Knowing, Caring, and Acting:
Making Use of Socio-Cultural Perspectives to Support Biophysical 'Conservation' Initiatives

Report to the
WATER RESEARCH COMMISSION

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EXECUTIVE SUMMARY

This report is the culmination of research conducted on the three-year project funded by the Water Research Commission, entitled "Knowing, Caring, and Acting: Making Use of Socio- Cultural Perspectives to Support Biophysical 'Conservation' Initiatives (K5/1800)."

The project aimed to:

1. Investigate local socio-cultural perspectives of conservation, and specifically, water conservation, and the many degrees/ways in which people know and care about conservation, and the degrees/abilities/ways in which people act in a manner that reflect this.
2. Develop a conceptual understanding of the theoretical underpinnings that explain why individuals and society do not know, care or act in the context of freshwater conservation (perspectives from anthropology and sociology) and the associated tools (for example qualitative research methods such as: mental models methods, action research, grounded theory, ethnography, case study approach, soft systems approach, and participant observation, to name a few) for acquiring this understanding.
3. Design a methodology for identifying different categories of actor clusters (based on the knowing, caring and acting clusters) and develop the associated characteristics of each.
4. Identify and characterise generic barriers to changing the mental models of each of the actor clusters and propose how they could be overcome to improve the effectiveness of freshwater conservation.
5. Identify how the generic actor cluster categories and barriers to changing mental models can be aligned to the development of catchment management strategies.
6. Design selection criteria for an appropriate geographic area within which to test the learning from the previous objectives.
7. Apply and test the generic learning in the selected geographic area, that being the Greater Kruger area, and specifically, the Hazyview and Bushbuckridge municipalities.
8. Examine how the conservation planning process is influenced by the knowing, caring, acting dynamic and local socio-cultural perspectives.

Additionally, the project sought to interrogate the relationship between (1) policy intent, (2) conservation planning and management and (3) societal values and behaviours in relation to conservation. At the onset, it was hypothesised that the relationships between these three interdependent components are not equally distributed. The project's underlying assumptions formed the basis of qualitative research, that being that:

- There is a strong connection between policy intent and the conservation planning process.
- However, important disconnects exist between conservation planning and an understanding of societal values and behaviours on the one hand, and between values espoused by policy and that held by societal (user) clusters, on the other.

At the outset, the project questioned the implicit dichotomy of western-centric, positivist understandings of conservation and local socio-cultural realities and the perceived moral superiority of existing conservation planning models as processes of "teaching" conservation practises to uninformed local community members. The view that society should be influenced by, and should adjust their knowledge systems, their values and behaviours in greater support of conservation, is an enormous socio-cultural and socio-political challenge. While unsustainable and environmentally damaging practices are rife at the local level, this view undermines the needs and challenges of local communities. This is especially true in the context of freshwater ecosystems where, apart from water, the ecosystem benefits to society are sometimes hidden and typically not felt in a commercial or market-oriented fashion. This may make it difficult for people to develop an appreciation for the value of freshwater systems. Add to this a legacy of fortress conservation and exclusion from conservation areas by apartheid policy, and the prospects for a more supportive way of knowing, caring and acting seem ever more remote. The emphasis on a participative process ensured locally-relevant findings, and not merely a literature review of scientific best practices. Ultimately, the KCA project addressed the key environmental and social challenges facing local communities in, and how this influences their realities regarding knowing, or caring about conserving the environment, and the degree to which they act in a manner that conserves.

In order to achieve this, this project adopted a multi-method approach and has been undertaken over a three year period. This comprised of a variety of methods including a literature review, desktop research, workshops and one-on-one interactions with experts, qualitative fieldwork through interviews and focus groups and quantitative research techniques such as questionnaires. The need for an adaptive research process design is also highlighted due to the emergent nature of perceptions and definitions around conservation and what people consider to be acting in a manner that promotes this or not.

This report describes the process undertaken to meet the project aims and test its underlying assumptions. Firstly, a historical overview of conservation in the South African context is provided in chapter one. Secondly, chapter two provides a comprehensive literature review of conservation as a value, and documents the major influences of its evolution over time. Chapter two also describes conservation and behaviour and the highlights conceptual strategies for changing behaviour. Thirdly, the findings of the actor

cluster conceptualisation, and its basic characteristics per group, is analysed in chapter three. Based on preliminary focus group meetings, findings revealed that the actor cluster dynamic, as a tool for understanding participatory processes, mental models, attitudes and beliefs on conservation and the degree to which people act on these, was useful but inadequate in capturing the dynamism and multi-faceted nature of people and the mental models they have relating to conservation. It was found that pre-conceived notions of what water conservation or pro-environmental behaviour is, confined to a pre-defined actor cluster matrix with associated characteristics and barriers to change, did little to illustrate the diversity of perspectives on conservation beyond the four actor clusters. Moreover, it increased the risk of producing over-simplistic policy recommendations that were too rigid and unable to adapt to mental models that are constantly changing. Fourthly, the findings of two fieldtrips undertaken in the case study area of the Greater Kruger, in Bushbuckridge and Hazyview municipalities, were examined in chapter four. Finally, an overview of key findings is summarised in chapter five, along with the project's conclusions, research implications and recommendations for conducting social science research on attitudes and beliefs.

The project's key findings indicate that the two disconnects, i.e. between conservation planning and an understanding of societal values and behaviours; and between values espoused by policy and held by societal (user) clusters, can be attributed to an array of factors that centre around the lack of societal support, community buy-in, the recognition of constantly changing mental models, and the "diversity within diversity" (or the degree of heterogeneity). These include:

- The dynamic and inter-subjective meaning of conservation
- Analytical tools not being reflective of reality
- The social sanctioning around water conservation
- The compartmentalisation of conservation
- The juxtapositioning of water as utility versus water as aesthetic value
- Conservation not being internalized in the mental models of many participants
- The normative aspect of conservation, and specifically, deciding what ought to be "good" conservation behaviour
- The "Knowing, Caring, Acting" dynamic being non-linear and non-sequential, with the "Knowing" dynamic pronounced.

A key connection made between participant responses and policy interventions, was the expressed perceptions that appropriate water conserving behaviour means saving water. This perception can also be linked to the discourse on water demand management and relevant policy interventions endorsed by government as well, where the focus is on reducing the amount of water used, using water sparingly and not wasting water. Policy interventions that are based on this definition of appropriate water conserving behaviour ignore the inability by some people to use any less water than they already have due to

limited access, priority given to using water for key household tasks and less for others, etc.

It is argued in this report, therefore, that water scarcity is not just physical, but also manufactured and constructed, which means that uneven access to water or varying perceptions about water use and water availability, also come into play when discussing water scarcity. It is found that there are still huge inequalities in the distribution and supply of water in South Africa as many people in the Hazyview municipality still experience problems in the supply and distribution of water. Therefore in order to address this, policy should not just focus on "saving water", but also on other activities (like storing and using multiple sources of water, or working to understand varying socio-cultural and socio-economic perceptions around water use) which also form part of effective water demand management strategies. To ask of the respondents in this study, who often go days without water and sometimes up to three weeks, to use even less water than what they currently use, is a sub-optimal solution to promoting appropriate behaviour around water conservation. Conservation planning and management efforts should therefore work to produce policy interventions and implementation strategies that factor into it the range of socio-cultural and socio-economic perceptions around water use and water availability, the range of water access challenges borne out of poverty, and a distinction made between different groups (especially those who have to function within a context of poverty) and the stipulations made on them to curb their demand for water in order to conserve water.

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ACRONYMS AND ABBREVIATIONS

AWARD	Association for Water and Rural Development
CMA	Catchment Management Agency
CMS	Catchment Management Strategy.
CSIR	Council for Scientific and Industrial Research
DWAF	Former Department of Water Affairs and Forestry
DWEA	Department of Water and Environment Affairs
KNP	Kruger National Park
NGO	Non-governmental organisation
NWA	National Water Act (Act No. 36 of 1998)
SANParks	South African National Parks
SASSA	South Africa Social Security Agency
UJ	University of Johannesburg
WRC	Water Research Commission

GLOSSARY

Acting	When people make behavioural adjustments within their means to engage in change processes that are perceived to support the persistence and sustainability of what they value.
Actor Cluster	A conceptual tool used to characterise and group participant responses according to the varying degrees they know about conservation, care about conserving their environment or using water wisely, and acting in a pro-environmental manner. Actor clusters are based on the recognition that society is not homogeneous in terms of actual behaviour or the drivers of behaviour, and as such, various actor cluster groups represent typical aggregations of knowing, caring and acting. There are numerous areas of overlap between the different actor cluster groups.
Belief	Mental acceptance of and conviction in the truth, actuality, or validity of something, in this project's case, spiritual beliefs regarding nature and especially water. Water, river systems and riparian zones are often given greater cultural and spiritual meaning where human ancestors and zoomorphic spirit manifestations such as the snake and mermaid are said to reside in water (Bernard, 2003).
Caring	When people value ecosystem services sufficiently as to regard them highly within their value system.
Community based social marketing	A process where explicit steps are taken to identify the range of behaviours necessary to overcome / address a specific issue and the barriers that stand in the way of such a behaviour change. These steps include: identifying the barriers to specific behaviours of interest and then based upon this information selecting which behaviours to promote / influence; designing a program to overcome the barriers to the selected behaviour(s); piloting the programme; and then evaluating it once it is broadly implemented (McKenzie-Mohr, 2000).
Conservation	For the purposes of this project, the concept of conservation took on an emergent definition, coming from the participant responses, data collected and project results. At the onset of the project, the project team defined (water) conservation as the protection, development, and efficient management of water resources for beneficial and sustainable purposes. Qualitative research in the study area found that people understood water conservation to mean the wise-use (but rarely saving water because they already have so little access) and reuse of available water.

Context	The term refers to the way in which something can be understood. This 'something' can be anything from an individual to a community, from an action to behaviour, from a political situation to a natural environment, and so forth. One may find that these different types of context may provide insight from a specific perspective to the 'something' that is being understood. Examples of different types of context are: cultural, political, economic, and biophysical contexts (to name a few). By including context into one's analysis one provides for a more holistic and integrated understanding of the problem or issue at hand and thus also making it essential for a multi-dimensional appreciation of the complexity of any situation or environment. It is also important to note that each context operates at different scales, i.e. spatial and temporal, as well as different levels of scale, i.e. international, regional, basin, national, sub-national, local, community, etc. This results in a multi-level and complex system of people, context and scale.
Ecocentric approaches	A radical and fundamental change in political economic structures (Adams, 1995) and a focus on non-material values such as education, fellowship, civic responsibility and democratic participation (Carter, 2001).
Environmentalism	"the quest for a viable future, pursued through the implementation of culturally defined responsibilities" (Milton, 1996:2).
Ethnobiological taxonomy	A multidisciplinary field of study that draws on approaches and methods from both the social and biological sciences. Ethnobiology aims at investigating culturally based biological and environmental knowledge, cultural perception and cognition of the natural world, and associated behaviours and practices. This broad definition of ethnobiology encompasses ethnobiological taxonomy, which is the study of how people classify principles of animals, plants, soils, and ecosystems according to local peoples.
Fortress Conservation	Coined by Dan Brockington (2002), the term refers to an approach that seeks to perverse wildlife and their habitat through the forceful exclusion of local people who have traditionally relied on the environment in question for their livelihoods. Brockington explains that this approach is part of a powerful narrative that informs broad-based conservation approaches still to this day. It assumes that local people have harmed and degraded the environment, but Western science has the knowledge and means to restore it.

Green Political Thought	Offers a critique of existing society and conventional values, together with beliefs about what a future society should be like if it is to be sustainable and environmentally benign (Pepper, 1998). Green political thought is traditionally conceptualised as consisting of two separate schools of thought: ecocentric vs. technocentric.
Knowing	Learning systems and knowledge creation, consciousness and awareness
Mental Model	The representation of how individuals and teams define their world, negotiate terms, determine which actions to take, in other words how they construct their social world. It therefore influences how an individual or team behaves in or to a particular context (Carley, 1997).
Perception	The act or faculty of apprehending by means of the senses or of the mind; cognition; understanding. In the case of this project, perceptions were critically important to shaping participant's mental models on water conservation. For example, a wide range of perceptions of whether water scarcity exists and what the possible explanations for water scarcity was explored. More general perceptions and knowledge on water was explored, specifically knowledge on water quality and dangers to water, as well as how water is viewed and valued.
Political Ecology	Coined by Frank Thone in 1935, political ecology refers to the study of the relationships between political, economic and social factors with environmental issues and changes. Political ecology differs from apolitical ecological studies because it politicises environmental issues and phenomena in a post-positivist manner.[2] As a discipline, political ecology promotes the integration of ecological social sciences with political economy (Peet and Watts, 1996) in topics such as degradation and marginalisation, environmental conflict, conservation and control, and environmental identities and social movements (Robbins, 2004).
Technocratic approaches	This approach involves technical and implementable steps towards the reform of development practice by rendering it increasingly sustainable (Adams, 1995).
Values	Includes the principles, standards, or qualities considered worthwhile or desirable with regards to water conservation. Some values expressed in this project included: "water should be free," "water should be for everyone and not only a luxury for the rich," "the government should care more about people than about animals in the Kruger."

