” (BBFPG0713.3). However, the one idea that was common to many of the definitions was the idea of value(ing) being attributed to an object, which is reminiscent of Bengston and Xu (1995, p. 6) who define *objects* of value as the “things we care about or think are important”, while values are “the ways in which we care about those things”. They continue to say that values are “a conception of what is good about objects of value” (see Section 2.4.2).

The definitions taken from the interview discourse contained words and phrases such as “standards, respect, or principles” (BBFInt0912Ind(2).2), “what’s important to me” (BBFInt0712LG.3), our “backgrounds” (BBFInt0812NG.3), our “consciousness about protecting the environment” (BBFInt0915NGO.2) and “your attitude towards something” (BBFInt0713PG.3).

4.3.6.6 Values formation

Semi-structured interviews

Knowledge, attained through experience or more formal means, seems to have shaped some people’s values. This notion was supported by the paper industry respondent who indicated that he had gleaned experiential knowledge because of his exposure to the industry and because people in his organisation shared their information and knowledge (BBFInt0712Ind.3, 19). The mining and private sector respondents echoed this notion. The metal-refinery respondent felt that it was through “experiential training” that he realised that “we have a lot of water related problems” (BBFInt0912Ind(2).3). The private sector respondent indicated that it was in “seeing how water is used and abused and treated and mistreated” that he was able to grow his “knowledge and experience” (BBFInt0712PrivSec.7).

Closely aligned with gaining knowledge through experience and formal training is the influential element of mentorship. In two interviews, mentorship was mentioned as an influence on those people’s value systems (BBFInt0912Ind(2).3; BBFInt0712LG.8).

Proximity to the object (water) played a role in valuing of the object, but in different ways. The NGO respondent mentioned how easy access to a river helped shape the values he holds for water: “Oh, that [easy access to a river] influenced me a great deal” (BBFInt0915NGO.5). Whereas the provincial government respondent spoke of how his experience in Limpopo, a very dry part of South Africa, and his inaccessibility to water caused him to protect it (BBFInt0713PG.4). The provincial government respondent articulated an interesting insight into this concept of accessibility: “But when I came here (Gauteng), I [saw] that…the water is abundant, but…because it is readily available, the people don’t really care about water” (BBFInt0713PG.4). The paper industry respondent didn’t think it matters “whether you live next to it or [not]; people have to have the understanding of what the resource actually means” (BBFInt0712Ind.7).

A concept that may share links with proximity to water is childhood experience. One respondent recounted her formative years growing up in Soweto and how the pollution from the burning of coal and the dumping sites influenced her in terms of values (BBFInt0912Ind(2).1). Two respondents recounted how the passion for nature and the environment had been with them since they were children (BBFInt0915NGO.4; BBFInt0705PrivSec.12). The national government respondent recalled a memory: “…play[ing] in the water, fishing, it was such a nice time… we had a very good experience and… we had a good life with an advantage of staying next to the river” (BBFInt0812NG.8).

One respondent mentioned the role of her Christian beliefs in shaping her values as she is “taught by the word of God to look after what He gave us…” (BBFInt0712LG.7).

4.4 The public in the Rietspruit Catchment Management Forum

In this section, the data is presented in a narrative that is centred round the six core analytical categories as described in Table4.1. This section follows the same representation logic as Section 4.3 regarding data relevant to the research questions. As in Section 4.4, the respondents’ comments have been quoted verbatim to ensure adherence to accuracy.

4.4.1 Values

4.4.1.1 Biospheric values

Document analysis (CMF minutes)

There was only one reference made to the biosphere and that was in the context of the safe use of chemicals for fear of the "contamination and killing of aquatic species" (RSFMins0207.8).

Semi-structured interviews

A respondent expressed the importance of water in relation to ecosystems by saying that, "without water there is no life, as ecosystems cannot be sustained" (RSFInt0323AC.1). When asked why she valued water, she referred to a certain tranquillity that the biodiversity, which lives near or on the water, brings her. This is exemplified in her words: "[it is] calm, solemn, it [has] ducks… there's vegetation around it…it's got trees, it's got grass…" (RSFInt0330Ind.20). Two respondents expressed the importance of water for life in general (RSFInt0405LG.4, RSFInt0601Mining.4) but failed to express a focus of that importance on biodiversity per se.

Observation

Biospheric value of water was assigned to the pristine condition of the rivers in the Drakensberg by the parastatal respondent (RSFInt0307ParaS.11). These values were again expressed during the observation and seemed to be laden with a sense of respect for water that "gives life to everything" (RSFObsParaS0517.9, 15). However, when he was talking about water giving life, he used a concept that may highlight a contradiction in his discourse. The term or concept was "commodity". He described water as a "commodity that gives life to everything" (RSFObsParaS0517.9). The word "commodity" has economic connotations that may allude to egotistic values.

4.4.1.2 Altruistic values

Semi-structured interviews

Altruistic values were expressed strongly in the interviews. One respondent intimated that water is a resource we should "preserve for future generations" (RSFInt0323AC.3), while another maintained that "our children and our grand grandchildren will not have an opportunity to engage with those natural resources" (RSFInt0405CBO.13). A strong altruistic value system was also articulated by a third respondent, indicating it would be a tragedy to have nothing "to show your kids, or your grandkids in twenty years' time except a concrete building…" (RSFInt0307ParaS.4).

Observation

A passionate plea was made by the parastatal respondent not to be "flippant and Mickey Mouse with the things that we're dealing with" but to work to look after water for "everyone and not just humans", otherwise "*we* are *all* stuffed" (RSFObsParaS0517.9, italics added).

4.4.1.3 Egotistic values

Semi-structured interviews

Only one respondent clearly articulated an egotistic value system when she declared that she would not "get the life that I value, if I didn't have this source, this water" (RSFInt0330Ind.8). She went on to say that she "cherishes [water] because it allows [her] to do the things that [she] actually cherish[es]" (RSFInt0330Ind.8). Another respondent articulated how her engagement with her water stewardship practice stems from a value to save money (RSFInt0601Ind(2).10) for herself.

There was also a variety of values that could arguably fall under egotistic values. These values could be egotistical because they centre on what water can do for the person concerned: Aesthetic ("We have an aesthetic access to water in an aquatic environment" (RSFInt0405AC(2).6)); recreation ("[the river was able to provide] recreation for us" (RSFInt0405LG.9)); spirituality ("Water is playing a more spiritual role within my family" (RSFInt0405CBO.7)) and once again, economic ("We have

access to water daily in our taps for domestic use, for commercial and industrial use“ (RSFInt0405AC(2).6)).

There were four references to the economic value of water, which may be argued is a complement to an egotistic value of water because economic values may help shape economic processes that we derive personal benefit from. A respondent spoke of water as “a public and economic good” (RSFInt0323AC.3), and indicated awareness of “over-exploitation of this resource” (RSFInt0323AC.3). Another stated “[water] is most probably the most precious, important commodity that the world has, to use and to deal with in the future…” (RSFInt0307ParaS.7).

Valuing water in economic terms seemed to generate some tension within individuals. One believed that “valuing water as a commodity…[will] exclude people…” (RSFInt0405CBO.12).Yet, another expressed that by valuing water as “an economic good”, people will deem it important (RSFInt0319NG.4).

Observation
The egotistic values expressed by the ceramic industry respondent in her semi-structured interview, were evident in the observation as I probed around her water stewardship practices. For the most part, it seemed as though her practice was driven by the desire to save money and to enhance convenience in her life (RSFObsInd0517.2). Towards the end of the observation session, she admitted that it also “makes [her] feel really good to help the environment” (RSFObsInd0517.12).

4.4.2 Beliefs

4.4.2.1 New Environmental Paradigm (NEP)

Document analysis (CMF minutes)
One of the beliefs that comprise the NEP is in the existence of limits to growth for human societies. A decision was thus made to include a few sentences from the minutes to highlight this belief. The sentences describe the state of the wastewater treatment works in the catchment; most of the “stress” associated with the capacity

of the wastewater treatment works was blamed on the “numerous developments that takes place and add additional loads on the existing wastewater treatments works” (RSFMins0510.2), or that there was a “capacity problem. Plant receives volumes much higher that design capacity” (RSFMins0510.5).It was also noted, however, that development “is a political issue [which is] difficult to resolve” (RSFMins0509.9).

Semi-structured interviews

Another of the intrinsic beliefs associated with NEP is humanity’s ability to upset the balance of nature, so when identifying NEP beliefs in the interview text, I stumbled on a potential contradiction. The academic believed that “people should optimally utilize [nature] and if [this is] adhered to by everyone [it] will ensure a clean and safe environment…” (RSFInt0323AC.1). The contradiction is that if humans have the ability to upset the balance then do we have the propensity to choose to live optimally? This egotistic value also speaks to another NEP belief, which is in humanity’s right to rule over the rest of nature.

Humanity’s right to rule over the rest of nature was a sentiment that wove its way through the interviews. For example, one respondent articulated that a clean and safe environment “is a basic and fundamental human right” (RSFInt0323AC.1). Then, another believed that our decisions that impact the Earth have to be “beneficial to the guys with the money…” (RSFInt0610Ind(2).4). And finally, another expressed this belief best when she said, “[It is] no good having these nice natural environments when the people around [them] are unable to benefit out of those resources” (RSFInt0601Mining.5). A fourth respondent’s comment appeared to negate these economic value sentiments when he said, “…the [stakeholders in the catchment] take it as more or less a commodity which they can just use and discard” (RSFInt0319NG.4). This sentiment, however, seemed to contradict his earlier statement about valuing water economically so that people deem it important.

4.4.2.2 Awareness of Consequences (AC)

Document analysis (CMF minutes)
Approximately 19 examples of concern emerged. Of the 19 concerns, two were about data sharing or reporting; two were about government inaction; and three were about non-compliance, particularly with regard to wastewater treatment works.

Thereafter the concerns were quite diverse. There were concerns about community health (because of a sludge pond issue), sewage flow, uncoordinated action of consultants, slow licencing processes, capacity of a particular wastewater treatment works, electrical conductivity of certain water samples, lack of mining people at the forum, an incomplete study, lack of public participation and pollution at monitoring points.

Semi-structured interviews
During the interviews it seemed as though the overarching concern was for the country's water scarcity and how that scarcity related to the "next generation" (RSFInt0405AC(2).16) or "everyone else" (RSFInt0307ParaS.15) or the "poor" (RSFInt0330Ind.23). Only one respondent mentioned a concern about the "aquatic environment" (RSFInt0405AC(2).4). And only one mentioned concern for himself (RSFInt0319NG.4).

Water scarcity was related to inefficient use (RSFInt0323AC.3; RSFInt0405CBO.12), access (RSFInt0330Ind.23), the impact of economic activities (RSFInt0405CBO.9), pollution (RSFInt0330Ind.23) and the cost of treating polluted water (RSFInt0405LG.10). The following examples taken from the interview data confirm concerns for inefficient use, the impact of economic activity and the cost of treating polluted water:

> I am deeply concerned about the inefficient use of water resources in light of scarcity and United Nations (UN) projections that this resource could run out for some southern African countries in the next two decades (RSFAC0323.3).

> And I saw that having a negative impact in the people that were staying in that particular area. Because their economy activities had to stop because of water…the impact of their water resources (RSFCBO0405.9).
>
> It should be a concern for us and then it means with all this pollution happening it's gonna cost more for us to treat the water. Which means at the end it'll cost more for me to buy drinking water, so that that's the concern which means even our future, the future generation (RSFLG0405.10).

Government responsibility, or lack thereof, was mentioned twice, and once as an issue of leadership (RSFInt0405CBO.12, 13). Concern for a lack of leadership at the top of his organisation was expressed by the parastatal respondent when he said "I feel a serious worry or concern because I think we're [leadership] looking at things in too short-sighted a way. It's for an immediate gain, and this goes to the whole political, social, fabric of the country is dealing with (RSFParaS0307.13).

Questionnaires

In order to explore the concept of awareness of consequences (AC) – not concern, as I had erroneously probed for – a short questionnaire was sent to the relevant forum respondents as mentioned in Section 3.4.2.1.

Of the eight questionnaires sent out, six were returned. All six respondents were unequivocal in their responses that there are indeed harmful consequences as a result of certain environmental conditions pertaining to water. However, the answers as to who, or what, will carry those consequences, were quite disparate. It seemed as though two respondents didn't quite understand the question because the answers given did not answer the question directly. Another two respondents answered that people and the natural world at large would bear the consequences (RSFQuestion0715Mining; RSFQuestion0715.LG), while the ceramics industry respondent mentioned that the consequences would affect "the people who depend on the affected water resource" (RSFQuestion0717Ind) and the parastatal respondent said that people and the natural world at large would bear the consequences (RSFQuestion0701ParaS).

Most of the consequences mentioned can be summed up under water quantity or quality issues. Examples of these consequences were captured by the local government respondent as:

> Underground water pollution; waterborne diseases caused by pathogens present in waste water used for irrigation; killing of natural species due to illegal discharges of harmful substances into the natural water resources; reduction of water in streams and lakes due to illegal pumping of under groundwater; harmful algal blooms due to nutrients washed into the rivers from agricultural activities and non-compliant effluent discharged to the river by waste water treatment works as well as the high cost for treating water and buying drinking water (RSFQuestion0715.LG).

Fairly different answers were given by the academic respondent who suggested that one of the consequences would be “continued disintegration of human attempts at leading relatively happy lives in many parts of South Africa” (RSFQuestion0628AC). And the parastatal respondent stated that “it’s simple, someone will die” (RSFQuestion0701ParaS).

4.4.2.3 Ascription of Responsibility (AR)

Document analysis (CMF minutes)

The word “responsible”, or derivations thereof, was mentioned only four times in seven years of minutes. Only once was the word attributed to an individual and that responsibility was attributed to that person by someone else (RSFMins1110.4). The rest of the responsibility was attributed to a body or organisation, all of which were government departments – local, provincial and national (RSFMins0806.6; RSFMins1106.6; RSFMins0207.5; RSFMins0507.7; RSFMins0509.9). On one occasion responsibility was deferred from one municipality to another (RSFMins0509.9).

The issue of municipalities not taking responsibility was mentioned in the interview by the academic respondent who bluntly said that it is “brute negligence of the people who are responsible to govern us effectively” (RSFInt0405AC(2).5).

Most of the discourse with regard to responsibility centres on deferring responsibility, except for the academic respondent who explained: “My wife and I decided we can’t really change our living conditions but we can try and change the community in which we live in. And then we took a principled decision to try and improve the lives of our children, the community we live in, as well as the community we serve” (RSFInt0405AC(2).3).

The issue of deference of responsibility is expressed in the pronouns people use to describe the attributed responsibility. The respondents use words such as they, them, and their. This can be highlighted by examples in the following quotes: “…they [another organisation in the catchment] seem to have accepted that it’s their responsibility to protect” (RSFInt0601Ind(2).11) and “they [ordinary people in the catchment] take responsibility of the water resources” (RSFInt0405LG.11) and, finally, “if they [ordinary people in the catchment] see people messing it up, it’s going to impact them, and they need to say something about it” (RSFInt0307ParaS.7). Though one respondent did appear to ascribe responsibility to others, it must be stated that she did follow on to say that “I think that we are all responsible” (RSFInt0601Ind(2).13).