CHAPTER ONE: CONTEXT

INTRODUCTION

There is a growing recognition that there is an implementation crisis in the field of conservation (Knight *et al*., 2006). Simultaneously, there has been an ever-growing realisation that solutions for this crisis can only be found outside the conservation process and beyond the confines of the natural sciences. For this reason, the broader socio-economic and political context within which conservation management and planning occurs should be taken into account.

One aspect of recognising the importance that the solutions to conservation problems lie beyond the natural sciences is to attempt to understand, influence and change the behaviour and attitudes that people and society have towards the environment. It is necessary to make society more aware of the value of a healthy environment for the wellbeing of both current and future generations in order to increase the success rate of the implementation of conservation action. For this, research that investigates the degree to which people know and care about conservation, and the degree to which they act on these beliefs and attitudes, is critically important to developing holistic and integrated policy recommendations that are locally driven but also provincially, nationally and regionally applicable.

A Water Research Commission (WRC) study entitled Enriching Freshwater Conservation (K5/1678)[1] identified four potential actor clusters which feel and act differently towards the environment. They are:

1. People or institutions that know that the conservation of freshwater resources is important but don't care what the negative consequences of their actions are;
2. People or institutions that know that conservation of freshwater resources is important but cannot care, i.e. cannot afford the luxury of caring because their priorities are day-to-day survival;
3. People or institutions that know that the conservation of freshwater resources is important but don't know how to care for them; and
4. People or institutions that don't know that they need to care for freshwater ecosystems and resources.

The consequence of behaviour common to all these groupings is the continued decline in freshwater ecosystems, all for different reasons, some more legitimate than others. It is

[1] The *Enriching Freshwater Conservation* project (K5/1678) is the precursor to the *Knowing, Caring, and Acting: Making Use of Socio- Cultural Perspectives to Support Biophysical 'Conservation' Initiatives* project (K5/1800)

important to note that this does not mean that there are no people or institutions that "know, care, and act" on conservation, what it does mean is that this actor cluster is severely in the minority.

In order to understand some of the nuances of the implementation crisis for freshwater conservation initiatives, one needs to interrogate the "knowing, caring and acting" sequence. The selected focus on this acknowledges that the conservation planning process happens within a context where values drive knowing (learning systems and knowledge creation, consciousness and awareness), caring (when people value ecosystem services sufficiently as to regard them highly within their value system) and acting (when people make behavioural adjustments – within their means – to engage in change processes that are perceived to support the persistence and sustainability of what they value). It is felt that South African society's basket of values that drive knowing, caring and acting, does not adequately support a widespread conservation ethic and behaviour. Our urban rivers for example, are not celebrated or enjoyed, but are typically polluted eye-sores in the urban landscape. But, the expectation that society should be influenced by, and should adjust their knowledge systems, their values and behaviours in greater support of conservation, is an enormous challenge. This is especially true in the context of freshwater ecosystems where, apart from water, the ecosystem benefits to society are sometimes hidden and typically not felt in a commercial or market-oriented fashion. This may make it difficult for people to develop an appreciation for the value of freshwater systems, as they may feel disconnected from or have no knowledge of the source. Add to this a legacy of fortress conservation (Wilchusen *et al*., 2003) and exclusion from conservation areas by apartheid policy, and the prospects for a more supportive way of knowing, caring and acting seem ever more remote.

In contrast to this reality, the drafters of South African environmental and natural resource protection policies have placed much value on the conservation imperative. They have created robust policies and rooted their motivation deeply in the acknowledgement that the use and protection of natural resources and landscapes are interdependent, and that the sustained use of ecosystem services relies on maintaining (i.e. conserving) a defined state of the ecosystem. The Ecological Reserve for river ecosystems for example, was set up to support such a state, with the aim of sustaining basic freshwater ecosystem integrity. In the absence of protection and collective custodianship, it is unlikely that there will be a future availability of desirable benefits. The sustainability of desirable benefits in turn, relies on an equitable and agreed-upon sharing of the resource by users in society that is in line with guidance as provided by policy and management. These concepts are put forward with particular clarity of intent in the White Paper on a National Water Policy for South Africa (1997).

In particular "the National Water Act (NWA, Act No. 36 of 1998) and the National Environmental Management Act: Biodiversity Act (Act No. 10 of 2004) together provide a broad legal environment to advance the practical implementation of freshwater water conservation measures across all relevant sectors" (Roux *et al*., 2006). South Africa is also a signatory to the Convention on Biodiversity, which requires a national strategy for the conservation and sustainable and equitable use of biodiversity. A particular response to this international agreement has been the completion of a national spatial biodiversity assessment for South Africa in 2004, including assessment of terrestrial, marine, estuarine and river ecosystems (Driver *et al*., 2005).

These policy instruments all provide national goals and targets for the protection of freshwater and other natural resources, and have been developed for the sub-national level through a systematic conservation planning process. For example, nationally, at least 20% of each inland water ecosystem type should be maintained in a Natural Class as defined by the National Water Resource Classification System (Roux *et al*., 2006).

Policy intent is therefore clear, espousing conservation values in order to make provision for a reasonable balance between resource protection and use. Conservation planning (as a technical process) is in place, is based on good science and is advanced in its development in South Africa (Knight *et al*., 2006). These mechanisms together should result in effective conservation but still there is a sense that society and the institutions through which it achieves its collective goals, are not adequately supportive of or even compliant with the conservation imperative. This is perhaps not surprising, since conservation planning and management are processes that must give effect to the distribution of human values that balance conservation of the supply system and use (i.e. the demand system, including extractive use as well as non-utility benefits). Additionally, conservation planning and management needs to occur within the mandate to promote and ensure mechanisms for maintaining and enhancing natural capital for current and future generations. If we accept this interpretation of the intent of conservation planning and management, then it must seek to understand those human values, mental models and behaviours that relate to patterns of use and conservation.

We propose that in the relationship between (1) policy intent, (2) conservation planning and management and (3) societal values and behaviours in relation to conservation, the connections and understandings are not equally distributed. We believe that there is a strong connection between policy intent and the conservation planning process. However, we propose that there are two important disconnects. The first is between conservation planning and an understanding of societal values and behaviours and second, between values espoused by policy and that held by societal (user) clusters.

Without seeking and securing societal support (and without understanding shifts in societal support and what it values), policy, planning and management will take place in a vacuum. Within such a situation, it is unlikely that conservation as a value will secure popular support. If this situation is perpetuated, conservation cannot hope to achieve its objectives through voluntary support, perhaps only through compliance enforcement and policing mechanisms.

For the purpose of this research, we understand policy intent, we understand conservation planning and management (as a technical process), but we do not understand:

- why society has (or is perceived to have) a knowing, caring and acting repertoire that does not seem to support conservation; and
- how and why the realisation of this can enrich the freshwater conservation process.

This report is the amalgamation of findings of the three-year "Enriching Freshwater Conservation (K5/1678)" study and starts by providing a historical overview of conservation in the South African context in Chapter One. Chapter Two provides a comprehensive literature review of conservation as a value, and documents the major influences of its evolution over time. Chapter Two also describes conservation and behaviour and the highlights conceptual strategies for changing behaviour. Chapter Three focuses on the actor cluster dynamic and their characteristics per group. Based on preliminary focus group meetings, findings revealed that the actor cluster dynamic, as a tool for understanding participatory processes, mental models, attitudes and beliefs on conservation and the degree to which people act on these, was useful but inadequate in capturing the dynamism and multi-faceted nature of people and the mental models they have relating to conservation. It was found that pre-conceived notions of what water conservation or pro-environmental behaviour is, confined to a pre-defined actor cluster matrix with associated characteristics and barriers to change, did little to illustrate the diversity of perspectives on conservation beyond the four actor clusters. Moreover, it increased the risk of producing over-simplistic policy recommendations that were too rigid and unable to adapt to mental models that are constantly changing. Chapter Four examines the findings of two fieldtrips undertaken in the case study area of the Greater Kruger, looking particularly at Bushbuckridge and Hazyview municipalities. Chapter Five summarises the project's conclusions and offers recommendations for conducting social science research on attitudes and beliefs, the need for an adaptive research process design, and for the impact on policy interventions.

AIM AND OBJECTIVES

The overall aim of the project is to develop a conceptual understanding of how the conservation process is influenced by the knowing, caring and acting dynamic. The following project objectives speak directly to this aim:

- Understand the theoretical underpinnings that explain why individuals and society do not know, care or act in the context of freshwater conservation (perspectives from anthropology and sociology) and the associated tools (for example qualitative research methods such as: mental models methods, action research, grounded theory, ethnography, case study approach, soft systems approach, and participant observation to name a few) for acquiring this understanding.

- Design a methodology for identifying different categories of actor clusters (based on the knowing, caring and acting clusters) and develop the associated characteristics of each.

- Identify and characterise generic barriers to changing the mental models of each of the actor clusters and propose how they could be overcome to improve the effectiveness of freshwater conservation.

- Identify how the generic actor cluster categories and barriers to changing mental models can be aligned to the development of catchment management strategies.

- Design selection criteria for an appropriate geographic area within which to test the learning from the previous objectives.

- Apply and test the generic learning in the selected geographic area

METHODOLOGY

This project adopts a multi-method approach and has been undertaken over a three year period. This methodology consists of a variety of methods including a literature review, desktop research, workshops and one-on-one interactions with experts, qualitative fieldwork through interviews and focus groups[2] and quantitative research techniques such as questionnaires.

The broad plan of work for this research follows. This plan illustrates which methods were applied to which objectives.

[2] This is discussed in more detail in Chapter Five which deals with the Case Study.

Plan of work

Method: A literature review (see Chapter Two).

The Literature review provides theoretical background and guidance, especially in relation to identifying the appropriate tools for the study at hand. The literature review contributes to the design of an approach to understand why people do not know, care and act.

Method: Internal (team) and external (experts) workshops (see Chapter Three and Appendixes A, B and C).

The full project team designed a working definition of the actor clusters, their associated characteristics and their barriers to change. Thereafter this understanding was tested with experts through various smaller interactions.

Method: Desktop research

In order to ensure that the project outcomes have a direct practical application, exploration of existing related initiatives that could benefit from the learning of this project have been undertaken. Learning from the actor clusters with the Guidelines for Catchment Management Strategies (DWAF, 2007) is also explored and relevant links between the learning and the process described have been established.

Two tasks was undertaken to enable the project team to identify the strengths and weaknesses in the management arena that are relevant to freshwater conservation (establish the case study area), as well as the social and cultural issues / parameters that may impact the level of knowing, caring and acting within the study area (context of the area).

Using what was been learned from the different objectives, the project team developed a questionnaire (see Appendix G), semi-structured interview schedule (see Appendix E), and focus group themes (see Appendix F), which was then used to complete the final objective. This was done in order to establish and understand the socio- economic circumstances and socio- cultural milieu of the field area.

Method: Questionnaire, interviews and focus group discussions

This involved the practical application of all the other objectives. As such the team from the Council for Scientific and Industrial Research (CSIR) and students from the University of Johannesburg (UJ) had a variety of interactions through the different methods with people from the case study area.

Clarification of statistical analysis and the utility of the multi-method approach

While the data set used is too small to provide comprehensive statistical significance, the statistical exercise undertaken in this project was used to find plausible linkages between

concepts, observe trends and identify stark contrasts. The utility in the statistical exercise is therefore to provide one input into the variety of data analysis tools used. Due to its adoption of a multi-method data collection strategy and an equally diverse analysis strategy, this final report is therefore a useful prototype, serving as a basis for future research on how socio-cultural perspectives influence conservation because of its ability to consider more explanations for its findings. The project team was able to pose research questions that would probably not be testable with a single method. By embedding local knowledge into conversation planning and management, policy interventions and implementation strategies may be better placed to inform local water conservation challenges. A conceptual parallel is made here between the project objective and the way in which data were analysed, with results from interviews, focus groups and survey data interwoven in Chapter four, and embedded within researcher observations, interview notes, statistical analysis, narrative and secondary-sourced research.

HISTORICAL CONTEXT TO CONSERVATION IN SOUTH AFRICA

The development of conservation and conservation sciences in South Africa followed a global progression in paradigmatic patterns with characteristic phases as described by Wilchusen *et al*. (2003). The first national parks were established in an era of colonial and authoritarian control, commonly with the displacement of local communities and ensuing conflict with at best, low levels of legitimacy afforded for the parks by local inhabitants. This sort of pattern was common throughout the developing world at the time. In acknowledging these unintended consequences, the 1980s saw large scale attempts to encourage approaches that promoted a greater degree of local participation and sustainable use of resources. The rationale was that approaches such as community-based conservation, in which livelihoods and conservation were linked, would lead to greater acceptance of and compliance to restrictions as set out by protected area management agencies. In this way, conservation coupled with development characterized many conservation approaches through the 1980s and 1990s. The success of this approach in terms of promoting conservation and development goals has been highly variable. The next response was to think about protected areas at a regional scale rather than individual protected areas plus their buffer zones. The rationale was that conservation is threatened most profoundly by macro-level influences such as national and international policies. Although this approach makes ecological sense, it presents tough institutional challenges and to a large degree excludes local participation. Another conservation approach constitutes co-management or partnerships between the protected area agency and adjacent private landowners. It has been argued that in South Africa, this approach has been used by private white landowners as a strategy to be declared exempt from the land reform process. While these paradigms or approaches are presented chronologically, they can coexist.

Currently, the conservation paradigm in South Africa is moving away from the notions of the 'balance of nature' and away from the idea of managing for stable states (Du Toit *et al*., 2003). This is being replaced by a view of nature and society that management should promote multiple dynamic states in order to promote resilience and diversity in both ecosystems and society (Walker and Salt, 2006). In line with this thinking, conservation agencies are now adopting adaptive management as an approach that incorporates human values into an understanding of systems as being dynamic over space and time (Rogers and Bestbier, 1997).

Generally little is known about indigenous natural resource strategies. Evidence does point to the adaptive strategies of early African pastoralism being based on the fluctuating environmental conditions of the grasslands; in the same way poor soil conditions influenced the settlement patterns of the Iron-Age farmers (Breedlove, 2002). Ecosystems and landscapes around the Cape changed drastically with the arrival of the first settlers. By way of example, Breedlove (2002: 97) points out that, "Not only did they cause considerable disruption in the territorial use of land in the south western Cape, they turned their cattle out to permanently graze the same field, then too in much larger numbers than once grazed there in the time of the Khoi".

Over the last 200 years human land use in South Africa has changed dramatically and the impacts were often severe. The drivers of change – economic, social, political and environmental – have shaped the parallel socio-economic relationships between people and natural resources in South Africa and have been significant with regard to management interventions, land reform and conservation. This is evidenced in the legislation introduced during the colonial period around natural resources – particularly land, water and wild resources – that created an individualist system of allocation of rights that sought to privilege white settlers at the expense of the local populations. This rights regime was largely sustained by a legal structure that undermined, disregarded and criminalised the traditional claims of rights to access and use of natural resources (SLSA, 2003). In 1856 forest conservancies were proclaimed in the Knysna and Tsitsikama forests and the Forest and Herbage Preservation Act was passed. Colonials viewed the environment "as a frontier to be tamed and western technological ingenuity employed to overcome environmental constraints" (Hoffman and Ashwell, 2001: 133).

However these values shifted over time as settlers increasingly developed a broader appreciation of nature and wildlife to incorporate non-utility and non-commercial values associated with nature (Mabunda *et al.*, 2003; Stevenson-Hamilton, 1937). In 1883 the Natal Game Protection Association (Steyn and Wessels, 2000) was formed and in 1926 the passing of the National Parks Act provided for the creation of the Kruger National Park (KNP). The policies of apartheid ("separate development") implemented after 1948 had a particularly detrimental impact on the human and natural environments, most

especially in the homelands and the black townships bordering white communities as is evident in the communal and rural face of poverty in South Africa today – inequality and lack of social sustainability and threats to environmental sustainability going hand in hand.

Attitudes to the environment in the 19th century: Hunting and Nature reserves

Colonial attitudes to wildlife and game protection have been a significant strand in South Africa's environmental history – white men hunted, Africans poached (Adams, 1995; DeGeorges and Reilly, 2007). As with the rest of Africa, the main impact of environmental concern in nineteenth century grew from the hunting which accompanied the expansion of European trade and missionary work (Adams, 1995). Up until the late 1800s, hunting was a matter of subsistence for both settlers and indigenous communities. But later wildlife was slaughtered in great numbers (Carruthers, 2007) for sport or commercial gain by both local hunting parties (Boer settlers and black hunters) and professional trophy hunters from overseas (Steven-Hamilton, 2003). Paul Kruger, President of the Transvaal at the time, "defended the extermination of wild animals by arguing that the land needed to be cleared of wildlife so that agriculture could begin and thus accelerate the process of civilisation and settlement" (Carruthers, 2007: 151-2). Hunting was a highly popular and exciting sport but at the time a new set of values emerged as some people objected to sport hunters not using or selling animal by-products and as the beauty of the wildlife was captured in popular literature by authors such William Cornwallis Harris, Frederick Courteney Selous, William Baldwin and Roualeyn Gordon Cumming (Carruthers, 2007). This shift in thinking represented a broadening of the value set as related to wildlife with the growing appreciation for the non-utility value of wildlife and wild landscapes and the need to conserve them as whole systems.

Towards the end of the century two elements to wildlife protection came into effect – first the promulgation of restrictive hunting laws and the other was the creation of game reserves, one of the first of which was the Pongola Game Reserve established in 1895. The creation of this and subsequent reserves, based on a philosophy of wildlife protection, created tensions between different culture groups because they were established through enforcement and the consequent forced removal of black people from these areas (Pollard *et al*., 2003). The "preservationist view that conservation can only succeed if people and Parks are kept separate and that communities 'contaminate' natural wilderness", created tensions between those who lived around the national parks and those who were responsible for managing the Parks Makwaeba, 2003: 115). National parks were seen to have not only economic value through the development of the tourism industry, but also cultural and natural heritage value and to reflect nationhood and national sentiment. This sentiment was, however, exclusive to whites as blacks[3] were

[3] Racial classification as defined during Apartheid and according to Apartheid legislation

not allowed to visit national parks because of apartheid policies. There was also an associated disrespect for local, indigenous knowledge and traditional conservation practices and disregard for the fact that the "communities often paid heavily for conservation in terms of loss of land, loss of access to natural resources and, hence, reduced economic opportunities" (Makwaeba, 2003:115). Neither the concept of biodiversity and the ecosystem, nor that of naturally functioning ecosystems delivering 'services' or benefits to other areas, existed at this time (Carruthers, 2007).

Water

As with land, South Africa's water law comes from a history of conquest and expansion, with rules of the well-watered countries of Europe being applied to the dry and variable climate of Southern Africa (RSA, 1997). From the mid-1850s to the early years of the 19th century the primary use of water was for agriculture, with the government concentrating on provision of water for irrigation. MacKay (2003) points out that the previous Water Act (Act No. 54 of 1956) was focused on the development of water resources, continuing to give much attention to providing and allocating water for development in the agricultural sector, a policy explained by the historical political power base of the National Party in the commercial agricultural sector. "Water rights were tied to land rights, in that a person who owned land over which water flowed had a right to a share of the 'normal flow'" (MacKay, 2003:50). It also provided for water subsidies from the state, who delivered the water at no cost.

In the second half of the 1900s the demand for water began to shift towards the needs of a growing industrial economy and consequently inter-basin transfer schemes, which are amongst the largest in the world, were developed (Abrams, 1996). The secure and permanent access and distribution of water to industries remained a focus of the government until 1994. The various governments of the day did not regard themselves as responsible for ensuring that citizens had a water supply and had no political mandate for such responsibility. As a consequence, rapid urbanization and the lack of essential services for black communities (housing, electricity, drinking water, waste removal and sanitation) have impacted severely on people's health, as well as on their attitudes towards managing environmental concerns.

Current water policy recognizes all aquatic resources (and the aquatic ecosystem in its entirety) as a common property resource. As a consequence, contemporary emphasis is on equitable allocation and peaceful sharing of water resources (as opposed to fixed rights) based on a dynamic negotiation and renegotiation of legitimate use of the resource over time. Within this policy commitment, the conservation of aquatic resources is recognized as critical for the provision for a desirable set of goods and services to society. This set of benefits is interpreted to include uses that are utility- and

commercial-oriented as well as non-material benefits (Van Wyk *et al*., 2006). By implication then, the protection of aquatic resources as defined within the current policy framework is supposed to support economic growth and human well-being in its widest sense, i.e. including aesthetic and cultural/symbolic value. The intent is that meaningful public participation should inform trade-offs that determine the basket of legitimate uses and benefits. The process of participation in decision-making is therefore seen by drafters of the current policy as a mechanism for deepening democracy and nation-building, particularly to bridge disparities in access to and use of the water resource as created by past policies.

Land and environmental management

In analysing agricultural science, poor rural communities have often been depicted as responsible for degrading and declining the environment. Such beliefs are supported by Hardin's , "Tragedy of the Commons" (Hardin, 1968). Deconstructing notions of environmental degradation and sustainability requires a political ecology perspective that examines the socio-economic, political and cultural contexts within which these views are generated. In South Africa it is evident that politics and economics, rather than religious or philosophical ideas, have influenced different levels of environmental concern between population groups; this can be attributed to a complex interplay of factors and not necessarily a lack of concern (Carlson, 2004: 14). The political and economic systems in South Africa of colonialism, apartheid policies and migrant labour were brutal in their impact on livelihoods, forcing millions of black South Africans onto some of the country's least productive and ecologically sensitive areas, some 15 percent of which was potentially arable (Moyo, 2005). These as well as the 'betterment schemes'[4] introduced in 1939, have influenced "land use practices, the management of resources, and ultimately the quality of life of all South Africans" (Hoffman and Ashwell, 2001, 41).

In 1913 the Natives Land Act restricted black land ownership to 7 percent of the area of South Africa and permitted only customary, not freehold tenure. By 1936 South Africa's black population was 6.6 million, 45 percent of whom lived in the reserves, 34 percent on white-owned farms and the remaining 21 percent in urban areas (Hoffman and Ashwell, 2001). Between 1948 and 1994 these 'reserves' were consolidated into homelands. Overcrowding had a marked influence on the natural environment and directly led to widespread soil erosion. Worsening the situation was that efforts to combat land degradation were directed almost entirely at white commercial farmers while communal areas received a fraction of the state subsidy in support of efforts to combat environmental degradation and drought losses (Hoffman and Ashwell, 2001).

[4] Betterment schemes entailed the villagization of scattered African settlements, fencing of communal pastures into camps and the separation of arable land from residential and grazing land (Beinart, 2003).

Hoffman and Ashwell, (2001: 129) note that "the ways in which people understand natural processes and agricultural practices influence the use and status of the land". Two broad knowledge systems can be identified – 'western scientific' and 'indigenous' knowledge systems, the former based on "reduction of phenomena to constituent parts...[the latter]… often takes into account both the natural and social contexts when addressing problems" (Hoffman and Ashwell, 2001: 129) and has, until recently, been marginalised. As Laurens van der Post in *The Lost World of the Kalahari* points out, the Western or European way "has been one of 'Calvinistic' conviction and tied to values of possession and other material issues" (Breedlove, 2002: 99).

Changing attitudes are also a reflection of the political and economic realities of industrialisation and urbanisation. Pollard, Shackleton and Carruthers (2003, cited in Carruthers, 2007: 169) note that:

> "…as agriculture assumed a less prominent role in peoples' lives with apartheid planning, cultural beliefs in the powers of nature also declined. Coupled with the forced influx of people and the legislative relocation of power to tribal authorities, much of the traditional management of natural resources was replaced by an increasingly mechanistic approach, effected through chiefs who instituted fines against transgressors".

When apartheid ended in 1994, around 15 million people, 83 percent of the rural population, lived in 'communal' areas, while approximately 2.9 million or 16 percent lived on commercial farms (DFID, 2003) on wood for fuel, lacking access to resources and inputs to assist with farming, the effects on soil erosion and deepening food insecurity were severe, particularly in areas such as the former Transkei.

The impact on attitudes towards the environment is captured by Steyn (2005:394) in the following:

> "The profoundly detrimental environmental impact that apartheid had on the human and natural environments of all people of colour in South Africa also made it very difficult for these communities to support the dominant environmental agenda in the country. In addition, the government showed very little understanding of the environmental hardship that people of colour had to endure on a daily basis".