Questionnaires

Yet, as in the case of the Blesbokspruit Catchment Management Forum, when asked the question about ascription of responsibility by way of a questionnaire, the responses seemed to be different from the interviews: Though all respondents answered ‘yes’ to the question about whether their current water stewardship action/s could begin to avert those consequences to other people, themselves or the natural world at large, three of the six did not answer resolutely. One respondent answered, “yes, to an extent” (RSFQuestion0715Mining); while another suggested that his water stewardship “is not so big” and that rather “we all need to chip away at the big block” (RSFQuestion0628AC). All but one respondent suggested that the water stewardship practice of “environmental awareness”, “education”, “awareness and education”, “knowledge” and “promoting social learning” were fundamental to protecting our water resources. The parastatal respondent said that people should just do their jobs and then “most of the problems will be manageable” (RSFQuestion0701ParaS). Then, apart from two, all other respondents presented

practices that were congruent with either their professional work, or their private sphere practice, as in the case of the metal producer respondent. She suggested the following practice from her private life: “Everybody should do whatever they can to reduce use, stop wastage and recycle (rain harvesting, grey water recovery) the water they use as much as possible”(RSFQuestion0630Ind(2)). The mining respondent presented the following as a practice from her professional life:

> Contributing to averting or addressing water demand and supply issues that are related to mining activities (current, historical and future) also assists in prevention or control of pollution, conservation of water and wise usage of water in different resources (RSFQuestion0715Mining).

Observations

The perceived ascription of responsibility by the metal producer respondent was confirmed in the observation of her stewardship practice. She showed me the solar panels she uses for her pool when she began to tell me about her desire to buy solar panels so as to run her household. It was then that she mentioned her desire to be “off the grid” so that “you are responsible for [electricity], and don’t have to rely on anyone” (RSFObsInd0517.11).

4.4.3 Norms

4.4.3.1 Obligation to take Action

Document analysis (CMF minutes)

The discourse represented in the analysis of the minutes seemed to be centred on compliance issues. Examples of these issues are, “Results must be evaluated according to licence agreements” (RSFMins0205.3) and, “All standards according to licence agreements should be added” (RSFMins0205.4).

Other issues identified in terms of the “obligation to take action” were centred on problems such as “safety problems” (RSFMins0505.12), “waste management problems” (RSFMins1106.6), and “chlorine issues” (RSFMins0509.3).

Some of the issues identified spoke to the transfer of information in either the form of the reporting of incidents (RSFMins0207.9; RSFMins0509.10; RSFMins0509.13; RSFMins0510.6), compliance (see above) or the invitation of relevant people to attend the forums (RSFMins0208.7; RSFMins0209.8) for feedback.

Semi-structured interviews
Norms with regard to compliance were a theme that emerged during interviews.

The CBO respondent spoke of regulating fishing on the river (RSFInt0405CBO.10) as well as about water security and how the Department of Water Affairs must guarantee that security (RSFInt0405CBO.15). The metal producer respondent spoke of the need to ensure that water leaving the site of production should not be contaminated and that as much as possible needs to be re-used (RSFInt0601Ind(2).7). She continued to speak about the "EMIs" [Environmental Management Inspectors] who enforce the law and "petrified" all in the industry upon their arrival to do their inspections (RSFInt0601Ind(2).17).

The metal producer and local government respondents mentioned that there must be collaboration between industry and local government because they "need each other" (RSFInt0601Ind(2).18; RSFInt0405LG.3).

Finally, there was some discourse about how South Africans (in general) must conserve water because of the country's semi-arid status. There was acknowledgement that our water is a "finite natural resource"(RSFInt0405AC(2).15). The academic, metal producer, mining and national government respondents made these remarks.

4.4.4 Social Learning

4.4.4.1 Framing

Document analysis (CMF minutes)
From an analysis of the minutes, one could see little evidence of framing. The only piece of evidence identified was a "gaining of knowledge and experience during a

[site] visit" (RSFMins0505.14). And even this could be argued to be a form of learning not categorised as framing.

Though little evidence of framing was found, the *potential opportunities* for framing to occur were identified. These opportunities were discussions, negotiations and meetings (RSFMins0505.4; RSFMins1106.11; RSFMins0210.2).

Semi-structured interviews

The respondent of the academic sector spoke about "instilling" values of both the government officials who "render" a service and the students – a "new generation" – he lectures (RSFInt0405AC(2).7, 8). The work he does in trying to "instil certain values with them [students]" is done so that "they will be able to work more responsibly with our water resources" (RSFInt0405AC(2).8). He continued to say that he believes that there are "a lot of misconceptions" and that in this "field of misconceptions, we have a lot of teaching and a lot of learning to [do]" (RSFInt0405AC(2).9). Reminiscent of Glasser (2007), he said that this is all a "process of mutual learning, and also mutually, collectively making mistakes and rectifying those mistakes" (RSFInt0405AC(2).9).

The CBO respondent adopted characterization frames – although the labelled group was not identified –when he said that "they value [water] as a commodity that they turn into…profits" (RSFInt0405CBO.12). He continued to adopt a characterization frame when he said "a particular sector will push their own interest over other interests" (RSFInt0405CBO.15). Up until this point the characterization frame was used to label "them", when suddenly he pinned the label on "industries" when he said, "The industries…are engaging…for their own profit margins" (RSFInt0405CBO.15). The interesting point, however, is that the respondent did not give the impression that he applied these frames antagonistically. It seemed as though years of CMF attendance had taught this respondent (and his colleagues) that "you don't need to go to the forums and start attacking the particular group of people" (RSFInt0405CBO.16). In fact, it appeared as though they were keen to transfer this collaborative approach into other forums like the Leeutaaispruit Forum, in Sasolburg, Gauteng.

The ceramic industry respondent expounded the importance of education in helping her realise the value of water. This point is best exemplified when she explained how it was when her teachers sat her down and told her about the value of water, that ”it came into perspective for [her]. That water is actually an important thing” (RSFInt0330Ind.9).

The metal producer respondent was quite outspoken with regard to characterisation frames adopted towards municipalities and NGOs. The first characterization frame adopted was directed towards municipalities “that are polluting that water” (RSFInt0601Ind(2).11). The second was directed at NGOs who, “…direct their displeasure against industry instead of trying to work…together” (RSFInt0601Ind(2).14). Though she did adopt a characterisation frame, she provided a solution to this potential conflict when she said that it is important that we work together by providing spaces for discussion (RSFInt0601Ind(2).18).

The local government respondent explained how her value of friendship works to build relationships with industry which, later influences the “people’s mind-sets” (RSFInt0405LG.3). She also explained how she believes education can create a “realisation in the minds” of the industry respondents that their actions are “damaging the environment” (RSFInt0405LG.5). However, she intimated later in the interview that even though these industry respondents may “know that what they are doing is wrong… they were just looking for a quicker and cheaper way to get rid of the water” (RSFInt0405LG.10). This led her to conclude that “most of the business people know what they are doing. It’s just that they are greedy” (RSFInt0405LG.10). Though this is a statement that originates out of experience, you could say that it is a generalisation and thus that she is applying a characterisation frame. She also maintained that she was personally learning a lot from her work with residents of a local community (RSFInt0405LG.11).

Similar community interaction has led the mining respondent to “get a different perspective” on water-related issues (RSFInt0601Mining.17). She continued talking about how working with people has enabled her to “see things from different angles [and] different perspectives.” She also intimated that some of these different

perspectives would not have come to the fore if she had experienced the water sector on her own (RSFInt0601Mining.17).

Community interaction also "helps you as a person to look at all angles…especially with water problems," said the national government respondent (RSFInt0319NG.5). He spoke of how important it is not to be a "fixed person" with a "rigid mind-set" so that you keep learning in a "changing scenario" (RSFInt0319NG.5).

This idea of having a "rigid mind-set" is echoed by the parastatal respondent who said that "people are not learning because they are not opening themselves up to learning" (RSFInt0307ParaS.18). He continued to say that taking responsibility for one's actions enabled a building of "consciousness, awareness or value system in other people…" (RSFInt0307ParaS.6). Then, he discussed how, if these actions (as part of people's jobs) are just a part of a tick-box exercise, where the fundamental value system is how "to make a quick buck", then influencing their value system will be a struggle (RSFInt0307ParaS.3).

4.4.4.2 Other learning

Document analysis (CMF minutes)
The analysis of the minutes identified that the dominant medium of potential learning in the forum was presentations. Many presentations were given over a seven-year period. Most of those seemed to be about water quality and water-use licence processes; while others were about mining operations, and wastewater treatment works (RSFMins0205.12; RSFMins0206.3; RSFMins0806.2; RSFMins0207.2; RSFMins1109.2; RSFMins0210.10; RSFMins0211.1).

Other mediums of potential learning were meetings (RSFMins0807.6), environmental awareness activities during National Water Week (RSFMins0208.7; RSFMins0509.10), an environmental education activity (RSFMins0509.1), disseminating of a newsletter (RSFMins0505.7), a workshop for women (RSFMins0509.2), training wastewater treatment works operators (RSFMins0210.6), and disseminating maps (RSFMins1109.2).

Semi-structured interviews

An academic respondent explained how many different activities have shaped his learning about water and water stewardship practice. These activities include his undergraduate and post-graduate degrees, his exposure to the forum and other workshops and conferences, collaborative research, and practical experience (RSFInt0323AC.2).

Another respondent spoke about how his journey into the history of water caused him and his wife (who is a prominent environmental journalist) to "realise how precisely important water resources are in our country" (RSFInt0405AC(2).3). He continued to say how his undergraduate students "literally become activists once you…teach them things in environmental history" (RSFInt0405AC(2).8). He also argued that "awareness is still absent", which leads to "naïve assumptions" and so there is still a lot of work to do with regard to changing these misconceptions (see Section 4.3.4.1).

The ceramics industry respondent recounted how her experience as a child going to fetch water did not appear to influence her learning in anyway because, to her, it was the "norm" but she argued that if you were a stranger to that environment then, perhaps, you would learn. However, later in the interview, when presented with the juxtaposition of her current accessibility to water and her childhood *in*accessibility she was able to reflect on her childhood experience as a learning experience. Now, she can see that it taught her that "there were alternative ways of doing the same thing" (RSFInt0330Ind.16). This point is further elucidated in a wonderful thick description captured by this quote:

> So you could do things, you could get water from the tap, or you could go get it from the river. Which was an indirect lesson but it was a lesson in itself and as you grow older you found that going down to the river was an inconvenience…it wasn't something that you liked doing. So your value attached to water probably wasn't that great when you had to go fetch it. But as a child it was really nice going down there [be]cause you got to play. But like I said as you became older it became more of a shlep [hassle] than anything to get the water (RSFInt0330Ind.16).

She mentioned that the forum is also a good place for learning because it exposes one to other "water users in the district" and it helps her to value water "more than I already do" (RSFInt0330Ind.30).

The metal producer respondent learns by reading newspapers and by spending time in the forum (RSFInt0601Ind(2).7, 15).

Similar exposure to newspapers led the national government respondent through a process of awareness and learning about water issues (particularly the effect of leachate from waste) that triggered deeper interest that eventually caused him to apply for a job within the Department of Water Affairs (RSFInt0319NG.1). And now, he maintained, he learns new things every day in his job (RSFInt0319NG.6).
The themes of awareness-raising and education also appear in the discourse of the local government respondent. This person said that "most of the things that are happening [are] because our people [don't] have an understanding" (RSFInt0405LG.5). She argued that we don't even need formal education as long as we just "tell [the people] the principles" (RSFInt0405LG.6).

The mining respondent explained how growing awareness, as "one grows and develops" and how one is "exposed to certain circumstances", affects the way she now values water more (RSFInt0601Mining.5). These elements of awareness, coupled with reading and research on water and "how it behaves" also foster learning. This learning is enhanced when she works with her colleagues, who may be from engineering or legal disciplines, because they "will get a bit of [her] world, [she] also gets a bit of theirs and it broadens their horizons…" (RSFInt0601Mining.19).

The parastatal respondent seemed to admit grudgingly that there was an "*element* of learning [in the forums]" but that learning "would be better if things actually got done" (RSFInt0307ParaS.18).

Observation

During the observation, the parastatal respondent shared the lesson that the water quality sampling done at defined points in the system needs specific training but that that practice cannot be viewed in isolation to the entire catchment (RSFObsParaS0517.7). Moreover, that sampling practice must be accompanied with a questioning of "what are we trying to learn" (RSFObsParaS0517.3). This learning needs to be communicated to management in "new ways" to help management understand what is happening in the catchment "because they have no clue to what this is…" (RSFObsParaS0517.9).

It appeared that the metal producer respondent learned continued stewardship practice from previous experience of practice. How she explained her use of rainwater harvesting was that she "had the vegetable garden first, and then… got fruit trees… then instead of using the municipal water I figured… I can get all the water from all these drains" (RSFObsInd0517.2). This learning from practice seemed to continue as she suggested putting a meter on the rainwater harvesting tank to see how much water "you pump out or what you are getting…" (RSFObsInd0517.6).

4.4.5 Water stewardship practice

4.4.5.1 Water stewardship

Document analysis (CMF minutes)

Most of the water stewardship practices identified were categorised as compliance, which is similar to the Blesbokspruit Catchment Management Forum. Most of the practices dealt with water-use licences for mining and wastewater treatment operations. However, unlike the Blesbokspruit Catchment Management Forum, there appeared to be more reciprocation and engagement on the part of the Department of Water Affairs in the water-use licence approval process.

Other compliance processes engaged in were the adherence of sludge disposal guidelines (RSFMins0205.9), the implementation of ISO14001 and Cyanide Code[3] (RSFMins0209.9) and the Blue (RSFMins0509.13) and Green Drop Programmes[4] (RSFMins1109.11).

There was much more engagement with the youth in this catchment. There is evidence of local schools visiting a wastewater treatment works (RSFMins0205.15); engagement with a local youth forum (RSFMins0505.6); activities of a local environmental club (RSFMins1106.9; RSFMins0507.10); and the running of workshops and training of local community members on issues such as manhole management (RSFMins0509.13; RSFMins1109.8)

Semi-structured interviews

An academic respondent used words associated with the definition of water stewardship as articulated in Section 2.3.2. This academic suggested that water should be managed "for the benefit of existing and future generations" and that management of water "should be a collective responsibility" (RSFInt0323AC.4). The concept of responsibility was also presented by another academic respondent who suggested that the moment we "start using nature in a responsible way" we will begin to "connect properly with the system" (RSFInt0405AC(2).14). He continued to describe how he and his wife practice water stewardship. He mentioned that, at home, they are "zero-scaping" parts of their garden; using "more indigenous plants in [their] domestic environment"; they use less water when flushing toilets and they hold "very intense debates about water management…" (RSFInt0405AC(2).15).

All of these practices, he said, are about setting examples for people and in that way you become a better steward (RSFInt0405AC(2).15). He continued to say that one must set an example but "not in the form of being a braggart but by being sincere in what you do and being very dedicated in how you try to manage the environment around you" (RSFInt0405AC(2).15).

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[3]The Code is an industry voluntary program for gold mining companies. It focuses exclusively on the safe management of cyanide and cyanidation mill tailings and leach solutions.

[4] Blue Drop is aimed at testing the quality of drinking water provided by South African municipalities, water authorities and providers. Green Drop rewards excellence in the management of wastewater from source, in sewer networks, its treatment at wastewater works and its final discharge to the receiving environment.

The CBO respondent does not believe that the Department of Water Affairs is practicing water stewardship because, according to him, the Department is not applying the law equally "to the people who are using water for different activities" (RSFInt0405CBO.13). He argued that citizens need to be more engaged in "water governance in terms of their own decision making about how they should use water" (RSFInt0405CBO.14). He recognised that he has to "behave in a certain way with water – spiritually, economically and otherwise – so that the results [he] gets out of that water, would be a good results" (RSFInt0405CBO.14).