Policies and legislation

The increasing international isolation of South Africa from the 1960s onwards, which resulted in its exclusion from global environmental initiatives, has also had implications for the development of governmental environmental management (Steyn, 2005). The government failed to grasp the importance and essence of the newly emerging model of sustainable development, and thus failed to integrate environmental and development issues. Furthermore, until the late 1980s even the NGO sector was apolitical and conservation-focused in nature. Broad ranging environmental legislation was considered unnecessary prior to passing of the Environmental Conservation Act (Act No.73 of 1989).

The change to a democratic government in 1994 led to comprehensive reform in South Africa's environmental policy, broadly requiring greater public participation in environmental decision-making and commitment to sustainable development.

Conservation ecology

With the growth of the science of ecology, close links were forged between ecologists and conservationists and the doctrine of environmental realism was developed further. This area of inquiry was referred to variously as "human ecology" or "conservation ecology". Most environmental problems were seen to be confined within state borders and were most often defined in scientific and technical terms (Elliot, 1998). Environmentalists hardly questioned issues of development; they were concerned instead with species conservation and rational resources management in line with the overall development paradigm.

Ecology served the purpose of both providing data, and as basis for conservation management. The interpretation and analysis of human relationships in relation to conservation played almost no role in conservation science or management. This is when we see the early beginnings of the conservation movement, informed by two ideological, and divergent themes that arose at this time and that reflect the contradictions of modern environmentalism – ecocentrism and technocentrism (Pepper, 1996). Technocentrism is based on the belief that human actions are anthropocentric and on the assumption that man is supremely able to understand and control events to suit his purposes. The natural environment is regarded as neutral and nature can and should be exploited and dominated for human benefit, to be used for endless gain. Society is separate from nature; nature is reduced to it basic parts.

Ecocentrism rests "upon the supposition of a natural order in which all things moved according to natural law, in which the perfect balance was maintained up to the point at which man entered with all his ignorance and presumption" (O'Riordan, 1999: 32-3). It states that nature is an entity with its own agency and seeks to protect the integrity of natural ecosystems, not simply for the pleasure of man, but as a biotic right. This paradigm claims that nature contains its own purpose and should be respected as a matter of ethical principle. Opposed to anthropocentrism, ecocentrism believes that humans must observe ecological laws, and preaches the virtues of reverence, humility, responsibility and care. It argues for permanence and stability based upon ecological principles of diversity and homeostasis. Ecocentrism incorporates the principle of limits or non-negotiable barriers to certain uses of natural areas, and believes that these limits establish their own kind of morality upon man – there are no trade-offs, no compromises made in meeting these objectives.

The 60s saw the emergence of the environmental movement into relatively broad public consciousness: with scientific developments and growing public anxiety about environmental degradation and its impacts, along with a sense of a planetary crisis, the number and scope of environmental concerns began to rise on the international agenda (Peluso and Watts, 2001). Environmentalism was, nevertheless, still "synonymous with a rather narrow concept of conservation – the protection of nature, and the major threat was pollution" (Keller, 1996: 5). The environmental movement today continues to be dominated by two main themes: the cult of wilderness and the gospel of eco-efficiency.

> "..the cult of wilderness is "concerned with the preservation of wild Nature but without anything to say on industry and urbanization, indifferent or opposed to economic growth, most worried by population growth, backed up scientifically by conservation biology…the gospel of eco-efficiency is concerned with sustainable management or 'wise use' of natural resources and with the control of pollution…resting on a belief in new technologies and the 'internalisation of externalities' as instruments for ecological modernisation, backed up by industrial ecology and environmental economics" (Martinez-Alier, 2002: 14).

Work in these fields seeks to understand the main forces determining how natural resources are used, the strategies that people use to manage those resources, and the possibilities for finding alternative resource management strategies to address, variously, problems of poverty, environment or (less so) growth.

TOWARDS A DEFINITION OF CONSERVATION FOR THIS RESEARCH STUDY

The term 'conservation' has multiple definitions and applications. For example, in academia distinction is made between conservation for terrestrial resources and conservation for water resources, both of which may manifest differently and require different interventions.

To illustrate, freshwater conservation in South Africa is regulated by the National Water Act (NWA, 36 of 1998). In the NWA, the goal for inland water conservation is to conserve a sample of full variety or diversity of inland water ecosystems that occur in South Africa, including all species including habitats, landscapes and rivers in which they occur, as well as the ecosystem processes responsible for maintaining and generating this diversity, for both present and future generations (Roux *et al.*, 2006. DWEA (formerly DWAF) has a somewhat different view of conservation stating that " "Conservation" in relation to a water resource means the efficient use and saving of water, achieved through measures such as water saving devices, water efficient processes, water demand management and water rationing" (DWAF, 1998), and "Water conservation is the minimisation of loss or waste, the care and protection of water resources and the efficient and effective use of water" (DWAF, 2006).

In contrast, conservation of terrestrial resources focuses more on the identification and conservation of taxa and their habitats. To do this, researchers and conservationists look to identifying the species that are most at risk of extinction. In order to do this the following assessment criteria is used, namely: "i) *vulnerability* (i.e. a species' susceptibility to threat); ii) *conservation value* of a species (often also referred to as *irreplaceability*); and iii) the intensity of the *threat* itself" (Keith *et al.*, 2007).

In this differentiation between the two, one can see how there is a distinction made between that which is 'biodiversity conservation' and those actions that is directed at the conservation or preservation of the resources – we see this especially with freshwater resources. Some authors however argue that 'conservation' is more than merely a biophysical challenge; rather it is also a social and political challenge (Janis, 1993). In some cases for example conservation is linked to social process where communities can play a more important and larger role in the act of conservation – here we look at people centred community based conservation (Brown, 2003). In other cases we see the ideology of conservation being politically entrenched and how new actors such as NGO groups, which are not necessarily part of research, emerge out of this process and make an impact on how conservation is understood and implemented (Escobar, 1998).

For the purposes of this project, the concept of conservation took on an emergent definition, coming from the participant responses, data collected and project results. At the onset of the project, the project team defined (water) conservation as the protection, development, and efficient management of water resources for beneficial and sustainable purposes. Qualitative research in the study area found that people understood water conservation to mean the wise-use (but rarely saving water because they already have so little access) and reuse of available water.

CHAPTER TWO: LITERATURE REVIEW

INTRODUCTION

This literature review is a combination of themes that, in their discussion, renders a multidimensional look at theoretical issues that underpin the quest to explicate why people know, care and act or know, but do not care and act within the conservation context. The themes under discussion are: the philosophy and history of the environment; green political thought; poverty and conservation; social construction of ideas about nature and conservation; conservation and behaviour; and, strategies to understand behaviour and attitudes.

The reasoning behind the choice of these themes is manifold. The literature review starts with a look at the philosophy and history behind the concept 'environment' and further on examines the social construction of ideas about nature and conservation. It is within these perceptions of environment and nature that the propensity of people to know, care and act are played out. The human ability to construct meaning within and through the environments in which they live become paramount in our understanding of that which drives the development and reinforcement of beliefs, attitudes and human behaviour in terms of conservation. The last section of this literature review therefore attempts to provide some insights into what human behaviour is and provides a brief introduction to some of the work and ideas on conservation and behaviour. In addition, the literature review includes two abstract themes that deal with poverty and conservation and the green political thought. Both of these themes represent debates which highlight the extent to which debate around the meaning of conservation endeavours impact directly upon human life.

THE PHILOSOPHY AND HISTORY OF THE ENVIRONMENT

The relationship between nature and society underpins a philosophy of the environment that cannot be explained without reflecting on social values and framings and the context of changing paradigms that influenced history. The ways in which nature and society interact are complex and a good understanding of these interactions is needed to contribute towards the solving of our environmental problems (Kinzig, 2001: 709).

Nature's relationship to history, society, and culture and the knowledge humans produce about the facets of that relationship are dynamic processes and have changed considerably over time. In medieval times nature was seen as singular, abstract and at times personified (nature as goddess); it was God's creation. It was with the development of the new sciences – physics, astronomy and mathematics – in the sixteenth and seventeenth centuries that nature and society were separated. The 'state of nature' became a set of laws and conventions discoverable through inquiry, a set of

passive objects to be used by people. The juxtaposition of nature and society reaching its fullest in the mid 19th century in the west as it came to be seen as something that was to be managed, subdued and controlled by humans. In fact, progress came to be equated with the domination of nature and the human ability to transform natural capital into manufactured capital. Perceptions of the threat to natural resources and wild nature led to the development of the notion of nature preservation, a value set which found expression, in part, in the many national parks that were established in the late nineteenth and early 20th century, the division between nature and society increasingly taking on a spatial form. This period was significant for nature conservation with the growth of and international ethos marking a change in values in relation to wildlife (Carruthers, 2007). The first national parks were established in response to a perceived large-scale threat to the values associated with nature and the marked depletion in wildlife by the end of the nineteenth century: colonizers secured and transformed land; due to sport hunting and hunting for meat and skin, game started showing a dramatic decline in numbers, to the extent of driving local extinctions (Mabunda, 2003; Stevenson-Hamilton, 1937). This division between nature and society was increasingly taking on a spatial form, and is in stark contrast to traditional societies in less developed countries where there is no binary opposition between nature and society: rural areas are dedicated to agricultural production; multiple land use is rare; and, environmental problems are mostly the result of development.

Perceptions of "environment"

Power relationships can also play an important part in how people perceive the environment. For example, the ability to label, define and change the land or water-scape is based on power hierarchy (Bertolas, 1998: 99). It is therefore our ability to control space that becomes paramount in this power hierarchy thus providing those in power the right, so to speak, to decide how and to what extent the land or water-scape can be accessed, altered and exploited. Therefore, one needs to also examine the way in which people act without sanction or in which people grant validity to certain people or groups' claims over a particular piece of land, or river resources in the case of this project. What this refers to is the primacy of a particular ideology (which would include how nature is defined, interpreted, commodified and packaged) of nature as held by a particular group (Bertolas, 1998: 99). For example, Bertolas (1998) in his study on the environmental perceptions of three distinct culture groups in Canada, asks participants to define, locate and assess the value of 'wilderness'. Bertolas found that value of such 'wilderness' spaces were primarily attributes to environmental conceptualizations that had already been formed.

Environmentalism

Environmentalism, "the quest for a viable future, pursued through the implementation of culturally defined responsibilities" (Milton, 1996:2) depends on human activity. The apparent "social purchase" of the environmental discourse has highlighted the fact that social and cultural discourses relating to the debate on environmentalism is seriously lacking (Grove-White, 1995: 18). Including social and cultural discourses into the environmentalism debate would seek a moral discourse which would require a range of institutional and economic commitments which the world's governments and their scientific advisors, and even the world's consumers are not ready for (Grove-White, 2003:19) because it would in essence require a range of commitments which would include both the institutional and economic. Similarly, Van Houtan (2006) argues that conservation has not been as popular as one might expect mainly because those who promote it do not think to embed it in society's cultural realities. As a consequence conservation is not always perceived to be a socially relevant value set. One of the reasons for this is the fact that the most prominent problems in environmentalism has been seen to exist objectively in nature and mediated through the natural sciences – an orthodox way of viewing the world. Thus Environmental problems that are seen as legitimate are also regarded as physical problems which are bounded by nature itself and authenticated by natural scientific investigation and confirmation. The solutions to these physical problems can be found: it is propagated in regulation; technological innovation; and in, international agreements. Although very important, the ways in which problems have been bound, labelled, studied and found solutions for, have had impacts in other areas (Grove-Whyte, 2003). Some of these are the trivialization of the public's role, the inflation of the role and validity of (western) science, the perverse dominance of so-called "individual interests" and the fact that there is "little sign in the official descriptions of environmental problems or methodologies of the radically unknown character of the future, or of human kind's place in creation" (Grove-Whyte, 2003: 24).

Environmental concern, responsibility and the noble savage

Milton (1996:29) distinguishes between "ecosystem people" and "biosphere people". Ecosystem people are people who typically live within one, but can also live across two or three adjacent ecosystems such as land or sea. Ecosystem people would most often be characterised as being traditional or non-industrial and can also include those who have opted out or have been forced out of the 'technological society'. A study in the Amazon estuary indicated that local people usually 'manage' their natural resources in a sustainable (responsible) way if their population is stable (Anderson, 1990). In contrast biosphere people's lives are tied to the "global technological system" – what this means is that the resources they use is from the entire biosphere, different products from all over the world (contributes to the othering of nature). The differences and opposition between these two groups of people generates certain assumptions and expectations about responsibilities towards the environment (Milton, 1996:29). Ecosystem people

depend on their immediate environment for their survival and because of this close proximity might understand the consequences of their actions better and therefore may take care not to destroy the environment in which they live. In Milton's words "an ecosystem economy might be expected to engender a sense of responsibility towards the environment". In contrast, the biosphere people do not have the same constraints. They do not depend on one ecosystem for survival and can draw on a wide range of ecosystems to meet their needs. In comparison to ecosystem people, biosphere people might therefore be less likely to protect any one ecosystem.