The ceramics industry respondent described how her home practice centred on conserving water by having a "bottle of water that I use, maybe I'll fill it up and then use it for cooking or use it for whatever I do around the house. Then I won't have to have the tap open for such a long time" (RSFInt0330Ind.27). Then she described how when waiting for tap water to heat up that most people "let that run until it gets hot" and how she would "use that cold water and put it aside for whenever [she] needs cold water" (RSFInt0330Ind.27). She then continued to describe some of her stewardship practice in her workplace. She described how she could try and "reduce the pollution in the water" (RSFInt0330Ind.27) and how her attendance at the forum,

> holds people accountable. It makes us accountable because now, my water use is reflected in the report that I have to present when I get there. So now…I'm held accountable by those people, but in order for them not to be so rough on me I need to be accountable so that my results show better results (RSFInt0330Ind.28).

The metal producer respondent spoke about her rainwater harvesting practice using four JoJo tanks (RSFInt0601Ind(2).6; 8). At work, she told me of their effort to build and run a reverse osmosis plant so that they could recover the water and thus re-use it in their plant (RSFInt0601Ind(2).20).

The local government respondent explained her understanding of water stewardship practice by saying, "If something belongs to you, you will take care of it" (RSFInt0405LG.13). This was said in relation to an activity implemented by a local community, which she had experienced. The experience seemed to influence her

thinking greatly. She related how this local community “took their time and their resources from their home just to come” and “clean that stream” (RSFInt0405LG.11, 13). Through this experience, she was able “to see how they value the water” (RSFInt0405LG.11). She also told me of two other water stewardship practices she engages in: One is educating “those little ones” in primary schools about the importance of water (RSFInt0405LG.12), and the other is law enforcement (RSFInt0405LG.13).

The mining respondent said that water stewardship practice means “appreciating and acting responsibly when it comes to issues of water” (RSFInt0601Mining.14). She continued with an explanation of how you can identify a part of the hydrological cycle you can influence and how responsibly you can act to manage that water (RSFInt0601Mining.14).

The parastatal respondent mentioned how influencing people’s understanding of the importance of the environment has been “something of a crusade in a way” (RSFInt0307ParaS.2). He also said that his practice is steeped in values that provide a reason for his organisation to still employ him (RSFInt0307ParaS.16).

4.4.5.2 Practice

As in Section 4.3.5.2, the battle to distinguish water stewardship practice from normal practice became evident. As in Section 4.3.5.2, the practices analysed for the Rietspruit could arguably be water stewardship practice and vice versa. If the thinking that was applied to the practices described in Section 4.3.5.1 is used here, then the water-use licence, permit applications (RSFMins0205.12; RSFMins0505.6) and environmental impact assessment process (RSFMins1109.11) should be included in the previous section. So too should a tree-planting activity in Arbor Week (RSFMins0807.8), a school activity in National Water Week (RSFMins0509.1),a training session in a municipality (RSFMins0209.12), and advocacy (writing of letters)(RSFMIns1105.4; RSFMins1106.8; RSFMins0207.8; RSFMins0507.10;RSFMins0807.9).

Document analysis (CMF minutes)

Activities identified from analysis of the minutes were all deemed to be more technically oriented practices (that service the wider or broader concept of water stewardship practices). These can be listed as reporting, appointing consultants to help with wastewater treatment work upgrades, water studies, water pumping and discharge, containment of water, modelling pollution plumes, monitoring, using the website for disseminating information, sampling, using a newsletter to disseminate information, cleaning pipelines and storm water dams, appointing of consultants to perform environmental impact assessments and/or studies, and attending to blockages in pump stations.

Semi-structured interviews

As part of the interviews, the CBO respondent said that he engaged in different "water spaces [and] water debates" as part of his practice (RSFInt0405CBO.15). He then went on to describe some of the religious practices engaged in by Sangomas who "practice their rituals in water streams or rivers" (RSFInt0405CBO.16).

The local government respondent recounted how she witnessed industry "pump their acidic water into the storm water system" (RSFInt0405LG.10).

The parastatal respondent described how his practice of accessing rivers for monitoring is done as part of his job and thus is done mainly in work time (RSFInt0307ParaS.10).

Observation

The observation conducted with the parastatal respondent included questions seeking to understand his practice of water quality monitoring. It appeared as though the actual practice of collecting water from a river is applied in a simple, standard manner with little or no deviation (depending on the circumstances found at the river on that day) (RSFObsParaS0517.6). The only change in practice seemed to be the recording of data attained at the sampling point. Now, at each site, the bottles of raw water are recorded via a scanner that registers the sample and time of sampling at head office (RSFObsParaS0517.7). The practice of sampling "forces" one to get out

and see what is going on. This, in turn, becomes a practice that allows the practioner the opportunity to see “what’s happening to our rivers” (RSFObsParaS0517.12). He also explained the difference between the practice of collecting raw water samples and drinking water samples. The drinking water sample collection procedure looks more complicated to follow (RSFObsParaS0517.5).

The many practices of the metal producer respondent were on display at her home. The water stewardship practice of rainwater harvesting was explained as being easier because of gravity (her house is built on a sharp slope) otherwise she probably would not have engaged in the practice (RSFObsInd0517.2). This gravity feed allows her to water her vegetable garden and her normal garden (RSFObsInd0517.1, 2). Even so, she has “people looking for a proper wind-mill at an auction” so that she can connect it to one of the JoJo tanks (RSFObsInd0517.9).

4.4.6 Other

4.4.6.1 Non practice

Document analysis (CMF minutes)
Most of the non-practice looks to have occurred in 2005. There were a couple of incidences of no assessments or studies being undertaken (RSFMins0205.7; RSFMins0205.13; RSFMins0206.6), no monitoring (RSFMins1105.4; RSFMins0206.2; RSFMins0208.5) and no progress on the establishment of the Vaal Catchment Management Agency over seven years.

4.4.6.2 Non compliance

Document analysis (CMF minutes)
The major non-compliance incidents mentioned in the minutes were all attributed to the wastewater treatment works in that catchment. Most of these incidents had to do with water quality limits being exceeded on a continuous basis.

Two non-compliance incidents could be attributed to illegal waste sites (RSFMins0205.6; RSFMins0505.6) and illegal dumping of waste (RSFMins0205.7;

RSFMins0206.2). Also, a mining house and a metal producer in the catchment were issued directives for non-compliance (RSFMins0507.7).

4.4.6.3 Non involvement

Document analysis (CMF minutes)
There was only one comment about the lack of involvement of the Department of Water Affairs in a mine decanting issue (RSFMins0505.12).

Semi-structured interviews
The metal producer respondent strongly suggested that "nothing gets done…and nothing gets resolved or no actions are taken" (RSFInt0601Ind(2).14). She was referring to local and national government.

The parastatal respondent spoke of his organisation's leadership when he said, "the complete abdication of…accepting responsibility to stand up and do the right thing is" problematic (RSFInt0307ParaS.9).

4.4.6.4 Public participation

Document analysis (CMF minutes)
Most of the evidence for public participation seemed to arise in 2005 and 2007. The public participation processes were a part of disparate activities, which occurred in the catchment. The activities ranged from engaging with the public as part of the water use licence process, to geotechnical studies, to the establishment of the catchment management agency, to a landfill extension process.

Semi-structured interviews
The CBO respondent noted how the "religion [sic] groups are not participating" in the forums, and yet they are "the biggest group of people [even bigger than the industries] that use water" (RSFInt0405CBO.16).

4.4.6.5 Values definition

Semi-structured interviews

The question asked in the interview was the same as that asked of the other forum: "How would you define values." This was done to ensure that the main thrust of the interview –values –was understood.

The respondents touched on a variety of different issues in their answer to the question. Some gave me a definition of values, which included aspects such as "personal beliefs on moral or ethical issues" (RSFInt0323AC.1), or "something that's worth something to me" (RSFInt0330Ind.6), or "it is things that you consider important…that define how you live" (RSFInt0601Mining.3), or "I think it's about your ethical behaviour. You attach a value; I don't see it as a monetary value" (RSFInt0307ParaS.4).

Others touched on different types of values like spirituality, honesty and friendship. Many people explored how values come to be: Two respondents suggested that our values are instilled by culture or our cultural background (RSFInt0405AC(2).4; RSFInt0405LG.7). The academic respondent continued to say that they are also shaped by "the way in which we grow up and the way in which we are conditioned by society out there" (RSFInt0405AC(2).4). The national government respondent expressed a similar view when he said that your value system "is based on your experience and also on your background" (RSFInt0319NG.2). The parastatal respondent saw values as "being part of your social make-up" (RSFInt0307ParaS.4).

Infrequently, a tension between personal and organisational values came to the fore, particularly for two of the respondents. The metal producer respondent appeared to struggle with the tension between looking after the environment and ensuring profitability for the organisation (RSFInt0601Ind(2).6) while the parastatal respondent struggled with the difference in his values and those of his colleagues, particularly those of his managers (RSFInt0307ParaS.4, 5).

4.4.6.6 Values formation

Semi-structured interviews

Much of analysis comprises evidence for access to water as one of the main drivers of value formation. One could argue that access and place of residence are closely related. In the feedback from these respondent's access issues were physical access issues related closely to place of residence but also because of changing circumstances in that catchment. For example, the CBO respondent suggested that "African people don't get access to that particular river and lake" because of "development" (RSFInt0405CBO.6), whereas, the mining respondent expressed the sentiment that water in rural areas is "not easily and readily accessible to them [the rural people]" (RSFInt0601Mining.5). This issue of access seemed to be presented in both a positive and a negative light. On the negative side, lack of access to water seemed to affect the ability to recreate, to engage in meaningful agricultural activities, to enjoy spiritual practices and to use it as a protection against "many illnesses within our society" (RSFInt0405CBO.6,8,9,10,11). On the positive side, lack of access experienced as a child has strengthened a value for water as an adult (RSFInt0330Ind.16). However, it is equally true that abundant access to water has also strengthened, a value for water as in the case of the local government respondent who went swimming as a youngster (RSFInt0405LG.9).

Arguably, another issue closely aligned with access is the concept of disassociation – or, as the one academic respondent called it, "disconnectedness" (RSFInt0405AC(2).10) – with water. He claimed that this "growing disassociation" is a cause of the "breakdown of values" because "a child is born today totally oblivious to where the water comes from" (RSFInt0405AC(2).10,11). This point was implied by the mining respondent in her explanation of where the strength of the values she holds for water originates from: "I understand what it takes to get the very water from an aquifer until it gets to somebody's tap" (RSFInt0601Mining.6). Closely related to this point about childhood disassociation or "disconnectedness" are the formative experiences with water as a child as mentioned by the ceramics industry respondent (RSFInt0330Ind.17) and the local government respondent (RSFInt0405LG.9).

Another aspect that is briefly mentioned as a contributor to value formation is social learning. An academic respondent mentioned how participation in the CMFs and collaborative research helped him develop his value of water (RSFInt0323AC.2). The other mentioned how learning in the field helped him realise “that we are sitting with a scarce and a finite resource” (RSFInt0405AC(2).7).

Like the Blesbokspruit Catchment Management Forum, culture appeared to play a role in values formation too. An academic respondent talked of how “we don’t have sufficient stories to narrate from our cultural experience of where does water come from” (RSFInt0405AC(2).11) and the CBO respondent spoke of how lakes mean “different things to other cultures or in the African context” (RSFInt0405CBO.4).

Educational background and economic consideration were two issues mentioned as potential shapers of values (RSFInt0330Ind.17; RSFInt0601Ind(2).5). Moreover, experience was also mentioned as a potential driver of values (RSFInt0405LG.5; RSFInt0601Mining.7).

Interestingly, both the mining respondent and the parastatal respondent referred to the enduring nature of values in relation to action, experience and knowledge (RSFInt0601Mining.12; RSFInt0307ParaS.12).

4.5 The public who do not attend forums

The data is presented in a narrative that is centred round the six core analytical categories as described in Table 4.1.

The decision to conduct semi-structured interviews with people who do not attend forums and who do not work solely in the water sector (barring the academic respondent) was based on a need to explore whether there is any difference in the values, practice and learning of forum participants and people who do not attend forums.

Respondents were selected from sectors mirroring the forum participants to ensure some data collection consistency. Therefore, five people were interviewed from the mining, provincial government, NGO, academic and industry sectors. It is important to note that respondents' comments have been quoted verbatim to ensure adherence to accuracy.

4.5.1 Values

4.5.1.1 Biospheric values

Semi-structured interviews

The provincial government respondent summed it up best with her question to me: "Do you attribute the same importance of water to human beings as you do to the ecosystems that need the water?"(NFInt0412PG.4) The answer was just as insightful as she explained that she would not rate "people as more important than the ecosystem because we are kind of interdependent" (NFInt0412PG.4). Similarly, the mining respondent said that humans and industry are "a part of the ecosystem" (NFInt0515Mining.6).

Another respondent was very honest when she spoke on this subject. Generally she "values water in the environment" (NFInt0510AC.2) because she has never "had an experience with water like a water shortage or a water crisis" that has enabled her "to form that value attachment to water" (NFInt0510AC.2). Though she knows that water is important, the value attached to water comes from the fact that it is part of the environment and she values the environment as a whole (NFInt0510AC.2).

4.5.1.2 Altruistic values

Semi-structured interviews

From five semi-structured interviews, four respondents communicated a tendency towards altruistic values: The NGO respondent seemed earnest in describing her work in the environmental field as a calling to "serve other people more than myself" (NFInt0424NGO.7). This calling appeared, she said, to emerge from observing people suffering, which, in turn, drives her to "want to do more" (NFInt0424NGO.12).

The mining respondent's thoughts seemed to comprise both altruistic and egotistic values. Her discourse began with an indication of altruism as she spoke of how water is life – life for landscapes, her, her family, industry and the development mechanism that it is for the economy (NFInt0515Mining.4). But then she switched to describe how water has value for *her* space when she needs to relax at the beach or river (NFInt0515Mining.4, italics added).

Altruism values were expressed strongly by the industry respondent who suggested that her desire to assist people is tied up in her "spiritual journey" (NFInt0514Ind.5). She said that her journey is about empowering "an individual first to manage their mind and manage the state of their heart and their mind and once the individual is strong, the community, the family gets stronger…" (NFInt0514Ind.5).

Despite the academic respondent using an acknowledged cliché about conserving for the "little children of the future" to describe her reason for her environmental concern, she appeared to be sincerely involved for "everyone" or more particularly, "for [her] family's sake" (NFInt0514Ind.5).

4.5.1.3 Egotistic values

Semi-structured interviews

The academic respondent expressed an honest, egotistic response when she said that she is concerned for herself and will go to whatever lengths to protect something that [she] values (NFInt0510AC.3).

Other sector respondents (NGO, provincial government and industry) spoke of the importance of water for life, and for living – drinking, cleaning, cooking and manufacturing (NFInt0424NGO.2; NFInt0412PG0.2; NFInt0514Ind.7).

4.5.2 Beliefs

4.5.2.1 New Environmental Paradigm (NEP)

Semi-structured interviews

A belief that water is a basic resource that everyone needs and that everyone has a right to (NFInt0424NGO.3; NFInt0412PG.2) emerged strongly. However, this belief was tempered by another belief expressed by a respondent that this right to water comes with responsibility (NFInt0412PG.4, 5).

Another strong belief to emerge from a respondent was in the interconnectedness of ecosystems – natural, societal and industrial (NFInt0515Mining.7, 8), whereas the industry respondent expressed a belief in the nature of consumption and a concern about over-consumption creating "the imbalances in the world today" (NFInt0514Ind.3). She said that "everybody is consuming more than they actually need" (NFInd0514.3).

4.5.2.2 Awareness of Consequences (AC)

Semi-structured interviews

Awareness of consequences within this group of respondents varied. The NGO and provincial government respondent focussed on consequences to people, especially those from the "local, rural areas" (NFInt0424NGO.7). A concern was also expressed by the NGO respondent for the lack of access to water, the use of water and the consequences people and the planet (NFInt0424NGO.6, 7) will experience because of these issues. The provincial government respondent said that consequences for water pollution were water-borne diseases that will impact on people's lives (NFInt0412PG.3). She articulated her concern about a time when we do not have water, and the consequences of that would be that "people wouldn't survive" (NFInt0412PG.3, 4). The mining respondent suggested that sometimes there is a consequence and sometimes there is not. This depends on the extent of enforcement of non-compliance from a government perspective, and sometimes an organisation won't necessarily enforce compliance because they may be intent on profitability (NFInt0515Mining.9).

The academic respondent communicated consequences of “degradation of certain environmental functions or decreased river flow, or water scarcity” but it was her other insight that was more interesting: She spoke of “the way the new generation will view the environment” (NFInt0510AC.3). She elucidated by saying that the new generation will grow up with new perceptions or feelings towards a different environment. As a result of this, they “might have to operationalize, manage this different environment that we know, in a different way” (NFInt0510AC.3).

4.5.2.3 Ascription of Responsibility (AR)

Semi-structured interviews

The ascription of responsibility of individuals seemed clearer amongst non-forum respondents than forum respondents interviewed earlier.

In keeping with her sense of calling, the NGO respondent boldly claimed responsibility for working towards the mitigation of the environmental challenges. She described how this work is “very personal” because she feels a “need to answer to that call” (NFInt0424NGO.1, 7). She said that “life is a gift” which elicits a reason to “fight for the common cause” (NFInt0424NGO.12).

The mining respondent agreed that she feels a personal responsibility towards the mitigation of environmental problems. She shared that she is “very emotionally attached to finding the solutions to those problems” (NFInt0515Mining.9). This ascription of responsibility expressed by the mining respondent would be affirmed by her resignation if her organisation took a decision that clashed with her ethics (NFInt0515Mining.9). Yet by her own she admission, she lives a contradiction in her personal life by not taking responsibility for wasting water while showering (NFInt0515Mining.12).

Taking responsibility means, to another respondent, “being good to people and being good to your environment and being good to your society as a whole” (NFInt0514Ind.3). The origin of this ascription of responsibility stemmed from her religion’s teachings. She conceded, however, that the word responsibility is “used so much in vain these days” (NFInt0514Ind.3).

The “want to help”, as another respondent termed it, appears to be intrinsic to her nature, as captured by these quotes from her: “it’s just inherent, it’s just there” (NFInt0510AC.4). She described how she “wants to make things better” and she wants to “do whatever [she] can to help” (NFInt0510AC.4). She also acknowledged that help can be “something so small” (NFInt0510AC.4).

4.5.3 Norms

4.5.3.1 Obligation to take Action

Semi-structured interviews

The responses from two respondents both addressed the issue of ethics in determining action. “Moral obligation” (NFInt0412PG.5) and “ethics” (NFInt0515Mining.2) seem to influence the respondents’ behaviour and how they try and influence the industry’s behaviour (NFInt0515Mining.2).

4.5.4 Social Learning

4.5.4.1 Framing

Semi-structured interviews

The greatest sense of learning emanated from the NGO respondent who expressed many ideas about learning. Examples of which follow: Her lived Zimbabwean experience, where the municipal systems did not allow flushing toilets, caused her to think deeply about saving water. She explained that this experience “may somehow go up to the subconscious and then when you visit people or you yourself experience it again then you know it comes back” (NFInt0424NGO.4). Then, she recounted that where she noticed wasteful water practices, she questioned the people wasting rather than just saying “no, stop you are wasting this” (NFInt0424NGO.9). This concept of questioning came up again in the discourse when she said that she likes to engage in a conversation to create an awareness/consciousness of what they are doing” (NFInt0424NGO.11).

The provincial government respondent alluded to particular frames by referring to a sense of protecting water is “subconscious, it is just within you” (NFInt0412PG.6); and how this frame was used to challenge her family about their practices to the extent that they said, “Oh, she’s back. And now we can’t do things in a certain way” (NFInt0412PG.7).

The mining respondent referred to conflict when she alluded to a “clash” that happens when different frames come into contact with one another (NFInt0515Mining.4). She explained that the “clash comes in when your right doesn’t necessarily mean someone else’s right” (NFInt0515Mining.4). She determined that, “you try and make people understand that ‘yes it is wrong to destroy a wetland or to pollute water’” (NFInt0515Mining.4).

It appeared that practice was important to a respondent who spoke of it in terms of “realisation”, “transformation” and “conviction”. These words denote a change in mind-set. In terms of practice, it was recycling that enabled her to “realise”; it was spiritual teaching of children that enabled her to “see this transformation” and it was planting of a vegetable garden that enabled her to “speak from conviction” about her knowledge (NSFInt0514Ind.4, 6, 8).

The academic respondent came to “realise” the value of the ecological reserve in terms of water allocation (NFInt0510AC.3) through exposure to university, its lectures and discussions.

4.5.4.2 Other learning

Semi-structured interviews

The NGO respondent communicated different concepts about learning throughout her interview. The first was her perception that people (South Africans) do not know what to do because they do not have information, so wherever she goes she “spreads the message” (NFInt0424NGO.10). Secondly, she acknowledged that she is also learning but that learning is a continuous process and so cannot be gauged by one particular event in time and space (NFInt0424NGO.11). Next, she said that having an “understanding of a scientific background of things” was helpful in

preparing her for engagement with her constituency (NFInt0424NGO.12). Lastly, she maintained that learning by experience, whether through seeing people in action or being exposed to different areas of the country, makes “the most impact” (NFInt0424NGO.12).

Mirrored in the provincial government respondent’s discourse is this notion of learning by doing articulated by the NGO respondent. The provincial government respondent mentioned repeatedly doing and practising within a context of learning (which she also said was a life-long process) (NFInt0412PG.8, 9).
Another respondent mentioned different levels of learning: Personal, professional, and corporate. From a personal perspective, she learnt that South Africa is a water-stressed country and so “every drop has a value” (NFInt0515Mining.5). She did say, however, that she “hasn’t learnt that water is more valuable” but rather she is learning to “manage [her] water and manage [her] impacts differently” (NFInt0515Mining.12). From a professional perspective, she mentioned that she is trying to teach people daily about the importance of water (NFInt0515Mining.7) because it’s important to understand “what we are going to do as a business” (NFInt0515Mining.8). From a corporate perspective, she mentioned another level of learning where “corporate requirements actually force you to think about a lot of those things [like saving water]” (NFInt0515Mining.10).

Another respondent spoke of her religious experience where her experience was never questioned and so was lived purely by rote (NFInt0514Ind.3). She said that it was only until she joined another religious organisation that she began to “make sense” of everything (NFInt0514Ind.3). This sense-making of her own spirituality, by her own acknowledgement, led her to understand that her “teaching is not only about protecting your stuff; it is about protecting other people and protecting your environment”. This, she said, leads to a slow “engraining” of values in her that enables her to lead a different life (NFInt0514Ind.7).
The “progression of knowledge” as the academic respondent termed it, was very important to her in terms of learning (NFInt0510AC.4). What she meant by “progression of knowledge” is that “the knowledge that’s been created today, for everything that we know, and the experiences that we’ve been through…I think it’s incredibly important for that [knowledge] to be passed on and not lost…”

(NFInt0510AC.3). She gave an example of how her parents' travelling experiences recounted to her as a child, made her excited (NFInt0510AC.3). The academic respondent told me how she is constantly learning but that it is important to want to learn and that if you do not have this want, you will learn "absolutely nothing" (NFInt0510AC.5). She felt that her sense of learning comes from a naturally inquisitive nature that allows learning through "an informal meeting over tea, in the staff room at 11 o' clock or it can be attending a lecture by Professor Anthony Turton" (NFInt0510AC.5). The academic respondent concluded by saying that her openness to learning has strengthened her connection with the environment. But she cannot be sure because she "never really thought about this strong connection so [she doesn't] really have anything to relate it to" (NFInt0510AC.6).

4.5.5 Water stewardship practice

4.5.5.1 Water stewardship

Semi-structured interviews

Two types of stewardship practices emerge from the interviews. The first is non-activist behaviour in the public sphere and the other is private-sphere environmentalism.

The non-activist behaviour in the public sphere is characterised by the provincial government respondent's work with schools in water management (NFInt0412PG.4). The mining respondent also exhibits this type of behaviour when she "teaches others" in her place of work (NFInt0515Mining.11); and when she works with her design teams, challenging them to think differently about water use and processing, ensuring cleaner water is sent back into the catchment (NFInt0515Mining.10). The academic respondent engaged with water awareness campaigns in conjunction with Rand Water (NFInt0510AC.2).

Much of the water stewardship practice can be allocated to the private-sphere environmentalism category. The NGO respondent described her practice as helping "people to live consciously everyday even with water" (NFInt0424NGO.9). Similarly, the provincial government respondent, who is from Limpopo, likes to remind people not to water their garden during the day (especially those washing their cars). She

also advocates for capturing blue and grey water for re-use so that we can “utilize the water resource so that it goes a lot further” (NFInt0412PG.8). The mining respondent installed a solar geyser in her home, which means that hot water takes a long time to “come through”. She has therefore determined – though, by the time the interview was done, had not succeeded – to use a bucket in the shower to capture the wasted water (NFInt0515Mining.6). She also maintained that it was the “small things” that can be done around the house that will help save water; tasks such as turning off taps, making sure there is no leak, and if there is one, getting it fixed (NFInt0515Mining.9). She also recalled how, during her childhood, there was a bad drought, and as a result her mom put a brick in the cistern and made the children turn the tap off when brushing their teeth (NFInt0515Mining.5). The academic respondent’s personal connection with nature drives her to protect nature through her educational background and professional career (NFInt0510AC.3). She told of her practice of enjoying four-minute showers that are governed by a water-proof, green-frog clock that sits in her shower (NFInt0510AC.5). She has also put gutters on her house so that she can channel water from her roof into a 500-litre JoJo tank that she uses for watering her pot plants (NFInt0510AC.5). Moreover, the academic respondent does not own a dishwasher, she does two loads of clothes washing a week, and the townhouse complex she lives in will soon have water meters fitted (NFInt0510AC.5). In addition, when she goes walking alongside a wetland and/or stream, the academic respondent picks up bottles, cans and plastics out of her “want to protect nature, water, wetlands, whatever it happens to be” (NFInt0510AC.5). In conclusion, she said that she is “constantly looking for new ways and opportunities to improve my own practices in terms of conservation and whatever I try to get involved in as many things as I can” (NFInt0510AC.6).

A respondent concluded her interview with the thought that practice certainly strengthened her values because when you “practise what you see and what you preach, it strengthens everything (NFInt0514Ind.8).

4.5.5.2 Practice

Semi-structured interviews

One could argue a case that this “normal” practice could be defined as water stewardship practice. The reason for not defining as such was that the virtues associated with water stewardship were not evident in this discourse.

For example, the NGO respondent spoke just about sharing information with her network as an example of practice (NFInt0424NGO.9); the provincial government respondent relayed her experience of her parents watering during midday (NFInt0412PG.6); the industry respondent mentioned her delight in offering friends vegetables that were chemical free because they were home grown (NFInt0514Ind.6). The industry respondent continued to describe her realisation about the ease of recycling at home and how she has installed a fireplace instead of warming her house with gas or electricity (NFInt0514Ind.6).

4.5.6 Other

4.5.6.1 Values definition

Semi-structured interviews

Everyone had different definitions of values, but for some, there were commonalities inherent to each definition. These common themes were that something is important to the individual (NFInt0412PG.2; NFInt0515Mining.2) and that they are belief based, i.e., they are what we strongly believe in (NFInt0424NGO.2; NFInt0514Ind.3). One respondent referred particularly to the role of spirituality in her life and how that helped her discover her value system (NFInt0514Ind.3). She wondered if values are inculcated or taught, and if they were taught, then it was important for people to be exposed to role-models that could help you differentiate right from wrong (NFInt0514Ind.3). To the academic respondent values, meant a personal connection, to a particular thing or person which would mean that one would automatically assign value through that connection (NFInt0510AC.1).

4.5.6.1 Values formation

Semi-structured interviews

Like those who participated in the forums, there were many different ideas of how values were formed in the lives of the respondents. However, most of the ideas proffered here can be categorised into childhood experiences and spirituality.

The childhood experiences range from living with water scarcity (NFInt0424NGO.3) to exposure to certain school subjects (NFInt0515Mining.11; NFInt0510AC.1); from family upbringing where care things was taught (NFInt0515Mining.3) to recreational experiences (NFInt0515Mining.5); from place of residence (rural Zambia) to concomitant exposure to nature (NFInt0510AC.1).

The NGO respondent expressed spirituality in terms of “calling” (NFInt0424NGO.1). This was clarified when she spoke about her relationship with God, and how that “guides me in really living out my life and doing the best that I can” (NFInt0424NGO.7). The idea of spirituality was also expressed by the industry respondent who said that she has just recently begun to expose herself to greater spirituality and as a consequence is “making me value and appreciate things a little better” (NFInt0514Ind.4).

Knowledge also seemed to be a driver of values formation (NFInt0412PG.5; NFInt0514Ind.3) and so was fear, because fear was articulated to bring on guilt for wasting water, which is a precious resource that may run out one day (NFInt0412PG.5).

4.6 Conclusion

This chapter presented the data as analysed according to the categories identified (see Table3.5). This represents the second stage of data analysis. The chapter used the categories and sub-categories for the analysis to ensure ease of flow and coherence. The clear display of the data relied on the use of analytical memos, and thick description to provide transparency. Data analysis relied on induction and abduction as the modes of inference but it must be noted that,

> in qualitative data, the analysis is almost always interpretive hence the data analysis is less a completely accurate representation but more of a reflexive, reactive interaction between the researcher and the decontextualized data that are already interpretations of a social encounter (Cohen et al., 2007, p.469.)

As can be seen from the data in this chapter there are many interesting dynamics associated with held and assigned values (e.g. the dominance of altruistic values); the valuing process (how people understood values, and how these related to water stewardship practices); the water stewardship practices themselves and how they differed over time, and also in relation to contexts of practice, beliefs and norms held by those engaged in them. It is also interesting to see that technical practices support broader water stewardship practices, and that it is difficult to differentiate between these. The insights into learning, as presented in this chapter are also interesting as it seems they play an important role in supporting and enabling water stewardship management practices. Educational encounters, and learning experiences differ, yet all contribute to water stewardship practices in the private and public spheres. These findings will all be discussed in more detail in the next chapter.

Chapter five will attempt to use the synthetic power of analytical statements (Bassey, 1999), drawn from the data presented in chapter four to provide a platform for discussion using context, theory and the data collected. Six analytical statements have emerged from the data, which will form the backbone of the next chapter.

CHAPTER 5: DEEPENING UNDERSTANDING ABOUT VALUES, WATER STEWARDSHIP PRACTICE AND SOCIAL LEARNING IN TWO CATCHMENT MANAGEMENT FORUMS

5.1 Introduction

In chapter four, the data from two case studies located in the Upper Vaal Barrage– the Blesbokspruit Catchment Management Forum and the Rietspruit Catchment Management Forum – was presented. Moreover, data collected from a purposive sample (Collins et al., 2000) of people who do not attend forums was also presented. These sets of data were presented using thick description (Merriam, 1995), drawing on the raw data to provide a narrative context for each of the case studies (and the non-forum sample). This data was presented in discrete sections within chapter four therefore no discussion between cases occurred.