Milton (1996:30) acknowledges that this distinction is quite simple and the reality of it is more nuanced and complex, however she argues that it provides a useful idiom to discuss environmental sensibility and environmental exploitation, an important discussion for this project. What this refers to is what in anthropology is commonly known as the 'noble savage' myth. Orlove and Brush (1996: 334) recognizes the myth as the idea that there is a kind of person out there that can live completely in synchronization with nature, because they are born like that. Indigenous people are often seen to be in complete harmony with nature – they are so 'in tune' with nature that they would not threaten the continued existence of plant and animal species. Milton (1996:109) presents some explanations for the proliferation of this myth amongst environmentalists. Firstly, it is assumed that those that conform most closely to what is seen as a natural existence live in the most ecologically sound way; secondly, the fact that the primitive ecological wisdom is seen as the opposite of industrial practice, it tends to be shaped by issues of concern with industrial society; thirdly, the geographic and historic proximity of environmentalists has directed the focus some particular non-industrial societies rather than others; fourthly, environmentalists tend to show greater respect for indigenous peoples of any region rather than for those inhabitants whose origins lies elsewhere; lastly, human inhabitants of some ecosystems has been scrutinised more often and in more depth than others by environmentalists because those regions have already been of concern to environmentalists, for example the rain forest. In conclusion Milton (1996: 114) argues that the problem lies in the fact that environmentalists look to the non-industrial people for ways or models of ecologically sound practice as well as appropriate ways for thinking about the environment, in other words, ways of knowing, caring and acting.

GREEN POLITICAL THOUGHT

Up until the 1960s little attention was given to political, social or economic impacts on the environment (Elliot, 1998). With the growing concern about adverse human impacts on the biophysical environment, the first discussions of ecology as a science with political content emerged (Forsyth, 2003). In response, and arising from a critique of (the much contested) sustainable development doctrine, a new wave of thinking developed,

involving a more socio-culturally embedded analysis of nature. In the 1980s the conservation campaigns of environmental pressure groups in industrialised countries started becoming increasingly vociferous and effective in influencing the actions of both banks and aid agencies. These funding agencies were particularly concerned about a number of key environmental problems, namely acid rain, the greenhouse effect, the depletion of ozone layer and threats to Antarctica, but also with issues related to the then Third World such as deforestation and desertification (Adams, 1995).

Green political thought offers a critique of existing society and conventional values, together with beliefs about what a future society should be like if it is to be sustainable and environmentally benign (Pepper, 1998). Most followers of the green political thought have the common belief that current Western society sees nature as an instrument to be used for endless material gain. Westerners, and increasingly also the middle and upper classes of countries in the developing world, measure both their individual and social progress against the quantity and quality of goods they can acquire. In this process of embracing consumerism as the very purpose of people's existence, their spiritual, emotional, artistic, loving and co-operative sides are neglected because of cold materialism. A compounding factor is the problem of complex technology and economic growth which is seen as the cure to social and environmental ills, even if they have negative effects and end up destroying and polluting. Another major factor is pollution and the fact that people perceive the earth as having an infinite capacity to assimilate waste and secondly the perception that the supply of natural resources are treated as limitless even though they are finite.

Some radical green solutions to these problems are to make fewer demands on the planet's resources by rejecting materialism and consumerism and accepting population control, low impact technology and sustainable development. Quality of life could rather be improved by increasing personal and community wellbeing, including social connectedness. There have also been calls for people engaging in more meaningful work and for a basic social wage to be paid to everyone (even house wives, and gardeners). Politically speaking, there is a need for a genuine participatory democracy in which people can make their views heard. Non-aggressive individual change and action seems to be the cornerstone of radical green political ideology; by changing our personal lifestyles, attitudes and values we make a powerful contribution to general political change (Pepper, 1998). Although such critiques are valid and the proposed solutions commendable, it is debatable whether such an approach takes into account existing political, social and economic structures when suggesting such radical reforms. It is important to critique current political systems in order to come up with realistic and implementable suggestions for reform and more environmentally friendly behaviour on behalf of individuals and communities. The green political thought has developed in industrialised countries and has characteristics that might be considered ethnocentric if it

is extended to other parts of the world. Researchers investigating what influences environmental behaviour and attitudes of people in the developing world should take cognizance of the above.

Green political thought is traditionally conceptualised as consisting of two separate schools of thought: ecocentric vs. technocentric. The ecocentric approach can be defined as radical and demanding fundamental change in political economic structures (Adams, 1995) and a focus on non-material values such as education, fellowship, civic responsibility and democratic participation (Carter, 2001). It does not however necessarily provide practical political and policy-related implementation guidelines and an in depth understanding of how to address the problems and challenges related to the structure and functioning of the global economy (Carter, 2001). Furthermore, ecocentrists or deep ecologists value nature for its own sake and believe that it should be protected for its intrinsic value (Gagnon-Thomson and Burton, 1994). Nature has intrinsic worth regardless of how humans use it (Pepper, 1998) or how it can benefit humans (Redclift, 1984), and humans are morally obliged to respect plants, animals and nature. They also call for holistic thinking and demand that humans recognise the full implication of their place in the global ecosystem: whatever is done to one part of the system will affect the other parts (Pepper, 1998). In addition, the ecocentrist view posits that much of human respect for nature is lost in the capitalist pursuit of material gain, and many of the motives, aspirations and achievements that support the contemporary world are challenged (Redclift, 1984).

In contrast, if one continues along the path of a binary opposition of approaches, the technocentric approach is more pragmatic and involves technical and implementable steps towards the reform of development practice by rendering it increasingly sustainable (Adams, 1995). This seems to be a somewhat more tempered version of technocentrism, of which the more extreme versions have the following characteristics: no limits to growth exists; committed to unrestrained economic growth; an unfailing scientific and technological optimism that human ingenuity will find an answer to every ecological problem in existence; emphasise material values; and resist widening public participation in decision-making (Carter, 2001).

An alternative understanding of green politics which goes against extreme anarchistic or ecocentric tendencies is needed, e.g. Barry (1999) argues for the importance of supporting a green political theory as opposed to green ideology, and Dobson (1990) rejects anthropocentrism and reveres nature. Such an understanding would focus on the importance of finding overlaps and themes between different conceptualisations of normative green theory rather than presenting the green political movement as a binary opposition of ecocentric and technocentric approaches. Barry (1999) also talks of the importance of developing an imminent critique. This means working from within the

existing conceptual real world situation towards an alternative understanding/position of the environment and human actions and behaviour that threaten it as opposed to basing the critique on a view from nowhere or a conceptualisation of an ideal future state of the environment. An idea that is important here is that of ecological stewardship, which suggests that human and non-human interests can be harmonised and presupposes the existence of a self-reflexive, long-term anthropocentrism as opposed to one that is arrogant and narrow in its views and interests. Such an approach will require a moral paradigm shift so as to enable a move towards a future sustainable society and also to formulate feasible and attractive solutions to present social-environmental problems.

Carter (2001) supports Barry's (1999) argument for the need of an imminent critique of the status quo by emphasising the importance of a broadly defined ecologism. Such a broader definition might help open up environmental philosophy to a wider audience and influence the behaviour of politicians and citizens, while at the same time placing the onus on persuasion on those who want to destroy rather than those who want to preserve the environment.

It thus appears that what is needed is a broader and more inclusive definition of ecologism, one that does not condemn contemporary society and human behaviour outright, but one that critiques it from within in order to come up with sustainable solutions to addressing the current environmental problems the world is facing. Another point that ties in here is the danger of espousing an overly realist view of what nature is, and equally that of promulgating a point of view that is too relativistic.

Kidner (2004), for instance criticises social constructionism, which defines nature as a social construction and as an artefact of human social and linguistic capability in attempting to assimilate nature to an exclusive anthropocentric reality. This, according to Kidner (2004), implies that nature only exists to the extent that we can describe and explain it discursively and is not a real entity or component of the world that is linked yet separate from human existence. Social constructionism thus implies that one particular view of the world as expressed in any given time in history is no more or less valid than the next, and that at any and all times nature is only what we make of it, rather than merely existing independently of how humans wish to see it.

Both environmental problems and concepts (e.g. ecosystems) are culturally grounded and socially constituted and are therefore fluid rather than real linguistic concepts. The social constructionist view thus holds that there is no world (or nature) that is independent of human cognition and language, which implies a clear conflict between the social constructionist point of view and a more realist one that states that although the natural world allows us to interpret it in various ways, its existence is still largely independent of human social life (Kidner, 2004).

The solution to this problem is for environmentalists to acknowledge that people's understandings of nature are affected by our cultural background, training and language, which does not mean, however, that nature is only a function of linguistic, cultural and social construction. Rather, it should be realised that nature is external to human existence and can only ever be partially known, as opposed to language itself constituting and defining nature. Such an attitude also presupposes a substantial degree of humility by realising that nature for the most part must remain a mystery and that the notion of preserving it should be rooted in the willingness to let nature be rather than on the presumption that we are able to "save" it through scientific knowledge or active management (Kidner, 2004).

Macnaghten and Urry (1998) to some extent echo Kidner's (2004) view by contesting several of the current schools of thought related to nature and the environment. They oppose the notion that the environment is objectively "real" and scientifically researchable, and that modern rational science can and will provide the understanding of the environment and the assessment of those measures which are necessary to rectify environmental problems. Macnaghten and Urry (1998) also oppose the doctrine of environmental idealism, which stipulates that nature and the environment should be analysed through identifying, critiquing and realising various supposedly stable values which underpin or relate to the character, sense and quality of nature. The problem with this approach is that these values are abstracted from the sheer messiness of what constitutes the "environment" and the diverse species which happen to inhabit the globe, as well as from the practices of specific social groupings in wider society who may or may not articulate or adopt such values. Again then, as with social constructionism and environmental realism, environmental idealism seems to be a rather one-sided, exclusivist approach, which does not take into account the importance of re-establishing the human-nature relationship nor the realities of contemporary environmental change and human engagement.

It is thus important to study specific social practices (especially of people's dwellings) which produce, reproduce and transform different natures and different values and to determine how people, through such practices, respond cognitively, aesthetically and hermeneutically to what have been constructed as the signs and characteristics of nature. Social practices therefore embody their own forms of local knowledge and it is crucial to understand them, within the broader context of nature, if individual and collective human behaviour towards the environment is to be influenced and changed. Social enquiry of this type should not be seen as separate from nature, but the natural environment within which people live should very much form part of any analysis to determine and influence what people know about the environment and whether they care about it and subsequently act to conserve it. An important point that comes in here is that nature should not only be seen or depicted as setting limits or subjecting human

beings to constraint. Rather, it should also be seen enabling as opposed to something that should be tamed or mastered or that poses a threat to human existence. Instilling such a point of view in people necessitates the development of specific and effective communication and behaviour changing strategies (Macnaghten and Urry, 1998).

Not only do the social practices of local communities need to be understood better, it is also important that development take place from below. This means that sustainable development initiatives should not only be innovative and research-based, but locally conceived and initiated, flexible, participatory and based on a clear understanding of local economics and politics rather than imposed from above. Such an approach necessitates calibre, commitment and continuity from the staff involved in development initiatives, as well as buy-in and commitment from the individual local people at whom the development initiatives are aimed (Adams, 1995).

According to Adams (1995: 202),

> "green development is not about the way the environment is managed, but about who has the power to decide how it is managed. Its focus is the capacity of the poor to exist on their own terms. At its heart, therefore, greening development involves not just a pursuit of ecological guidelines and new planning structures, but an attempt to redirect change to maintain or enhance the power of the poor to survive without hindrance and to direct their own lives. Sustainable development is the beginning of a process, not the end."

Political ecology in Africa

An emphasis on Africa's history of environmental injustice and eco-racism has been particularly strong given its colonial history of subjugation (Carruthers, 2005) and approach of ecological managerialism. While there can be no stereotype of the (very diverse) relationship between colonizer and colonized, nineteenth century colonialism and social science have, in general, long ignored and maligned indigenous knowledge (Warren, 1992). This, despite many environmental historians (such as Melissa Leach, James Fairhead and James McCann), providing evidence of the active role that rural communities in Africa have played in generating knowledge based on a sophisticated understanding of their environment, and in devising mechanisms to conserve and sustain their natural resources (Warren, 1992).