In this chapter, the data spanning the two case studies and the non-forum sample will be discussed thereby addressing the research questions directly. The research questions as discussed in chapter one are the following:

1. **How do held and assigned values influence water stewardship practices of the public in two Vaal Barrage catchment management forums?**
2. **How is social learning embedded (or not) in the process of shaping values within water stewardship practices of people attending catchment management forums?**

Derived from these questions, and the research goals (see Section 1.4), this study focussed on the following key objects: Values, water stewardship practice, and social learning.

To enable the discussion of data contained within chapter four, the data has been condensed into analytical statements (Bassey, 1999), which synthesize the data to enable a discussion in relation to the research questions. In addition to using the data in chapter four, this chapter will also draw on contextual and theoretical reviews

described in chapters one and two respectively, and contextual insights from the two case study sites and their histories presented in chapter four. This iterative process of analysis and data testing engenders confidence and trustworthiness in the analytical statements (Bassey, 1999), and is congruent with abductive inferences as discussed in chapter three. Retroduction is also a process (see Section 3.5) used in making inferences about the relationship between the causal mechanisms (values) and the empirical (water stewardship practice).

The first five analytical statements relate directly to the research questions, while the sixth analytical statement is indirectly related to the research questions.

5.2 Values and their relationship with practice

5.2.1 Held and assigned values

Drawing from the contextual and theoretical reviews, and the data presented in chapters one, two and four respectively, the following analytical statement is discussed.

Analytical statement one:

Altruism is the most prominent held value emanating from this study, followed by biospheric and egotistic held values.

5.2.1.1 Altruistic values

As reported in chapter four, though only two references to altruistic values (concern for others) were made in the Blesbokspruit Catchment Management Forum (and none in the Rietspruit Catchment Management Forum) spanning seven years, evidence from both sets of semi-structured interviews points towards a strong altruistic tendency amongst forum participants. A similar tendency, which is supported by the data emanating from interviews, is expressed by the non-forum sample. These tendencies are explicated in the respondents' values discourse (see Sections 4.3.1.2, 4.4.1.2 and 4.4.1.2) and in parts of their beliefs discourse comprising, according to Stern et al. (1999), an awareness of consequences (AC) and ascribed responsibility (AR). The respondents in both the Rietspruit Catchment

Management Forum and the non-forum sample conveyed a stronger tendency towards altruistic values than those in the Blesbokspruit Catchment Management Forum, where one could say that a greater biospheric held value system was displayed among those participating in the research. This indicates that it is not possible to expect the same kinds of values to be predominant in different sites of water stewardship practice.

The evidence reveals that these altruistic values are expressed for humans only and not for non-human nature (Weston, 2009). What is not evident is what shaped (or continues to shape) the values discourse around altruism for humans. Perhaps, if retroductive inference is applied, then credence needs to be given to the broader societal discourse of sustainable development and the role it may be playing in helping to shape this discourse (Stetsenko & Arievitch, 1997).

According to theory presented in Section 2.4.3, it appears that altruistic values (and self-transcendental values) play an important role in influencing norms which in turn are posited, according to the VBN Theory, to activate pro-environmental behaviour. It seems that this component of theory may be supported by evidence in chapter four that those who engaged in pro-environmental behaviour also seemed to have a strong held value of altruism. This is highlighted by an example of the local government respondent who articulated a strong, altruistic motive for doing (see Section 4.3.1.2).The point about the relationship between values and pro-environmental behaviour is also made by Rockström et al. (2009) and Chapin et al. (2011) who discuss the role of values as potential levers of change from a stewardship perspective.

5.2.1.2 Biospheric values

Drawing from the evidence in chapter four, biospheric values are held by a minority both within the two cases and within the non-forum sample. However, it must be noted that the biospheric voice of the minority within the Blesbokspruit is vociferous. This is evidenced by the number of biospheric values expressed in the Blesbokspruit Catchment Management Forum compared with the other forum (and the non-forum sample). This voice can be attributed to self-acknowledged environmental activists

(Stern, 2000) who care for the Grootvaly Wetland Reserve which is a focal point of this particular area (see Section 4.2). It is here that the relationship between held and assigned values and pro-environmental behaviour is seemingly demonstrated, i.e., the NGO respondents' held value of species is assigned to birds in the *Grootvaly Wetland Reserve and the Marievale Bird Sanctuary,* which leads to their action of protecting this local wetland (see Section 4.3.1.1).

It is interesting to note from the evidence that the biospheric value held by some finds expression as a norm or "feelings of personal obligation that are linked to one's self-expectations". There is, in other words, a strong articulation of a sense of obligation by some to defend or be a voice for the "voiceless organisms" (see Section 4.3.1.1) of the biosphere. If retroductive inference is applied to this issue, then it seems that the feelings of obligation originate from a sense of injustice that these people have about the world around them.

5.2.1.3 Egotistic values

While there is very little evidence for outright egotistic values – only two clear examples in the Rietspruit Catchment Management Forum – there were examples of economic values discourse, which could be argued to be associated with egotistic values because economic values may help shape economic processes that we derive personal benefit from. While Stern (2000) may negatively correlate egotistic values to pro-environmental norms and action, one of the most impressive displays of private-sphere stewardship seems to be influenced by egotistic values clearly and honestly articulated in chapter four (see Section 4.4.1.3). Therefore, it may be premature to dismiss the influential power of held egotistic values in favour of just the influence of altruistic values. The VBN Theory allows for the influence of other values, besides just altruistic values, on pro-environmental behaviour (see Section 2.4.3).

Meaning extracted from analytical statement one is that people engaged in stewardship practice appear to be influenced more by altruistic held values than biospheric or egotistic held values but that biospheric and egotistic values are also influential. Therefore, it seems to confirm theory that describes altruism as having a

greater propensity to influence beliefs and norms (than other values), and thus pro-environmental behaviour (or stewardship for this study). While only based on two cases of held and assigned values in catchment management forums, this finding may point towards possibilities for further research within wider research programmes such as one of the themes within Future Earth's broad research themes (Future Earth Research Framework, 2013), *Transformations toward Sustainability* that seeks to understand how "values influence individual and collective behaviour to more sustainable lifestyles" (p. 3). Another meaningful interpretation of the commentary on biospheric values is that it appears, according to both data as found in the two cases under study in this thesis, and theory as discussed by Stern (1995), that a biospheric orientation is not highly prevalent in modern society (except amongst certain activists), which may be due to a growing disassociation of people from the natural world due to rapidly increasing urbanisation and the commodification processes associated with capitalism and its dominant economic structures and functioning. Thus, the question arises as to whether if provision was made to deepen a biospheric held value system that that held value system would be just as powerful an influencer of stewardship as altruism, as evidenced by people caring for the Marievale wetland.

5.2.2 The socialisation of values formation

Analytical statement two:

Values – held and assigned – are shaped by different socialisation processes, and these values seem to influence practice.

As described in Section 2.4.2 by Kollmuss and Agyeman (2002) and Seymour et al. (2002) different socialisation processes shape held values or the valuing process, as they are assigned to specific objects and this is confirmed by data from chapter four. Though there was some evidence of assigned values, it became clear that people were influenced more by held than assigned values. This was because of the experience of a few failed attempts at explicating assigned values during the semi-structured interviews. This is not to say that there was no evidence for assigning values, or that historically assigned values did not have a role to play in the valuing process of those people. The failure to explicate assigned values may also have

been influenced by the way in which data was generated and treated in this study – analytically using categories, rather than following the unfolding stories of how values play out in narratives and experiences of practice (this would have required anthropological / narrative research approaches) which may have provided more detailed insights into assigned values and how they operate.

Nevertheless, the evidence of socialisation processes shaping individuals' held values in both case studies and the non-forum sample is extensive. These processes range from knowledge acquired through experiential training and mentorship to proximity to water, especially the dry parts of the country where assigning value to site-specific rivers is evident. Proximity to water is closely linked with accessibility and place of residence, which are other processes shaping values in this study. Childhood experiences are where historic assigned values may have played a role in the valuing processes of those people. Other influencing processes include spirituality, which Seymour et al. (2002) classify as assigned values, culture, particularly the loss of narratives explaining the origins of our water, economic considerations and social learning (the evidence for social learning will be presented later via analytical statement five).

5.2.2.1 The socialisation of practice

Like values, practice appears to be socially, as well as materially constituted (Kemmis, 2010). This is evident in chapter four which shows how social processes shape values (e.g. educational perspectives), as well as material experiences (e.g. living near and swimming in a river).

Indicators that practice is occurring "at the site of the social" (see Section 2.3.4) are abundant. The main indicator of this, in the public sphere, is the number of compliance-orientated activities that occur as a result of a socially-constructed framework of institutional and legislative arrangements that play themselves out in the practice architecture that is described by Kemmis (2010) in Section 2.3.4. It is also noteworthy that there is evidence of "non-practice" related to national and/or local authorities not practising what they are meant to practice within the realm of those institutional and legislative arrangements. For example, an absence of water

quality monitoring at key sample sites identified by the same authorities who fail to sample at those sites. Such absences are noticeable because they occur within a socially-constructed framework that allows absence to be evident. As shown in chapter four, in the two case contexts, most of the compliance-orientated activities occurring in the forums are driven by private sector organisations working in each catchment towards site-specific societal ends, such as the provision of products for further consumption. It could be retroductively inferred that this compliance-orientated activity may be because of the perceived or real threat of reputational and financial risk to their businesses.

Education practices are also located within a social environment, and can be linked to social learning practice (Wals, 2007) where education acts as a bridge between the public and private spheres. In one forum education practices were more youth focussed (see Section 4.4.5.1).

From a private-sphere perspective, the data reveals water stewardship practices that are practiced by the immediate family or extended family to help conserve water. Not only are these practices executed *by* family or extended family *for* the family but there is also evidence to show that it's done in and for the community at large (see Sections 4.3.5.1 and 4.4.5.1).Some of this practice is located within a spiritual community of practice shared by others who believe in the same, or similar, tenets of religion and who deem water as central to the practice of their religion.

It is also important to remember that practices are also socio-materially constituted. This means that the physical composition– not only social constructions – of water such as drought, pollution of water, scarcity, and acid mine drainage problems, among other issues shape water stewardship practices. Retroduction can explain the composition of water and its life-supporting properties.

5.2.2.2 The relationship between values and practice

If values are socially constructed, and practice is socially (and socio-materially) constituted (see Section 2.3.4 and 5.2.2.1) then values and practice should be linked. But how should they be linked? Through beliefs – the mediating factor as

proposed by Stern (2000) – or social learning discourse where values are explicated and seen to influence new practice, or by experience of practices (see Section4.3.5.1 and 4.4.5.1).

It is interesting to note that a values discourse is embedded in the components of beliefs – New Environmental Paradigm (NEP), awareness of consequences (AC) and ascription of responsibility (AR) throughout the three forums. However, even though values discourse ran through these components, a potential contradiction became evident in the ascription of responsibility (AR) discourse in both forums: There is very little evidence of ascription of responsibility (AR) over seven years of CMF discussion, and there is evidence for a weak approach to ascription of responsibility (AR) in the semi-structured interviews but in the responses to the questionnaire sent to participants of the Blesbokspruit and Rietspruit Catchment Management Forums there is evidence for a strong approach to ascription of responsibility (AR). As described before, a values discourse is evident in the non-forum sample in the components of beliefs but unlike the forums, there seems to be a stronger approach to ascription of responsibility (AR) amongst non-forum respondents.

Figure 5.1 illustrates a relationship between values and practice, and how society influences, and is influenced by values and practice; together with the link that social learning can play. The relationship between values and practice is also clear where Kemmis (2010, p.9) quotes Aristotle to define praxis: “action that is morally-committed, and oriented and informed by traditions in a field.” This alludes strongly to action steeped in values.

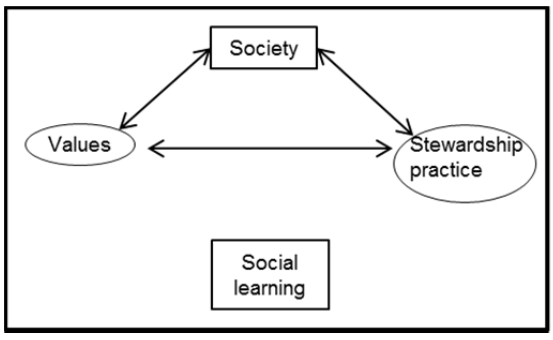

Fig.5.1: *A schematic representation of the relationship between values, practice and social learning supported by data from chapter four*

This discussion is best summed up by the industry respondent, who does not participate in a forum, when she said that practice certainly strengthened her values because when you "practise what you see and what you preach, it strengthens everything" (see Section 4.5.5.1).

5.3 Water stewardship practice

5.3.1 Practice shaped by anthropocentric orientations

Analytical statement three:

Water stewardship practice looks to be framed by a strong anthropocentric ethic discourse.

Drawing from evidence in the data, particularly with regard to discourse categorised by the New Environmental Paradigm (NEP), it is clear that the anthropocentric discourse of development and human right to water versus environmental protection is dominant in the two case study contexts. This evidence stretches across both case studies and the non-forum sample. This evidence is also mirrored in altruism values as reported on in Sections 4.3.2.1, 4.4.2.1 and 4.5.2.1. Moreover but to a lesser extent, it is also mirrored in the egotistic values discourse, both in explicit egotistic values articulation and implied articulation when the discourse has been about economic values (see Section 4.3.1.3, 4.4.1.3 and 4.5.1.3). This discourse is not without tension however, as there is evidence that among those corporate respondents interviewed and observed in this study there was a struggle between their own biospheric values, and their acceptance of the corporation's economically-driven values (see Section4.3.2.1 and 4.3.4.1). Regardless of the anthropocentric nature of the discourse, there is evidence for stewardship praxis as defined by Kemmis, 2010. The relationship between stewardship "doings" and anthropocentric "sayings" (Kemmis, 2010) is worth exploring. If the majority of the "sayings" are anthropocentric, albeit altruistic in nature, then are the forums providing a pluralism of environmental ethics (Weston, 2009) that allows a dissonance which, could potentially lead to social change (Wals, 2007)? Though it is important to provide the space for non-anthropocentric ethics to be voiced, it also seems difficult to do so amidst a loud, laboring discourse about sustainable development in a society that is aggressively pursuing a development agenda and where economic growth, poverty

alleviation and employment creation are the mantras of the day. Retroductive explanations suggest that it may be the strong policy environment that produces a developmentally-focused structure that is responsible for the compliance-orientated practices in the public sphere that is evident in the data of chapter four.

5.4 Social learning

5.4.1 Catchment management forums – a safe space?

The next analytical statement drawn from the data in chapter four is:

Analytical statement four:

Catchment management forums offer a space for potential social learning but, in the cases of the Blesbokspruit and the Rietspruit Catchment Management Forums, the space is not maximised.

It is important to be reminded of the central tenets of social learning before delving into a discussion about analytical statement five: There must be divergent values and constructions of reality that can be de-constructed, or de-framed, (and re-constructed, or re-framed) in a safe, trusted, facilitated space for learning to move beyond the individual to become situated in broader social networks (Wals, 2007; Reed et al., 2010).

While there is some evidence from chapter four (see Section 4.3.4, 4.4.4 and 4.5.4) that social learning is occurring as people engage in practice with internal and external stakeholders, it does not frequently occur in a safe, trusted space and it does not seem to be moving beyond the individual to broader social networks. However, as a result of responses from the semi-structured interviews, the most *potential* for social learning to occur seems to be in the catchment management forums.