In South Africa, the historical links between the contemporary environmental problems the country faces and the environmental, economic and political policies of the colonial period and the apartheid government have been expounded by many environmental historians such as Beinart (1984, 2000); Fuggle and Rabie (1992); Carruthers (1993, 2007); Adams, *et al*. (1999); Aliber (2001); Hoffman and Ashwell (2001); Moyo (2005); Steyn (2005); and Benjaminsen *et al*. (2006).

POVERTY AND CONSERVATION

Dependence of the poor on natural resources

A significant amount of literature exists on relationships between poverty and the environment. Some literature points out poverty as a cause of environmental problems especially in the forms of land degradation (Nyssen, Poesen *et al*., 2004) and deforestation (Fisher and Christopher, 2007). Poverty affects the kind of activities that a household engages in, hence the way and extent to which they use natural resources (Reardon and Vosti, 1995). Consequently, the poor rely mainly on local ecosystems for primary goods and services (Fisher and Christopher, 2007), such as fertile soils for farming (agriculture and livestock), timber and grass for shelter and fuel wood for energy. Furthermore, poor people would use these resources as a source of income, adding additional pressure on the resources in question. This is especially the case in marginalised rural communities which are left with no means of economic survival, except for the available and often scarce natural resources (Blignaut and Moolman, 2006).

Where the conservation of existing lands that poor people use for their resources are concerned, poor rural households are often faced with a hard decision of either investing in improving existing resources or migrating to more productive but often more fragile environments (Stringer, 2009). Investments in conservation techniques become difficult options if, for example, farmers produce just enough to meet their minimum needs but too little to make key conservation /intensification investments (Reardon and Vosti, 1995). Hence, moving to fragile lands remains the most likely decision that poor people take.

The links between poverty and the environment are not only limited to rural areas. Urban poverty is often associated with a wide range of environmental problems such as urban decay, waste, indoor air pollution, and general reduction in natural splendour. However, only a few literatures exist on urban poverty and conservation (especially biodiversity conservation). Perhaps this is because urban poor do not directly rely on natural resources for survival. Nevertheless, a recent study suggests that a growing need for urban employment with associated increase in squatting and informal settlement in South Africa pose a threat (habitat fragmentation) to the grasslands ecosystems in and around cities in the North-West Province of South Africa (Cilliers, Müller *et al*., 2004). This presents yet another dimension in a range of factors affecting certain behaviour of the poor with respect to the environment.

Free-will conservation by the poor

Apart from the direct dependence of the poor on natural resources, links between poverty and environment/conservation could be associated with perceptions. “A person

who cannot meet basic demands of physiology (i.e., food, basic shelter, etc.) or safety cannot be expected to pursue goals of environmental conservation" (Cinner and Pollnac, 2004). For example, when the poor manage agricultural lands, they don't always do it for the sake of the environment or because it is desirable, but because of some government or NGO conservation scheme (Barbier, 1997). Thus, when aids and subsidies are withdrawn, poor people often fail to continue with good practices.

A study in Mahahual Mexico showed that the perceptions of natural resources are highly differentiated among community members based on their socioeconomic status (Cinner and Pollnac, 2004). When the respondents were interviewed concerning dwindling fishery resources in their area, poorer respondents were clearly aware that there is a problem but they attributed it directly to fishery-related issues. Alternatively, wealthier respondents associated resource conditions with a wide range of terrestrial and marine practices such as tourism, shipping activity, conservation interventions, and land-based practices. This implies that wealthier respondents are more likely to understand and be more amenable to a holistic approach to resource management than their poor counterparts (Cinner and Pollnac, 2004).

Chokor (2004) suggests that poor people are environmentally rational, but that they are often handicapped in doing the right thing. A study among 831 rural dwellers in Nigeria concluded that most respondents have a holistic and long-term view of the environmental implications of natural resource use, however, sustainable traditional environmental resource conservation measures previously embraced by communities have been abandoned in order to meet the exigencies of short-term survival (Chokor, 2004). Poor people find it more lucrative to focus on improving their individual socioeconomics rather than what is good for the entire community.

Restrictions of the poor to protected/conservation areas ("lose-lose", "win-lose" or "win-win")

The benefits of conservation through protected areas are ambiguous to poor people and sometimes to conservation itself. A lose-lose situation occurs when poor people are restricted from gaining access to the conservation areas. This is especially the case when poor people are forced into marginal lands whose resource dwindle quickly, and people are then forced to break management rules in protected areas, as they do not attach legitimacy to the protected area, making it more difficult to achieve conservation goals (Tobey and Torell, 2006).

Sometimes conservation managers are able to successfully curtail access to protected areas and this might also increase poverty of the already poor neighbouring communities who would otherwise use the resources to minimise their poverty levels. This present a

win-lose situation as restricting access and property rights brings some gains to conservation while increasing poverty (Reardon and Vosti, 1995; Kerr, 2002).

A win-win situation can be achieved when conservation strategies involve local and/or poor people in the process, creating awareness of ecological and economic impacts (Reddy and Chakravarty, 1999); and even more so when other types of income generating activities are implemented. A study in villages next to Dja Biosphere reserve in Cameroon (with access to the reserve for hunting and fishing) showed less than anticipated impact on the reserve because people were able to draw additional income from other activities such as agro plantations. The pressure will be even less if this could be coupled with other activities such as small-scale enterprises and ecotourism (Timah *et al*., 2008).

Vicious cycle of poverty and degradation

In many instances, the relationship between poverty and the environment is cumulative rather than a one-way link – one phenomenon leads to the other as a vicious cycle. When land is allocated, the poor are left with marginalised, resource poor lands. Without money to reform those lands, the net production from those lands remains less, hence further worsening poverty. In Malawi for example, most women cultivate small, steep and less fertile portions of land and are often unable to finance agricultural inputs such as fertilizer, to rotate annual crops, to use `green' crops or to undertake soil and water conservation. As a result, they face declining soil fertility and declining crop yields, and all these exacerbate their poverty further (Barbier, 1997). However the literature also provides views of the poverty trap hypothesis that highlight that there are rarely simple causal factors that exacerbate poverty and associated degradation of the natural environment (Allison and Hobbs, 2004; Holling, 2001). Dimensions such as a lack of social capital and connectedness, in particular kinship ties and weak institutions promote risks to a healthy human and natural environment (Prakash, 1997).

On the other hand, conservation of resources can lead to improvements of livelihoods and poverty reduction (Mulwafu and Msosa, 2005). Conservation of water resources for example can lead to the improvement of community socio-economics (Mulwafu and Msosa, 2005). This is because water resources can serve as a direct input to food production systems (fishing and irrigation) and as the basis for human health (which is a measure of poverty).

Evidence for a non-linear relationship between poverty and environmental degradation

The widely held view is that poverty propels negative and unsustainable natural resource exploitation practices. However, it is not a given that income level guarantees

sustainability (Chokor, 2004). Despite the evidence in some parts of the world that poverty causes environmental degradation or conservation failure, some authors suggest rather dynamic scenarios (Wunder, 2001). More recent insights indicate that despite the dependence of the poor on natural resources, wealth and the associated over consumption can put pressure on natural resources and in any case, the poor are the ones who not only bear the costs (Chokor, 2004), but it is also here where it makes the biggest impact at the household level.

To support the lack of direct relationship between poverty/income and environmental problems, a household survey in the Colombian Andes (Agudelo *et al*., 2003) showed that land degradation is rather dependent on the type of assets that households own (e.g. size of land and quantity of livestock) and the type of activities undertaken by a household (cattle farm vs. coffee farming vs. being a labourer). Similarly, a study in Swaziland (Stringer, 2009) suggests that it is not the poor people who cause land degradation – households with different assets all contribute to degradation and/or conservation of land in pursuit of different livelihoods activities.

Poverty alleviation and environmental conservation

If poverty is the cause of environmental degradation then it follows that poverty alleviation programmes should save the environment. Poverty alleviation and environmental protection are seen as complementary to each other, and are strongly interlinked themes in policies (Stringer, 2009). This presents a win-win situation between the environment and human development as expressed in different concepts such as sustainable development, integrated conservation and development projects, sustainable use, and community-based resource management. The idea is that sustainable resource management and biodiversity conservation can result in tangible benefits to participating communities (Gjertsen, 2005).

In agricultural lands, for example, a win-win situation can be achieved through so called "conservation production" (Perz, 2004), which raise rural incomes while conserving the forest resource base. His analysis showed that, more diversified farms (multiple crop and livestock instead of mono crops) have higher agricultural incomes, but not significantly less forest cover and suggests that initiatives promoting agricultural diversity increase compatibility between conservation and production and hence, reduce poverty. This could be more so if population densities are moderate, off-farm employment opportunities are present, appropriate technology is used, property rights are secured, and local institutions are effective. Studies such as these highlight the conditions under which poverty-environmental linkages can be exposed to create opportunities for solutions that are based on an understanding of the social-ecological system that recognises its complexity.

Productivity and conservation objectives can be highly complementary, because conservation of soil, water, and natural vegetation leads to higher productivity of crops and livestock (Kerr, 2002). But the relationship with poverty alleviation is ambiguous because net benefits are sometimes skewed toward the wealthiest landowners. For example, in terms of catchment conservation, rich landowners downstream may pose measures to close common lands for the poor upstream leaving them with no resources for survival (Kerr, 2002). A win-win can only be achieved when downstream landowners can agree with upstream users to share benefits (Kerr, 2002), or downstream users pay for environmental services provided by the poor upstream (Tschakert, 2007).

Poverty alleviation projects have not always been able to eradicate poverty without compromising conservation objectives. For example, deforestation in St Mary village (rural Jamaica) are attributed to poverty alleviation programmes (Weis, 2000). Up to 1990, farm produce was not effectively securing income for the isolated Long road St Mary village. A marketing cooperative, established in 1990, has helped the community by allowing opportunities for administration, transportation, extensions and funding. The establishment of upland coffee plantations, together with improved expansions and reduced market isolation, increased profitability. Although the initiative greatly improved the economic prospects of the poor, it has led to ecologically hazardous expansions of cultivations driving environmental change into marginal lands and increasing the chemical intensity of agriculture. Construction of roads further increased the access to forests and the subsequent deforestation (Weis, 2000).

The benefits drawn from conservation based poverty alleviation projects sometimes show an uneven or heterogeneous pattern (Coomes *et al*., 2004). This is often due to the poor owing a small portion only of the conserved land, their lack of access to labour for aid in resource access, and their general lifestyle, or past experience do not allow. Such realities challenge the assumption that poor asset households will be able to draw more from poverty alleviation initiatives that incorporate conservation principles and practice (Coomes *et al*., 2004) .

The strength and direction of the links between poverty and the environment links differ, and, depending on the composition of the assets held by the rural poor and the types of environmental problems they face, can even be inverse (Reardon and Vosti, 1995). In addition, the success of poverty alleviation will depend on the type of aid provided and the community specific needs of the poor. It is therefore important to understand the drivers of behaviour of the poor individuals and the scope of the environmental problems to be tackled.

SOCIAL CONTRUCTION OF IDEAS ABOUT NATURE AND CONSERVATION

Ideas about Conservation

Protected areas are often sites that are rich in social production and social interaction (West *et al.,* 2006:252). This argument links strongly the social effects of protected areas to the value attributed to the conservation of spaces/environments/nature. West *et al.* (2006: 252) asks two important questions: firstly, what are the social, material and symbolic effects of protected areas; and secondly, how do protected areas impact people's lives and their surroundings. Their argument is that protected areas matter from a social scientific point of view because they are a way of "seeing, understanding and (re)producing the world" (West *et al.*, 2006: 252).

Human perception influences human action and thus decision-making (Bertolas, 1998:89). Perceptions guide decisions about what, when and where to invest or conserve. The role of peoples' buy-in cannot be ignored. An important question that one needs to ask is why and how do perceptions of place differ from individual to individual and society to society and how do such perceptions influence human-nature interactions? (Bertolas, 1998:89).

How do people understand/perceive nature?

"Nature" as a site of struggle: Nature is a site of struggle and is shaped by power and different conceptions of justice (Cock, 2007:1). Cock (2007:1) echoes other scientists in arguing that nature is a social construct and that people understand the "natural world" in different ways.

"Nature" as manufactured: Different ways for understanding the idea of nature varies, for example – wilderness and wild animals, or it may be indirectly understood through the image that the media creates of nature, or through visiting environments such as national parks which are highly managed (Cock, 2007:1).