While it appears from the data that many of the respondent's values are similar – most of the respondent's held values are altruistic – there is still evidence that there is divergence. This is because of the evidence of different frames (see Section 2.5.3) found in chapter four. While these frames are mainly characterisation frames

(Kaufman &Smith, 1999; Shmueli et al., 2006), they do not give the impression that they are deeply entrenched and thus may be amenable to re-framing (see Section 4.3.4.1 and 4.4.4.1 as examples). Evidence drawn from chapter four also shows that these frames are not given an opportunity to be explicated and thus may not be able to change if the space for facilitated de-framing and re-framing (social learning) is not provided.

Evidence from chapter four suggests that the forums, especially the Blesbokspruit Catchment Management Forum, are not safe, trusted spaces within which de-framing and re-framing processes can occur (Wals & Heymann, 2004). Perhaps, because of the complexity of the water sector, people in the forums have interpreted (or framed) circumstances differently and thus have introduced the potential for dispute or conflict (Shmueli & Ben-Gal, 2003). Perhaps this conflict has caused people to hold frames, not only about particular issues, but also about the *process* of conflict (Gray, 2004) i.e., interpretations of what the conflict is about, why it's happening, the motivations of the disputants and how it should be dealt with, which has perpetuated a context of distrust and insecurity. However, as mentioned before, the evidence in chapter four also shows that these frames do not seem to be held too tightly which means that there is potential for people to let them go in a facilitated process of de-framing and re-framing.

While it is evident in chapter four that the individual is holding and expressing loosely (in many instances) held frames, individuals also engage in a network of social actors that takes the form of the forum. Thus, it is likely that learning can be transferred from the individual into, and between, these networks of social actors. The forum, it can be assumed, is a meeting place of practice architecture where the practitioner’s doings, sayings and especially relatings have the potential to strengthen. However, the difficulty of the socialisation in these forums needs to be acknowledged by retroductive inference: The socio-historical nature of water management and control is politicised because historical legal access to water was tied to land ownership that gave rights to ground or surface water use. Moreover, land ownership was a racially-exclusive component of the apartheid governance regime (Palmer, 1999). This history of water management could influence power gradients and thus socialisation processes in the forums.

Though in many instances, as noted in the data reported on in chapter four, people do articulate the potential for learning in the forums, these opportunities are not maximised. From an interpretation of the data, it would appear that the opportunities are not maximised because of a) people's misunderstanding of conflict. This is also perpetuated by documents such as the Department of Water Affairs' *Guidelines on the Establishment and Management of Catchment Forums: in support of integrated water resource management* (2001). One of the document's headings is: "Pre-empting or *avoiding* conflict situations" (italics added), b) people's lack of skill and knowledge about social learning, and c) continuous polarization of participants at the level of frames (Shmueli et al., 2006).

5.4.2 Reflexive about values

Analytical statement five:

Values discourse – particularly biospheric values discourse – is not explicit in the Blesbokspruit and the Rietspruit Catchment Management Forums, yet it is evident in public-sphere stewardship practice.

5.4.2.1 Discourse in the public sphere

As already described, altruistic, biospheric and egotistic held values are poorly represented in the dialogue of the forums. This begs the question: Why is there no values discourse in the forums? If one takes a social constructivist perspective, then we see that language is an important mediator between a greater socio-cultural context and individual behaviour (and discourse) that forms a component of that culture (Stetsenko & Arievitch, 1997). Therefore, if the greater socio-cultural context is shaped by defined laws and regulations, then individual behaviour (and accompanying discourse) may be shaped by the context within which she/he is found. Thus, if the law and regulations are shaped anthropocentrically, then it becomes acceptable for the sayings and relatings to be anthropocentric and legislation-based and which does not for example, foreground how wonderful it is to enjoy nature for nature's sake or because being in nature may facilitate spirituality. This legislation-based, anthropocentric approach may be explicit in the forums but when participants of the forum were interviewed face-to-face about their public-

sphere practice then evidence for another values discourse emerges. What appears to be evident is that there is a values discourse that accompanies practice in the private sphere but it's just not heard in the public sphere structures (in this case the CMF).

The analytical statement could also convey the meaning that the contradiction between public sphere sayings and public sphere doings may be blocked from emerging into a new, and expansive suite of practices that could lead to new ways of practicing and talking and a new collective social stewardship that enables a planetary stewardship at a broader societal level. This affects the possibilities for social learning, especially the breadth and scope of the social learning that is possible.

5.5 Public-sphere practice versus private-sphere practice

Analytical statement six:

The majority of stewardship practices are found in the public sphere, and those are mostly compliance-orientated.

5.5.1 Compliance as a public-sphere practice

The evidence described in chapter four suggests that the majority of practices that are spoken about and performed by forum members are compliance orientated. Compliance did not appear to be such a prolific activity in the data gathered among the non-forum sample, indicating a possible reason for forum participation. The dominant compliance activity evident in both forums was water use licencing, especially for mining houses and wastewater treatment works. In the Rietspruit Catchment Management Forum there is evidence for some significant non-compliance incidents that could be attributed to the wastewater treatment works in that catchment. Most of those non-compliance incidences had to do with water quality limits being exceeded on a continuous basis.

In an attempt to understand this analytical statement further, an example of a water use licence is given. This is a real example from a metal-refinery based in Gauteng,

which uses water in its refining process. Water is abstracted, recycled and discharged in various quantities and qualities. These activities are listed activities under Section 21 of the National Water Act (1998) and require an authorisation from the Department of Water Affairs. The refinery employs a rehabilitation specialist (the metal-refinery respondent described in Section 4.2) to manage the water use licence process. The process is iterative and requires liaison between internal employees, the Department of Water Affairs, and external consultants who help with the application for authorisation from the Department. Iterative communication, and a constant striving to adhere to the basic conditions of the authorisation results in social learning. This iterative relationship between the Department, the consultants and employees of the refinery is necessary to ensure that the refinery does not contravene the law as a result of not receiving the authorisation, or not adhering to the basic conditions of the authorisation. One way to strengthen this contact is through the CMF. As a fellow participant of the forums, I observe that private sector organisations, like the refinery, attend the forum mainly to keep in touch with the Department of Water Affairs; in fact, I have come to learn that one of the conditions of the authorisation is the attendance of the relevant forum by the relevant applicant. It has also been my observation that much frustration is felt and expressed by the private sector respondent trying to enquire of the Department respondent as to the status of the authorisation process and the Department respondent who is overloaded with the number (and technical nature) of the authorisation application. This has resulted in a) many private sector organisations continuing operations without official authorisation, and b) the Department of Water Affairs embarking on a revision of their systems to cope with the overload of applications. Further frustration is felt, however, by local government who tries to enforce compliance with applications that are a) not yet submitted, b) not yet authorised, and c) badly compiled. Because the refinery operates its business within a broader societal structure governed by laws and regulations, it becomes apparent that activity is geared to ensure that the very nature of the profit-driven business succeeds within this legislative framework. However, in pursuit of these structurally-induced activities (because of legislation), practice seems to be orientated around the corporate's means to an end and not the individual employee's end. This may mean that personal values and their potential concomitant practices can get lost or be constrained by corporate power in this pursuit. In this particular example of the

refinery, however, it was interesting to hear how the rehabilitation specialist was using the very legislative framework around which her activities were orientated, to exercise the expression of her personal values. This is best captured in her own words:

> I believe that … as we are environmental scientists or environmental officers our duty is to take care of the environment. So like I said if the Department authorises something which is like a minimum requirement and I feel like it's not good enough for the environment just because of the care I have for the environment I must see to it that I do something which is more, which will help the environment (BBFObsInd(2)0503.7).

5.5.2 Stewardship as a private-sphere practice

Though it can be argued that compliance-orientated practice could also be defined as stewardship practice (see Section 4.3.5), the dividing line between compliance and stewardship actually comes with *where* those practices occur, i.e., according to Stern (2000) some practices, or pro-environmental behaviour occur in the public sphere and exhibit certain characteristics there, while others occur in the private sphere and exhibit certain characteristics there. Both behaviours (or practices) are influenced by held values but they *play out* in different spaces (Stern, 2000). This analytical statement is seeking to probe into the "*what* is practiced *where"* question. For this reason it is interesting to read the evidence in chapter four that reveals that private-sphere environmentalism (Stern, 2000) is mostly left to the confines of the individual's private household or limited community of practice, while compliance – a non-activist behaviour in the public sphere (as termed by Stern, 2000) – dominates the forums.

Moreover, compliance may be engaged with in the public sphere more so than other forms of stewardship because it may be construed as an anchor within a maelstrom of social networks that makes other forms of stewardship practice in the public sphere difficult. This emphasis on compliance practice, while important, may also have the effect of constraining creativity in practice and volunteering and broader forms of stewardship.

5.6 Summary

This chapter has used context (global and local), theory and the data presented in chapter four to discuss six analytical statements that have been centred on values, water stewardship practice and social learning. These are the three objects that are central to this study and which were articulated in chapter one as central to both the research questions and the goals of the study.

Chapter five has sought to synthesise the data, using the analytical statements, to answer the research questions. In brief, the research questions - *"How do held and assigned values influence water stewardship practices of the public in two Vaal Barrage catchment management forums?"* and "*How is social learning embedded (or not) in the process of shaping values within water stewardship practices of people attending catchment management forums?"* have been answered through the interpretation of the data and a process of extracting meaning from the analytical statements. This meaning is translated into key findings of the study and recommendations for further study, which form the large part of chapter six.

Chapter six will also include the key findings, recommendations, critical review and recommendations for future study.

CHAPTER 6: SUMMARY, FINDINGS AND RECOMMENDATIONS

6.1 Introduction

In this chapter, a narrative of the key findings will be presented in relation to the research questions, which then leads into the recommendations of the study. The recommendations originate from the analytical statements and ensuing discussion presented in chapter five. The recommendations focus on the key objects of the study as articulated in the conclusion of chapter four, namely: Values, water stewardship practice and social learning within a global context of planetary stewardship, a national context of integrated water resource management, and a local context of the Vaal Barrage CMFs. The study will conclude with a critical review of the research process and recommendations for further research.

6.2 Summary of the key findings

The aim of the study, through examining valuing processes, and expressions of these in held values, was to contribute to the understanding of social learning for social change within a broader IWRM framework so as to improve the practice of water stewardship amongst the public of South Africa. This emanated from a professional interest working for an NGO whose mission was fundamentally natural resource stewardship; an interest as a CMF participant to understand how and why people were engaging in IWRM and then, an interest in whether that engagement was transformative.

Drawing from literature in the fields of values, practice, stewardship, IWRM and social learning, the data in chapter four was discussed in chapter five. A diagrammatic and narrative summary of the key findings of that data follows.

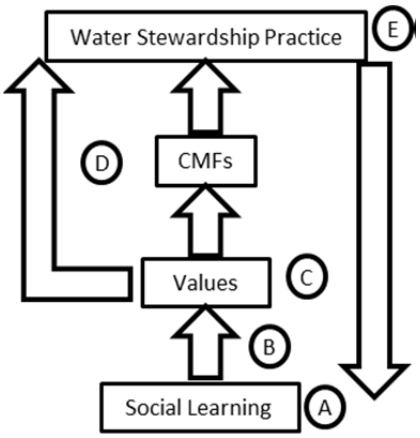

Fig.6.1: A schematic summary of the findings of chapter five

A) Social learning

Components of social learning, as positioned in this study (see Section 2.5.2 and Section 2.5.3), seem to be occurring in the context of practice particularly through mentorship, work experience, education, interaction with other people on the job or in the community and CMF engagement (see Section 4.3.4, 4.4.4 and 4.5.4). However, it seems as though this social learning is not occurring in a safe, trusted space nor moving beyond the individual to a broader social network (see Section 2.5.2).

The language presented in Table 4.1 to help identify evidence of framing was used to identify social learning, or, at the least, potential for social learning.

Most of the frames held by people are characterisation frames but these frames do not appear to be deeply entrenched and thus may be amenable to re-framing. It seems that these frames are not given an opportunity to be explicated and thus may not be able to change if the space for facilitated de-framing and re-framing (social learning) is not provided for. The reason for why the space is not maximised is because of a) people's misunderstanding of conflict, b) people's lack of skill and knowledge about social learning, and c) continuous polarization of participants at the level of frames. Also, there is a values discourse that accompanies practice but it's just not foregrounded and thus the opportunity for social learning and thus social change is not being allowed to manifest.

B) Social learning and values

There is very little evidence for the shaping of values within practice but there is evidence for an awareness of frames (see Section 4.3.4.1 and 4.4.4.1), which is fundamental to the social learning process. There is also evidence for different types of frames but not necessarily a self-awareness of these frames. The bringing together of these different types of frames within a safe, trusted, facilitated space may deepen the extent of social learning and also situate it within a broader social unit or community of practice (see Section 2.5.2).

Socialisation processes appear to be shaping held and assigned values within each case and in the non-forum sample. These processes are: Knowledge acquired through experiential training and mentorship; proximity to water (especially the dry parts of the country where assigning value to site-specific rivers is evident) which is closely linked with accessibility and place of residence; childhood experiences (this is where historic assigned values may have played a role in the valuing of those people); spirituality (which Seymour et al. (2002) classify as assigned values), culture (particularly the loss of narratives explaining the origins of our water), economic considerations and social learning.

C) Types of values

There seems to be an overarching environmental ethic of anthropocentricism which manifests in a private discourse about the importance of development and human right to water that is articulated in instrumentalist terms. This ethic is communicated in held altruistic and egotistic values while held biospheric values are at a minimum within these two case studies.

D) How values influence practice through CMFs

There is a strong altruistic tendency amongst forum participants and the non-forum sample, which seems to influence stewardship practice amongst forum participants. Biospheric values are held by a minority both within the two case studies and within the non-forum sample. However, it must be noted that the voice of the minority within the Blesbokspruit is vociferous, which appears to demonstrate that the relationship between held and assigned values and pro-environmental behaviour is a strong one.

The biospheric values displayed seem to be linked with a strong articulation of a sense of obligation by some to defend or be a voice for the “voiceless organisms” (see Section 4.3.1.1) of our biosphere. Egotistic held values appear to hold influential power within private-sphere stewardship. People engaged in stewardship practice appear to be influenced more by altruistic held values than biospheric or egotistic held values.

Held values, more than assigned values, are influencing people. This is not to say that there was no evidence for assigning values or that historic assigned values did not have a role to play in the valuing process of those people. Though VBN Theory was used to locate values’ influential power on beliefs and norms as catalysts to pro-environmental behaviour, the ‘how’ of the held values influence in these two case studies was unclear.

While CMFs provide a potential place for the explication of values and thus the potential for social change to occur, they are not the only place that provides for this social change: Values also seem to change with practice. It does seem however, that the CMF provides a place for the convergence of public-sphere practice.

E) Water stewardship practice

Most public water stewardship practice manifests as compliance activities in the forums, while private-sphere environmentalism (Stern, 2000) is mostly left to the confines of the individual’s private household. The majority of practices that are spoken about, and performed, in the forums are compliance related and are driven by the private sector organisations. The dominant compliance activity evident in both forums is water use licencing, especially for mining houses and wastewater treatment works.

Water stewardship practices that are practiced by individuals are easy, low-cost activities to help conserve water. Individuals practice these privately, and for the family (located in the family unit) or within a spiritual community of practice. There are strong indicators that practice is occurring “at the site of the social” (see Section 2.3.4).

6.3 Summative recommendations of the study

As a result of the discussion of the analytical statements and the key findings, recommendations are presented.

6.3.1 Explicating Values

It is recommended that provision be made in the Blesbokspruit and Rietspruit Catchment Management Forumsto encourage a pluralism of ethics (Weston, 2009) that “invites individuals into an ongoing process of defining and redefining their own rules for individual and community conduct” (Jickling, 2004, p. 16). Not only should this pluralism be encouraged but that it should be made explicit through skillful facilitation that seeks to provide a safe space for this explication. It is only through the explicit de-framing and re-framing of current constructions of reality that we can hope to broach the knowledge-action gap and thus encourage people into new ways of doings, sayings and relatings. For example, if explicit provision were made to expand a biospheric held value system, would that held value system be just as powerful an influencer of stewardship (as evidenced by the people caring for the Marievale wetland) as altruism? These spaces and expanded learning opportunities could go a long way in contributing to a society that needs transformation in activities if it is to continue to live within the safe, operating spaces of the planetary boundaries. It will be important for an NGO like WESSA, which has a stewardship-orientated mission, to work within the potential socialisation spaces to influence value formation.

Finally, in light of the comment about a perceived lack of biospheric values due to a rapidly urbanising population, the exposure of children to natural places or to ways of participating in water stewardship practices may be relevant interventions that an NGO, like WESSA, could engage in.

6.3.2 Expanding water stewardship practice

Values that are embedded in the practice of compliance may be the starting point for a social learning process that explicates other values. This explication could facilitate the expansion of stewardship practices from compliance in the public sphere into

new private-sphere practices. In other words, the explicated values discourse may enable more porous boundaries between current public- and private-sphere practices (see Fig.6.2) to expand the stewardship practices of individuals.

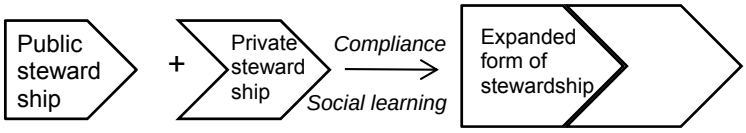

Fig.6.2: A schematic representing compliance as the catalyst for a social learning process that creates porous boundaries which bring public and private stewardship practices together.

This tension between public- and private-sphere practices may, if expertly facilitated, provide a new space for social learning, new practice and thus social change that moves beyond compliance into the realm of self-regulation or "compliance-*plus*". It is stewardship at this scale that, if moved from the sphere of the individual into collective action will provide the planetary stewardship called for by Steffen et al. (2011) and Chapin et al. (2011).

6.3.3 Effective social learning spaces

Though these forums seem to be difficult spaces to engage in social learning due to different socialisation factors, it is also *because* of these differences that make the CMFs a potential space for social learning processes. This is an important point because if we are to build an integration of doing, saying and relating across sectors that is required for integrated water resources management and the expansion of water stewardship practice, then there is a need to provide effective learning spaces and opportunities that may take the form of more engaged social learning interactions in forums like CMFs. This also means that an NGO like WESSA, which has a strong stewardship-driven mission, can play a mediating role between a strong regulatory framework and the society that is changing around it, and in it, in these learning spaces or forums. It is this opportunity for reflexivity that Glasser (2007) and Wals (2007) (see Section 2.5.4) suggest may help lead us to the social change necessary to live within the safe operating space of the planetary boundaries.

6.4 Critical review and recommendations for future research

The decision to embed the study in two case studies ensured that a limitation was placed on the study which may have a) constrained the selection of sample groups, b) perhaps constrained the diversity in data and c) limited the study's findings. Therefore, recommendations for future study would be to open the scope for a more diverse population that would comprise respondents with different demographic characteristics like age and standard of living; and select people not involved in the environmental sector or the water sector at all.

In a society that is so culturally-diverse, the role of culture in shaping values and practice is one factor that is important to understand better and so would require more depth of research. It was merely acknowledged in this study. This may mean that an ethnographic approach to researching values and ethics over a longer period of time could expand the data sets, and thus the detail and scope of a study like this in future.

The exploratory nature of this research and its concomitant key findings and recommendations may entice future researchers to engage in action research so as to catalyse social change through the social learning process located in selected, existent forums, like the CMFs or by way of the creation of new learning forums.

In reflection, though much of my study confirms theory that exists in a global body of knowledge, the purpose was not to develop theory, but rather to probe practice in two case study contexts. The interest on a professional level was driven by a need to understand how people were engaging in IWRM and, then, what motivated that engagement so that WESSA could develop a national water resource management strategy so as to influence effective public participation and social learning in IWRM.

This study has contributed to a broader understanding of values and their relationship to practice that could inform the construction of national water resource management strategies in organisations such as WESSA.

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APPENDIX 1: An example of semi-structured interview questions

Questions for the in-depth interview:

1. Please tell me about your job – who do you work for? What do you do? *(this is a 'settling in question', designed to make feel comfortable)*
2. Why did you choose to work within the environmental field? *(this question is striving to explore whether a) their value set guided them into the field and b) if past experiences helped shape that value set. From Seymour, et al.)*
3. Tell me what you think the word 'values' mean? *(this explores the notion of a confusion in the field about the definition of values. It also ensures that the participant and the interviewer are on the same page with regard to the word values, as I think it important that the language used has some common definition)*
    a. "judgements about what in this world and in this life is truly important, worthwhile, and meaningful" *(this is close to my definition of values)*
4. Think about water in general. What do you value about water in *general?(this question is exploring an understanding of people's held values about water)*
5. What helped you develop this value? *(this explores the theoretical notion of how past experience helps shape our held values. Similar to the question 2.)*
6. Do you live or work near a river, stream or open body of water? *(this sets the scene for an exploration into assigned values as well as an exploration into the theory of proximity and accessibility to water that may shape values. From Seymour, et al.)*
7. Do you think that this river, stream or open body of water is important? *(exploring assigned values)*
8. Do you have access to this river, stream or open body of water? *(exploring the theory of accessibility and locality. From Seymour, et al.)*
9. What about the nearby river, stream or open body of water do you value specifically? *(exploring assigned values)*
10. Being exposed to problems associated with the water sector, do you feel a deep concern? If so, for whom/what do you feel a concern? *(this is exploring part of Stern, et al.VBN Theory about the awareness of concern (AC))*
11. What do you value about the CMFs? *(a grounding question to set up the next to explore social learning theory within the CMF context)*

12. What do you think you learn about water in the CMFs? *(this is to explore social learning theory within the CMF context)*
13. *Do you think that when talking to others in the CMF context that you are changing your values about water? (exploring social learning theory – re-framing)*
14. *What water stewardship practice, do you think, emanates from your values about water? (exploring whether values produce practice)*
15. Where do you live? *(to explore assigned values)*

APPENDIX 2: An email requesting permission for an interview

Garth Barnes

From: Garth Barnes <gbarnes@wessanorth.co.za>
Sent: 09 June 2012 09:50 AM
To: [redacted]
Cc: 'Garth Barnes'
Subject: My Masters (Education): A request for an interview please

Importance: High

Good day[redacted],

As discussed in the last Blesbokspruit Forum, and as agreed to by the Chairperson, I would like to ask if you would spend just 45 minutes of your time in an interview with me for my Masters degree. Please see below for more information about this:

Semi-structured interview with members of the Blesbokspruit Catchment Forum

Purpose of the interview

The overall purpose of the interview is to support my research into how held and assigned values of the South African public influence water stewardship practice. The research will also help me to ascertain whether social learning is (or can be) a part of this valuing process.

The overall goals of the research are:

- To understand how different members of the public hold and assign value to water.
- To understand how held and assigned values, and the assigning of values (the process), influence water stewardship practices.
- To understand what social learning is embedded in the process of assigning values in water stewardship practices (e.g. what framing and reframing processes occur; what new knowledge is shared).
- To understand what social learning results from values oriented water stewardship practices (e.g. is there evidence of changed practice and awareness at community level).

My provisional research title is ***"An exploration of the way in which values and valuing processes might strengthen social learning processes of water stewardship practices in South Africa."***

What is required of you?

The interview will have the participant share their valued perceptions, interpretations and experience of the water sector so as to achieve an understanding that will inform future water stewardship practice. **The interview will be no longer than 45 minutes.**

What you can expect from me?

The interview will respect the rights of the interviewee. I will also ensure transparency by sending any analysis and/or interpretation of the interview back to you for verification. I will maintain your privacy which is achieved by ensuring confidentiality and anonymity. Lastly, I will respect your time.

I look forward to your participation in this process.

Please would you let me know when, in the next 2 weeks, you are available?

1

APPENDIX 3: A short questionnaire probing awareness of consequences (AC)

1. *Do you believe that there are harmful consequences as a result of certain environmental conditions pertaining to water?*
2. *If so, do you believe those consequences are for other people, yourself or the natural world at large?*
3. *What do you think those consequences are?*
4. *And do you believe that your current water stewardship action/s could begin to avert those consequences to other people, yourself or the natural world at large?*
5. *How?*

APPENDIX 4: A photograph of an observed practice

APPENDIX 5: An example of observation field notes from researcher's journal

I had not sought permission to interview the GBMD respondent who had invited me.
Moreover, the choice of observation, in some ways wasn't correct: it was the DWA first educational initiative of this nature, there was pressured, there were many kids & few equipment, I (by) was unprepared (from an equipment, clothing perspective). I didn't really know what questions to ask & then there was the 4 reprimand...
With regards to BBE (Ind(2)): a better note of questions; nice probing into practice
* Include a reflection on data collection" section in C3
She was very certain of her process, knowing that the (i) WDTA was central to her tasks.
When looking for data (or showing me on the computer)
data) I could see that she was an organised person. This was confirmed by an initial observation of the neatness of her desk & how well filed documents were in her cabinet.
She seemed to know her job & though doesn't know all about all, she seems to have a good network of experts to tap into if need be.
Continuation of 1st observation: DWA person in water shouting at kids — Toh down, Muda assumption about words & her actions)
Time pressure, group work: not much space for questions, split up - some in river some on bank; PG would show a learner what to do with the net, then hand over for practice but then take it back if learner not performing

APPENDIX 6: A transcribed semi-structured interview (showing evidence of coding)

DM650040

Garth and Ind2

Participant	Response
Garth	So I'm gonna leave that there Ind2 and I'm gonna take my watch off so I can just uhm respect your time. I'm aiming to be done in half an hour
Ind2	Okay
Garth	Uhm so ja so let's get at it. So I described a little bit about what the interview is about, that you feel comfortable, so I assume that you do.
Ind2	Okay
Garth	So the opening question really is an easy one. I just would love for you to tell me about your job and who you work for.
Ind2	I'm working for Exxaro in Springs and we have got an operation, it is called Zincor and as I said I am a rehab specialist. What I do normally is to coordinate the monitoring that is done by a third party company uh its Clean Stream and uh we are done monitoring, we are doing that, and uhmuhm I'm coordinating that and, hum well there is a lot projects that we are about to undertake now. So I'm the one who coordinates all the projects.
Garth	Okay, brilliant, brilliant.
Garth	So you told me a little bit about your history, your studying history.
Ind2	((Agrees))
Garth	What, if you look back over your studying history, what about the environmental field made you chose to study something to do with the environment.
Ind2	Uhm like I said I grew up in Soweto and uh back in the 80's/ 90's Soweto was very polluted, air pollution uh from the burning of coal, there were a lot of dumping

	sites.And for me well back then I didn't know about environmental management. But I just thought I wanted something that will sort of protect the health of the people and it so happened that when I went to tertiary they introduced me to environmental management and then I just thought this would be ideal for me, because uhm the whole thing for me was about uhm like the waste management and the air pollution and I just found that it's more relevant to me like environmental management via environmental health so that's how I got to know about the environmental management and do like uh uhm environmental management.
Garth	Okay so if I can just pick up a little bit of what you told me.
Ind2	((Agreed))
Garth	You said as a result of you growing up in Soweto you came across a lot of water pollution.
Ind2	Well more of air pollution and uh soil pollution from the waste uh, illegal waste dumps.
Garth	Okay
Ind2	Ja
Garth	So would you say that as a result of seeing that air pollution and soil pollution, that caused you to feel like you need to be involved to help make Soweto perhaps a better place
Ind2	Yes
Garth	Yer, is that right?
Ind2	Yes
Garth	Okay. So as I told you a little earlier, the study is about, my study is about values.
Ind2	Alright
Garth	So when I use the word values, what comes to your mind in terms of a definition for values, and there is no right or wrong answer I just wanna hear what your answer is about values.
Ind2	Well I think values are sort of uhm the standards or the respect that we have uhmtowards a certain like thing, like in this case we are talking about water or environment uh whatever like principles or standards that we have for the water bodies or water resources, if that's okay.
Garth	Okay, that's a pretty good answer, so standards hey

Ind2	((Agrees))
Garth	So you are talking about standards?
Ind2	Yes
Garth	Okay. So as you said, if we talk about water in general.
Ind2	((Agrees))
Garth	And you think about water in general, so not particular water bodies but just water in general, what do you feel is important about water?
Ind2	Oh I just feel that all aspects of water are important because uhmI have learnt that from the hydrological cycle, wherever you go there will be water Like from the what is the atmosphere and the ecosphere and from the hydrosphere the water will be everywhere, so if it happens that you pollute the water in a certain area it will end up being a national crisis or a national problem, so I just feel that water is very important.
Garth	Wow I must say I wish more people have the perspective that you do, I mean you just identified how important that water, a local water issue actually has connections to a national landscape.
Ind2	Oh yes, it does.
Garth	So now that you've mentioned what you think is important about water, what in your mind helped to inform the way you looked at water? You mentioned some of uh your experiences in Soweto
Ind2	((Agrees))
Garth	Uhm but perhaps there is something else that helped to inform your value about water and if so I would love to hear about it, and if it was more about the Soweto experience I would love for you to expand on that experience.
Ind2	Uh well it was that that but uhm when I did my experiential training I did it at Randwater and as you know Randwater they are dealing with water management. So it just happened that we were doing a lot of projects, I got exposed to uhm or I was working with uh my mentor in those projects. That when I realised that we have got a lot of water related problems in South Africa. And uhm myself as an environmental scientist it's something that I must focus on because I mean like I said a water environment issue cannot be a localised issue. It can be a regional and end up being a national crisis. So that's where I sort of became exposed to uhmthese water management problems.

Garth	So it's safe to say then that your training
Ind2	((Agrees))
Garth	…education helped you to develop an understanding around water.
Ind2	Yes yes
Garth	Okay. So now diverging a bit, uhhm if you think about friends and family
Ind2	((Agrees))
Garth	…that you have uh would you say that they have, they place the same sort of value on water like you do?
Ind2	Not really because uhm ((giggles)) uh most of the time, especially when I am home I'm always like uhm talking to somebody about not wasting water, because they will just maybe just let the tap run and they will just say agh we are paying for the water and everything and for me I know it's not the issue of paying, it's the issue of uh conserving what we have. So uhm I think they don't have a lot of respect or values for water, but I would say that it is because they are not really informed. They don't know,they don't have like background information about the water management.
Garth	((Agrees))
Ind2	Ja
Garth	So if they're not informed, and then you begin to inform them do you think that their behaviour will change if you inform them about water conservation?
Ind2	I would say it would change, uh the reason why people do such things is because they don't have knowledge on that subject, but I've been, whether at home or at work, I've informed people about environmental management and water of course being part of that uhm subject and I've seen a lot of changes, I mean from, like for example at home you find that maybe somebody was just letting the tap run just like without conserving water and after like talking to those people they will try by all means to conserve water, I'm not sure if they do it when I'm around only or
All	((Laughing))
Ind2	…or it is something that they do…
Garth	((interjects)) to Ind2 the policeman, they are scared you are gonna police them.
Ind2	Ja

Ind2	((Laughing))
Garth	So may I ask then, why do you tell them about water conservation?
Ind2	For me like I said it is because of all the aspects of the environment I feel that water is very important like I said it's like everywhere, it can affect the air, it can affect the soil as well, and another thing they must remember is that uhm as human whatever it is that we do we have is sort of picked on the environment and the animals and plants, So uhm I just feel whatever we can do to conserve or make sure that we prevent the pollution we can protect the animals, the flora and fauna in that process.
Garth	Okay. Uh you said that you grew up in Soweto, you did grow up in Soweto?
Ind2	Soweto…yes. I did, I did.
Garth	Where there any uh rivers or steams that you played in as a child that you remember?
Ind2	Yes
Garth	Oh there was?
Ind2	Yes
Garth	Okay
Ind2	I can't remember the name of that stream but uhm it was running uhm from Dobsonville via Meadowlands, so we used to go there to play there.
Garth	Oh wow. Do you think if you cast your mind back to those days if you can remember you playing in those streams? Do you think that playing in those streams helped you to develop some sort of an environmental consciousness?
Ind2	((Short pause)) at that stage I don't think so no, no at that stage. But as I was growing up that's when like I started noticing other things that uhm like uhm the water management, something that I wouldn't have identified as a child.
Garth	Okay fair enough, fair enough, okay, so if you, now that you are in the environmental sector right
Ind2	((Agrees))
Garth	And how long have you been working in the environmental sector for?
Ind2	I started in 2005
Garth	2005, so quite some time already?
Ind2	((Agrees))
Garth	So if you think about the environmental sector, uhm and hopefully particularly water.