"Nature" as moral yardstick: Milton, (1996: 112-120) argues that ethnographic record has shown that appeals to nature and the conservation thereof has universally been linked to moral and political beliefs. In fact Rayner goes as far as to argue that "nature is a direct source of moral feedback for behaviour, desirable and undesirable" (Milton, 1996:28). An example of this is how climate change has become a stage for competing social values and epistemologies.

"Nature" is socially and culturally constructed: Perceptions of nature are socially constructed (Descola, 1999: 82; Brosius, 1999:277). Nature is constructed by our "meaning-giving" and discursive processes. The meaning of nature has shifted

throughout history according to cultural, socio-economic and political factors (Escobar, 1999:1). Escobar argues that what we consider natural is also cultural. Arguing that nature is culturally constructed and defined implies that nature is made meaningful through practical engagement and cognition (Ellen, 1996:3). Therefore one must acknowledge that the idea of nature and the meaning attached varies between "different populations, according to different levels of discourse and over time" (Ellen, 1996:3). Strathern (1980: 177) argues that this would mean the acceptance that there are no culture or nature in Western thought (links to the nature/ culture dichotomy explained elsewhere in this review) – each term is highly relatavised. This has led some like Descola (1999: 82) to ask important questions with regards to the significance of these statements. He asks: "must we restrict ourselves to describing as best we can the specific conceptions of nature that different cultures have produced at different times, or must we look for general principles of order enabling us to compare the seemingly infinite empirical diversity of nature-culture complexes?" Descola (1999:83) argues for the second option of the self-posed question but in doing so poses even more questions, specifically relating to the role of ethnobiological taxonomies and that of social enquiry such as anthropology.

"Nature" as "the other: There are many ways to understand the concept of 'nature' in terms of space. Nature is not something external of 'out there', but it is something that we interact with everyday "in the food we eat, the water we drink and the air we breathe" (Cock, 2007:1). People are increasingly alienated from nature **(**Cock, 2007:9). Cock (2007:9) suggests several reasons: we are physically separated from those "wild" spaces we consider nature; we have the opportunity to 'enjoy' nature artificially through the media; and when we do have the opportunity to go to nature we mostly do so in a highly managed manner, e.g. we visit conservation parks in our cars, stay in bungalows and tents and go on game drives (Cock, 2007:9). This may only be a symptom of a much deeper issue of alienation where people tend to forget or even do not know that we are intimately connected to nature everyday through our need for food, water and air (Cock 2007:9). Complicated social processes involved in the production and distribution of food are largely hidden from people's immediate experience and we do no longer understand the many biological processes of nature (Cock, 2007:10). While natural science has contributed immensely to our knowledge of nature, scientific knowledge have also increased human domination and control over nature, primarily as this is seen as a marker of human progress (Cock, 2007:42).

Nature/culture (society) debate: The nature-culture/society debate depends on the "prevailing ideologies" and the particular context of a given time (Bertolas, 1999). The "Prevailing Justice" model of nature (Cock, 2007:48) implies that nature deals out rewards and punishment. This understanding explains the occurrence of bountiful harvests, fair weather, droughts, locusts and even floods.

Often social scientists (West *et al.,* 2006:254; Ellen, 1996: 7; Strathern, 1980) argue that the nature-culture dichotomy is a western construct that has been imposed on no-western people. It is also along this divide that many conservation strategies are built and either fails or has serious consequences for the communities involved. The nature/society dichotomy hinders true ecological understanding and therefore also sustainable solutions (Descola and Pálsson, 1996:3).

CONSERVATION AND BEHAVIOUR

The dramatic disconnect between our knowledge of freshwater systems, relevant policies and legislation, and conservation successes (or the reduction of environmental degradation) is in part illustrative of the fact that we should not try to manage the resources per se but rather focus our attention on managing people (as individuals and within institutions/organisations), the decisions they make and the behaviours they follow.

Environmental psychology (e.g. Stern, 2000; Kollmuss and Agyeman, 2002), social psychology (e.g. Leach and Sabatier, 2005) behavioural economics (e.g. Lambert, 2006), and other disciplines have offered some explanations of the gap between knowledge (and awareness) and behaviour. Attitude is fairly widely acknowledged as having an influence on behaviour (Carlson, 2004). Since attitude has an emotional component, which can either be positive or negative, it is more difficult to change than, for example, knowledge (Hersey *et al*., 1996). It is recognized that awareness of science stimulates positive attitudes towards science (Burns *et al*., 2003). Positive attitudes have the potential to change behaviour in a positive way (Gilbert *et al.,* 1999). The section below discusses some of the work done by various researchers who tried to understand what causes certain behaviour towards the environment. However there are still no definitive, commonly agreed upon explanations of human behaviour and the motivations to behave in specific ways.

What is behaviour?

Since the early 1950s the theory behind behaviour is studied (Worchel *et al*., 1991). According to Lewin (1952) a person's behaviour depends on personal needs and/or motives, and the situation or environment around the person.

As described in their Theory of Reasoned Action (Figure 1), Ajzen and Fishbein (1973) isolated two factors which determine behaviour intentions: a personal or attitudinal factor; and a social or normative factor. These two factors together form the intention to behave and this intention has potential to lead to behaviour (Fishbein and Ajzen, 1975). In 1980 Ajzen and Fishbein (1980) elaborated on the beliefs, evaluations and motivations

behind both the attitude and subjective norm components of the Theory of Reasoned Action model. They also identified external behaviours such as demographics and personality traits, which do not have direct effects on behaviour.

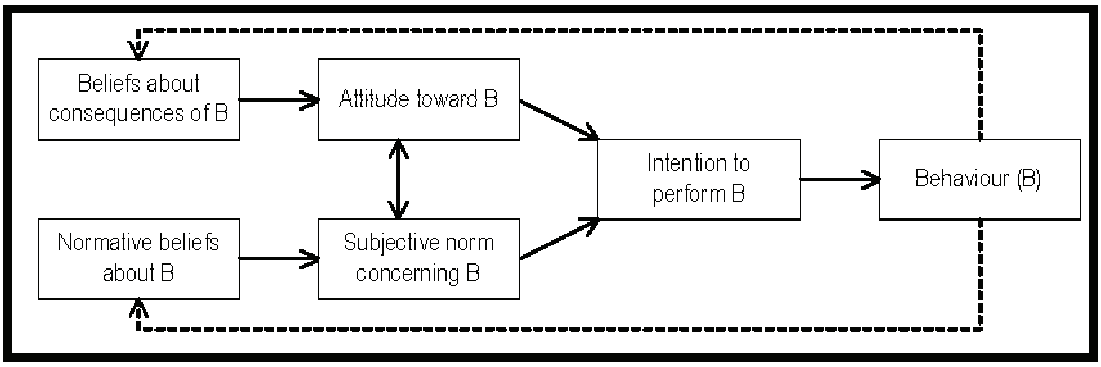

Figure 1. A schematic presentation of the Theory and Reasoned Action. (Adapted from Fishbein and Ajzen (1975)).

Ajzen and Madden's (1986) Theory of Planned Behaviour (Figure 2), was followed by several theories that include for example, feelings and emotional components. Examples are work done by Zanna and Rempel (1988) and Grob (1995). Grob's (1995) model of environmental behaviour included emotional and awareness components (Figure 3).

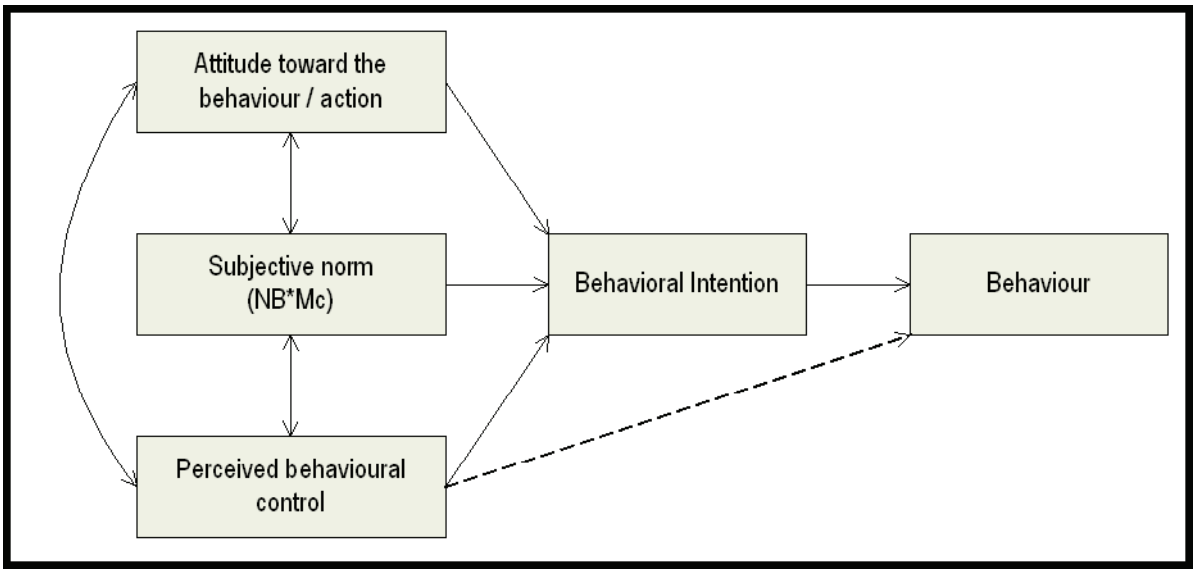

Figure 2. Schematic diagram of the Theory of Planned Behaviour (Azjen and Madden, 1986).

While the emotional component captures the emotional value that people place on aspects of the environment, the awareness includes the factual knowledge about the environment as well as the understanding of environmental problems (Grob, 1995). In Zanna and Rempel's (1988; In Carlson, 2004) model of attitude formation and expression (Figure 4), three observable expressions of attitudes are posited, namely cognitive (thoughts, ideas, beliefs, awareness), affective (feelings, moods) and behavioural (overt actions, intentions). These three components of expression are the result of responses to

the process of evaluating stimuli. In others words, incoming stimuli which can be individual, social, cultural, contextual and environmental, are 'processed' through existing perceptions, values and ethics, and then evaluated by the individual which leads to positive, negative or neutral expressions of attitude (Carlson, 2004). Eagly and Chaiken (1993) also point out that, due to lack of skills and/or resources, some behaviour is involuntary.

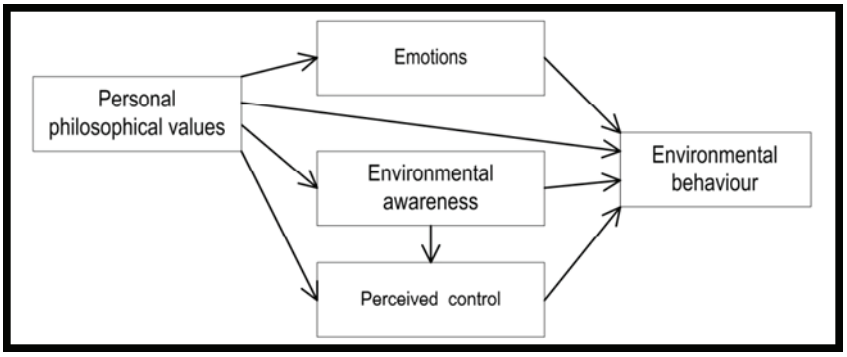

Figure 3. The model of environmental behaviour (Grob, 1995).

The Geller model (2002) (Figure 4) explains behaviour as a function of both activators (information, advice, education) which change attitudes and behavioural consequences. Excessive use of environmental resources is often maintained by natural reinforcing consequences such as monetary rebates and recognition (Geller, 1995).

Behaviour as is commonly understood by the lay person is only one aspect of attitude expression, and studies originating in the natural science domain should therefore not be limited to exploring just the concept of behaviour but all the expressions of attitude as well as the relationship between attitude and these expressions.