Ind2	((Agrees))
Garth	Do you feel a concern about what is happening in the environmental field?
Ind2	Yes uhmI am concerned because uhm I just feel that government is not doing uh enough to uhm sort of, to regulate and enforce the legislation that they have to protect the environment or the water, there's uhm you will find that uh if maybe I can give an example with Joburg there will be a lot of companies that are discharging into the water bodies or uhm stream and uhm you find that maybe government is not doing enough or it's not doing anything at all to ensure that that companies stops their activities.
Garth	((Agrees))
Ind2	Or maybe even to clean up that stream.
Garth	((Agrees)) so and when you feel concerned who are you concerned for?
Ind2	UhmI think it will be more for the environment, even though it ends up like being uhm a health issue but it's not on the environment because that's where it starts, that's where it begins
Garth	Okay
Ind2	Ja
Garth	So when you say the environment what do you mean exactly?
Ind2	I mean like uhm obviously we will have uhmuhm animals that depend on the water body or uh like we will have animals that like depend, uh we use the water body for habitat so I'm more concerned about those uhm animals; I'm more concerned about the plants that depends on the water that we are busy polluting.
Garth	Okay okay. Alright so you have quite a strong ethic, uh towards plants, animals, you hold them quite valuable.
Ind2	Yes, because I just feel that for us, if maybe there is something that is happening we can be able to voice it out. We can be able to talk about it, but for them they cannot be able to say you are busy killing us or something like that, so we need to be, somebody must have a concern about their health.
Garth	((Agrees)) Very interesting actually I think you are probably one of the only people that I've interviewed, that have uh communicated a strong uh ecosystem environmental ethic and you know you place intrinsic value in nature which is cool to hear. Are you involved in the catchment management forums?

Ind2	Yes the Blesbokspruit
Garth	The Blesbokspruit
Ind2	Yes
Garth	And so if you think about the Blesbokspruit, uhm what do you value about being involved in that forum?
Ind2	Uh well uhm luckily Blesbokspruit as an area is a Ramar site which means it's a wetland of international uhm interests so I'm happy that I am part of Blesbokspruit because of that and another thing there is a lot of challenges that are happening at uhmBlesbokspruit like for example there's uh excess water now uh because there is a lot of mines that are discharging into that river. And there's uh mines upstream that are discharging into that river and obviously that's changing the ecosystem around the Blesbokspruit so now all of the projects that are happening in the Blesbokspruit obviously they have uh, whatever project that they start they have got like…they are trying by all means to conserve whatever is left of the Blesbokspruit and uh to ensure that the water is uhm, clean and it would be able to be used by the animals and the ecosystem in the Blesbokspruit so for me I just feel that uh there are enough interesting challenges, that I can learn a lot of things from that forum.
Garth	ah learning, I'm gonna pick up on that.
Ind2	((Giggles))
Garth	Uhm so with regards to the water issues that arise as a result of the Blesbokspruit forums meetings
Ind2	((Agrees))
Garth	Would you say that as you engage with those issues in the forum that you are learning?
Ind2	Yes I am.
Garth	Could you give me some understanding of how you are learning?
Ind2	Uhm, okay I will talk about something that happened in our company, uhm part of, you know that Blesbokspruit is a wetland? and I think before I joined this company I didn't know anything about wetlands. Honestly the wetland management, and the delineation and all those things that need to be done. So when I joined this I, just did because our company is part of the Blesbokspruituhm we are a member of the Blesbok forum so we, obviously the challenges that we have in that wetland it's something that

	we raised on that forum and it's something that is being managed by the forum. And you know the outcomes of that project, it's something, for me it was a learning curve.
Garth	Brilliant, brilliant, that is a very good example thank you for that. And you say that it's a direct result of the interaction with the forum.
Ind2	Yes
Garth	And the projects that happen
Ind2	Because you can find that maybe uhm part of my training, I was taught something from the textbook but I cannot put that into practice, but uhm there was somebody maybe if it was involve in wetlands management and in that forum that's when we are busy interacting uhm and somebody who will come with the knowledge and like a practical knowledge of something that was implemented somewhere and uh while we are busy engaging then like I can learn something from that person
Garth	As you, as you're learning by talking to people and interacting with people about particular wetlands/water issues do you think that your values about water are changing?
Ind2	I think now I am more passionatewith what I'm doing from back to when I started because when I started I had a motive but just because I had limited information I didn't even know what I was doing but now that I know like I have got this information now I'm becoming more…. about what I am doing and uhm I'm protecting and conserving the environment and the water management.
Garth	Wow that is awesome.
Ind2	Ja
Garth	Okay. So as you begin to learn and as your values begin to change uh with regard to water do you think that you are practising uhm you putting into practise what you value, so in other words is what you believe then translated into your behaviour? As you work with water - whether that's in a professional space or whether that's in the private space.
Ind2	Yes I believe that whatever I am sort of learning is like uhm, it is sort of bringing change into my life because the things I used to do, maybe when I was younger I know now I cannot do it because I will have the environment best interest at heart. But also I gave you the example of somebody leaving the tap running, for me you know I take it very personal if somebody leaves the tap running ((laughs)) I promise you and my

	friends know, and they will, sometimes they are avoid doing things around me and they will end up saying eywena you like practising what you do at work at home.
Garth	Oh really
Ind2	Yes and ja I just feel that uhmwhat I have learnt it's sort of changing my life and I like the changes. I like the changes like I said, uhm unfortunately the environment, it doesn't help make ait doesn't voice out its frustrations so somebody must voice out all the issues that it encounters.
Garth	((Agrees)) So you mentioned uhm, you mentioned leaving your tap running as one particular water conservation practise, which is absolutely right, can you think of any other practises at home perhaps that you engage with for water conservation?
Ind2	You know there's something that uhm, even though this is something that is going to end up in a municipality sewerage and everything but there is something a lot of people do, they rinse like any toxic substances into a drain uh I would watch my father doing that especially with paint, but now he knows better, he doesn't rinse anything, he can just take maybe cleaners and just like wash his hands, then it won't rinse anything down the drain, and if he is doing it while I am not there, so I'm very strict on that one as well.
Garth	Okay, well that's brilliant.
Ind2	Ja
Garth	Ohkay and any examples from work, I mean what do you, what is your sort of work practise, are there certain things at work that you can practise the water conservation measures?
Ind2	Actually there is a lot, like I said we are just next to the Blesbokspruit
Garth	Ja
Ind2	And we must just make sure that uhm luckily we do have a water use licenceand we are allowed to discharge, but we must make sure that uhm our water quality, I mean the quality of the water that we discharge it iswithin the standards, uh stipulated on the water use licence. So it's something that I look at as well, obviously we monitoring our water and we are monitoring what we are discharging and everything so uh I sort of tell the guys not to exceed the limits of whatever elements that are stipulated there and sort of make sure that they understand why is it important for us not to exceed.
Garth	So Zincor is a mining house, hey?

Ind2	No it's not a mining house
Garth	Oh it's not?
Ind2	We are a smelter
Garth	Smelter?
Ind2	ja, we used to uhm I'm sure it was a refinery for zinc, ja we used to produce zinc and sulphuric acid
Garth	Okay
Garth	Okay so I would assume, and this is why I need you to speak to my question because I don't want to assume. I assume the work that you are doing is part of the environmental side of things is influencing your colleagues for better practise would you say?
Ind2	Yes
Garth	Ja?
Ind2	Yes
Garth	So as you're talking to your colleagues, whether they are engineers or uhm other scientists, uhm your environmental practise and your environmental language that you use, would you say that is positively influencing?
Ind2	You want to know if what I'm telling my colleagues is influencing their behaviour?
Garth	Ja
Ind2	I would say it is because uh like we have got an awareness programme where we would be telling the guys why they are not supposed to do this and why they are supposed to be doing this and we have got like procedures uhm that helps us to conserve the environment and uhm what happens is you find maybe one or two guys who are like not really going to follow the procedures and who is like not willing to follow whatever you have informed them During our awareness training, but I think uhm, when the guys learn to know why is it important for them not to do one, two three. That's when you want to implement or to follow what you're told about the environment. Because uhm sometimes they just don't understand why is there a need for us to conserve the environment but once they get informed that's when they can stop their uh like bad practises or ja the bad practises then they can follow like the procedures which are aimed at uhm avoiding or preventing the pollution.

Garth	And do they usually uh change their behaviour once they know
Ind2	Yes
Garth	Okay
Ind2	I would say a lot of them would, obviously you would find one or two people who want to work but a lot of them they would change their behaviour.
Garth	Okay. Ind2 I think that's really it from me. As I said short sweet and sharp.
Ind2	((Interjects)) we done!
Garth	Sharp, ja 25, 24 minutes
Ind2	((Laughs))
Garth	Thank you very much.
Ind2	I thought we are still on number 10.
Garth	No, no no
Ind2	((Laughing))
Garth	No that's how quick that went so uh thank you very much I really appreciate your time.
Ind2	Oh you are welcome
Garth	Thank you.
Ind2	You are welcome ((laughs)).

APPENDIX 7: Part of an analytical memo (with evidence of indexing and categorising)

Interviews of the Non Forum

Analytical Memo 1 (AM 1)

Theme: Values

Sub theme 1: Biospheric values
do you attribute the same importance of water to human beings as you do to the ecosystems that need the water? (NFPG0412.4). Uhm I wouldn't rate uh uh people as more important than the ecosystem because we are kind of uh interdependent you know (NFPG0412.4). in my view humans and the industry are part of the ecosystem.(NFMining0515.6). I appreciate so much maybe it's unfair the way it's [environmental resources] distributed but I mean I'm still grateful for the fact that I have this (NFInd0514.6). but I don't think ive ever had an experience with water like a water shortage or a water crisis that's enabled me to form that value attachment to water. So from a broader sense, I value water in the environment (NFAC0510.2). I know the importance of water but yaI think my value attachment to water comes from it being environment …as an essential part of the environment and I value the environment as a whole (NFAC0510.2).
Sub theme 2: Altruistic values
And for me this call although it is personal in a sense that it is directly linked to me but it's not to serve me but it's to serve the people around me. So that's the greatest value for me, that it will serve other people more than myself (NFNGO0424.7). I mean you are talking about this vulnerability of people suffering and you see it live. And it is moving and it urges me to want to do more. (NFNGO0424.12). Its life for everything. Its life for uhm the landscapes that I see around me. Its life for me as a person and for my family as I need to drink water and I need to use it at home. Its life for industry which is a development mechanism and a contribution to the economy. So water is an enabler to drive all of these processes and because it is so critical in that sense, it has that intrinsic value uh it, jauhm you know ja for my space that's …I guess that's where it is, it plays a role in terms of if I want to relax I will go to the beach and there is water or I will go to a river and that is where water is and so it has a personal value (NFMining0515.4). To go and assist those people in terms of my spiritual journey is about empowering an individual first to manage their mind and manage their state of their heart and their mind and once the individual is strong, the community, the family gets stronger, the community gets stronger and then you know suburbs, areas, whatever, gets stronger (NFInd0514.5). You cant manage people and an environment separately its all got to be together, so um…ya...conserving for everyone, for my family's sake, I don't have children, but if I did have

children I could…for the clichéd say..."the little children of the future" (NFAC0510.3**)**
Sub theme 3: Egotistic values
I think uhm water just like air that we breathe is something we cannot live without (NFNGO0424.2). actually, so for me water is kind of a basic uhm requirement if I can put it that way. Like we need water to survive, we need water for drinking, for cleaning purposes, for cooking (NFPG0412.2). …for for manufacturing, for almost everything we need water, so for me it is a very valuable resource you know (NFPG0412.2). I think in some respects when guys have to pay more for water it is easier to explain why water has a value. (NFMining0515.10). You know in South Africa we still pay relatively little for the water that we consume (NFMining0515.10). But yet we don't attach even an importance to water and your water is used for everything. For cleaning yourself on the outside, for cleaning yourself in the inside in terms of how you consume it, drink it it is an absolute, how can you quantify the value of water if you are made from water? (NFInd0514.7). So if people look at it that way the fact that we are made of it and if you would treat a water body that way you need to ask a question whether you would treat your own body like that (NFInd0514.7). I suppose selfishly myself, because we all want to protect something that we value and you know, we'll go to whatever lengths we can to do that…but also…um ya for society, for everyone (NFAC0510.3)

APPENDIX 8: An email requesting permission to access forums for conducting data collection

Admin

From: Garth Barnes [mailto:gbarnes@wessanorth.co.za]
Sent: 16 February 2012 07:53 PM
To: [redacted]
Cc: 'Garth Barnes'
Subject: Full Thesis Masters in Education: Permission to conduct Research
Importance: High

Good evening [redacted] and [redacted],

I trust that this email finds you well.

The presentation of my Masters, on the 7th February 2012, at the Rietspruit Forum refers.

[redacted], as Chair of the Rietspruit, and [redacted], as Chair of the Blesbokspruit, I would like to confirm permission to conduct my Masters research in the aforementioned Forums for as long as required for my research. In summary, my Masters will seek to:

Answer the following questions:

1. How do held and assigned values influence water stewardship practices of the public in South Africa?
2. What social learning is or can be embedded in the process of assigning values within water stewardship practices?

By:

Locating my study in two case studies: the Rietspruit and Blesbokspruit Forums so that I can collect data from a broad diversity of potential stewards of water, for example: industry, mining, government (all 3 tiers), non-governmental organisations (NGOs), community based organisations (CBOs), agriculture, academia.

How:

- Analysing the previous 5 years of Forum minutes;
- Conducting 14 semi-structured interviews with the audiences mentioned above;
- Conducting 3 focus group interviews with clustered sectors: 1) government, 2) private sector (industry and mining) and 3) civil society (NGOs, CBOs and academia)
- Gathering data from observations in-field (with the permission of the relevant people).

Why:

It is my aim to find out:

How 'better' water stewardship practices can be supported amongst members of the public; and thereby

Informing the construction of an environmental NGO's National Water Strategy so as to influence effective public participation and social learning in IWRM.

Therefore, I would like to ask your permission to conduct all facets of this data collection within the Forums.

[redacted] no one from the Forum has come back to me to say that I could not conduct research. Therefore, can I assume to move ahead?

[redacted], how would you like me to proceed with my effort in negotiating access to the Blesbokspruit Forum? Would you like me (or would you like to?) to send an email to everyone in the Forum asking for permission, or is it enough to get your permission only?

Chairs, this is quite **urgent** so I look forward to your prompt response and guidance.

Thank you and regards

Garth Barnes