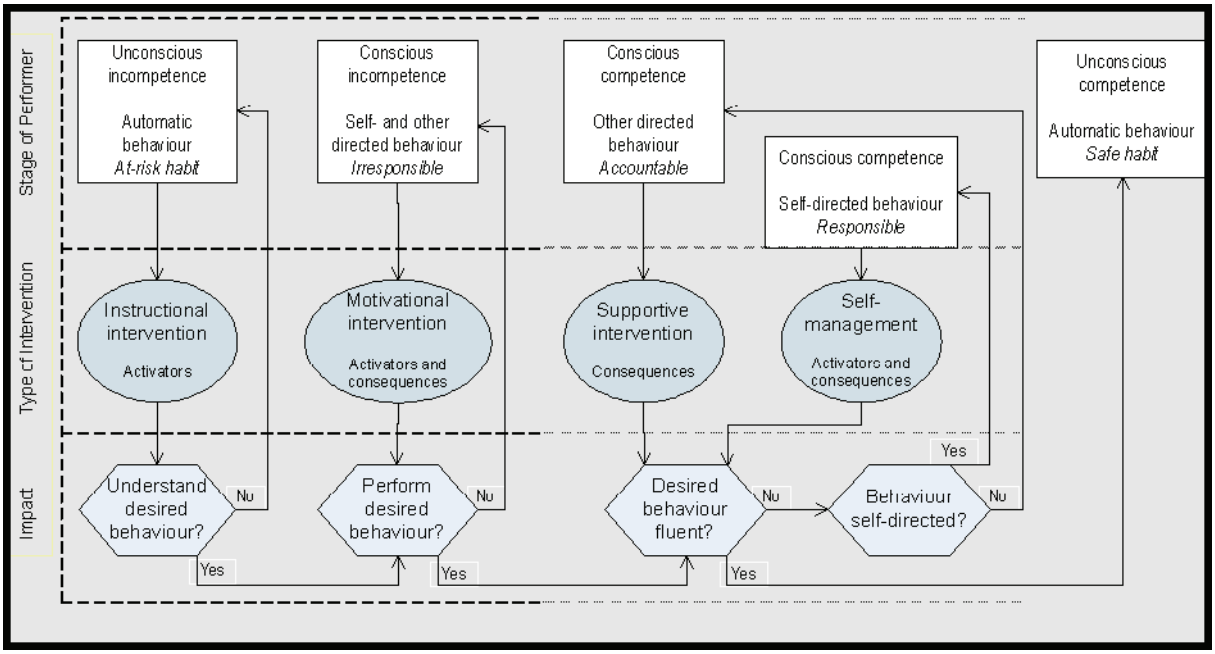

Figure 4. Geller's (2002) model that explains the flow of behaviour change.

Types of behaviour – an ethical approach

The relationship between humans and nature has a long and complex history. However, most descriptions of this relationship can fall into two main categories. Firstly, one where humans are regarded as an integral part of nature, each depending on the other for survival and secondly one where humans are regarded in some way to be superior to nature and therefore have the right to dominate and exploit its resources. Depending on your worldview, i.e. which of these categories one believes in, this forms the basis for whether human actions towards the environment are morally and ethically correct.

Fennell *et al.* (2008) propose three ethical domains that form the underpinning philosophies that are used to make decisions regarding for example the environment. These are described in Box 1.

Box 1. Domains of Ethics (Fennell *et al.*, 2008)

Deontology – the right behaviour – decisions that are based upon following duties, rules, or principles. In other words the means as opposed to the ends, consequences or outcomes. The chief advantage of the deontological perspective is that it gives us guidance in reference to how we should behave based on a sense of obligation and duty.
Teleology – good behaviour – decisions that focus on the end (not the means)s of our actions. The deontologist will follow rules for determining what is ethically right, while the teleologist acts according to what would lead to the best or good consequences. Two main approaches have emerged in teleology namely objective and subjective. Objective teleology or virtue ethics is based on behaviour that seeks good ends through the pursuit of excellence of a number of virtues (e.g. generosity, courage, and justice). Subjectivist teleology, or the pursuit of happiness as an end, is based on decisions that maximize pleasure for the individual (hedonism) as well as for the group (utilitarianism).
Existentialism – authentic behaviour – decisions that focus on being true to oneself. Although a subjective way of making decisions it provides the freedom to choose outside the bounds of entrenched reason and intellect. Existentialists are generally better equipped to evaluate different ethical standpoints and the applicability to different contexts of action than the rule-follower (deontologist) or the cost-benefit calculator (teleologist).

Motivating for a change in behaviour

Dawnay and Shah (2005) describe seven key principles that explain and could be utilized as a basis for motivating for a change in human behaviour. They are summarised verbatim from their article in Box 2:

Box 2. Seven Principles of Human Behaviour (Dawnay and Shah, 2005).

1. ***Other people's behaviour matters*** – people do many things by observing others and copying, and people are encouraged to continue to do things when they feel other people approve of their behaviour
2. ***Habits are important*** – people do many things without consciously thinking about them. These habits are hard to change – even though people might want to change their behaviour, it is not easy for them.
3. ***People are motivated to 'do the right thing'*** – there are cases where money is de-motivating as it undermines people's intrinsic motivation, for example you would stop inviting friends to dinner if they insisted on paying you.
4. ***People's self expectations influence how they behave*** – they want their actions to be in line with their values and their commitments.
5. ***People are loss averse*** – and hang on to what they consider theirs.
6. ***People are bad at computation*** – when taking decisions: they put undue weight on recent events and too little on far-off ones; they cannot calculate probabilities well and worry too much about unlikely events; and they are strongly influenced on how the problem/ information is presented to them.
7. ***People need to feel involved and effective to make a change*** – just giving people the incentives and information is not necessarily enough.

Another possibly important behavioural determinant is context. People hold diverse values and attitudes in a hierarchical configuration which is sometimes explicit but mostly tacit. When presented with the need to make a decision, the context plays a large role in the trade-offs between values, attitudes and the subsequent behaviour. "The behavioural outcome will be a result of the relative and preferred importance of all the competing values that the situation has activated". (Rokeach, 1973).

STRATEGIES TO UNDERSTAND BEHAVIOUR/ATTITUDES

Community based social marketing

Community based social marketing is a process where explicit steps are taken to identify the range of behaviours necessary to overcome / address a specific issue and the barriers that stand in the way of such a behaviour change.

Community based social marketing comprises four steps, namely:

1. Identifying the barriers to specific behaviours of interest and then based upon this information selecting which behaviours to promote / influence;
2. Designing a program to overcome the barriers to the selected behaviour(s);

3. Piloting the programme; and then
4. Evaluating it once it is broadly implemented (McKenzie-Mohr, 2000).

Point no. 2 in the box above suggests that we need to understand where people are at – i.e. current habits driven by current beliefs, ethics and attitudes. Perhaps we need to broaden our conceptualisation of social marketing to include the reality in which people find themselves – probably as determined by their perceptions of their particular reality. So, before we identify barriers as suggested above, we may want to understand 'current state' of perceptions, values, attitudes and behaviours.

Mental models

Understanding teams and individuals can be explored by using mental models. Mental models represent how individuals and teams define their world, negotiate terms, determine which actions to take, in other words how they construct their social world. It duly influences how that individual or team behaves in or to a particular context (Carley, 1997). Mapping mental models is a technique that can be used by researchers to understand how different people value, use and manage for example common natural resources. It allows one to form a basis of understanding how to focus on specific teams or individuals and different behaviours in order to achieve a specific objective (Abel *et al*., 1998).

CONCLUSION

This chapter has provided a comprehensive theoretical overview of conservation, and contextualized the field of conservation planning and management within historical and philosophical debates. Based on its interlinkages with key concepts such as poverty, and the social construction of the conservation concept itself, it is imperative to take cognizance of its dynamic and inter-subjective meanings. Conservation means different things to different people/groups of people, which in turn shapes the myriad ways in which they act. The apparent disconnect between our knowledge of freshwater systems, relevant policies and legislation, and conservation successes is therefore in part a failure of planning and management processes to incorporate multiple voices, perspectives and mental models.

The following chapter suggests one such analytical tool to grapple with heterogeneity and its implications for conservation planning and management. During the course of this project, this tool provided useful insights but proved to be limited in its utility to adapt to constantly changing mental models, and the overlap of clusters. It also assumed pre-defined notions of conservation as well as pre-conceived notions of the knowing-caring-acting dynamic, which did not necessarily reflect all definitions in the field.

CHAPTER THREE: ACTOR CLUSTER DYNAMICS

INTRODUCTION

In an attempt to advance our understanding of the relationships between freshwater conservation planning and the social, economic and political landscape within which the general public perceive freshwater conservation goals, the actor cluster dynamic was tested as a possible tool for interrogating the knowing-caring-acting sequence given the multiplicity of mental models on conservation.

Conservation outside of formally protected areas happens in a context where multiple societal interests interact and compete. As a consequence, we conceive that the effectiveness of conservation planning and management ultimately lies beyond the conservation process. It lies in collective and individual consciousness and behaviour in attempts to balance conservation with other goals. This project does not examine the policy and legislative environment, but seeks to emphasise the need to understand normative and behavioural aspects of human decisions and actions in relation to the environment. The project explores the links between knowing, caring and acting within the general public, at an individual and institutional scale. Numerous theoretical frameworks have been developed, and while they all have some validity in certain circumstances, no definitive answers have been found (Kollmuss and Agyerman, 2002). This report does not purport to present any definitive answers, and supports the value of an inter-disciplinary approach.

The notion of 'actor clusters' is based on the recognition that society is not homogeneous in terms of actual behaviour or the drivers of behaviour. In this Chapter, we give an account of our endeavours to characterise society according to groups or clusters by using our understanding of the interaction between knowledge and information, caring (values) and acting (behaviour).

METHODOLOGY

The concept of describing society as a collection of heterogeneous cluster groups originated from the WRC Report 1678: Enriching Freshwater Conservation. An internal workshop (see Appendix C) was held to share ideas and knowledge on the cluster groups described in the report and the barriers to pro-environmental behaviour as it relates to freshwater conservation. Seven CSIR staff members, natural and social scientists, attended the workshop. Workshop discussions opened with identification of the *core* problems related to the effects of human attitudes and behaviours on conservation in general, and freshwater conservation in particular, and the *issue of scale*, i.e. whether the target of this project should address knowing, caring and acting at the level of individual actors or institutions or both. The influence – or lack of – that individuals have

on and within institutions was also debated. Throughout the discussion, the group paid attention to unpacking and challenging core assumptions. These are listed below in the section subtitled *Assumptions*. Fundamental to the task was recognition of the importance of an inter-disciplinary research approach. The question of what shapes pro-environmental behaviour is complex and cannot be visualized through one single framework as there are numerous theoretical frameworks to explain the gap between knowledge/awareness and pro-environmental behaviour. A range of different disciplines including psychology, economics, politics, sociology, geography, and anthropology contribute insights. Actor-cluster groups represent typical aggregations of knowing, caring and acting. There are numerous areas of overlap between the different actor cluster groups. For the purpose of the workshop discussions, broad and fairly loose categories were identified.

The ideas and knowledge generated in the internal team workshop were tested amongst a wider audience. This wider audience included experts from a range of disciplines such as conservation, anthropology, psychology, environmental education to name a few. Each expert received a background information document (see Appendix A) which was used as a platform for discussion. Discussions were informal and guided by the key questions listed in Appendix A. A list of the experts involved and their disciplines are described in Appendix B.

Once these discussions were held, a desk-top study followed which examined and tested the utility of the actor cluster dynamic to existing freshwater conservation initiatives.

Assumptions

Assumption 1 – Common understanding of the term "sustainable development"

An agreement was reached by the research team on a common understanding of the concept of 'Sustainable Development' that does not see a conflict between environmentalism and humanitarianism. We adopted an anthropocentric approach that recognizes that the natural environment and development must be considered in social terms. South Africa's water policy, water resource strategies and legislation are based on an anthropocentric worldview and corresponding weak sustainability. The National Water Policy (1997) and the National Water Act (1998) are founded on the government's vision of a transformed society in South Africa. The First Edition of the National Water Resource Strategy (2004) confirms, a) that "the central objective of managing water resources is to ensure that water is used to support equitable and sustainable social and economic transformation and development" (GoSA, 2004: i), and b) enforces the principles of participation, inclusivity and building capacity in the managing of water resources. Trade-offs between conservation of freshwater biodiversity and human use of ecosystem goods and services are necessary, but an anthropocentric view of sustainable

development motivates for what some have termed "reconciliation ecology" (Dudgeon *et al*., 2006:164): "a compromise position of management for biodiversity conservation, ecosystem functioning and resilience, and human livelihoods in order to provide a viable long-term basis for freshwater conservation".

Assumption 2 – Legacy of South Africa's political economy

Environmental processes constitute and are constituted by the political economy of access to and control over natural resources (Peluso and Watts, 2001). The historical legacy of apartheid in South Africa raises the importance of Environmental Justice[5], which is concerned with the distribution of benefits and burdens in a society. Environmental conservation efforts in the past often led to the marginalization of parts of South African society – primarily based on race. The legacy of this marginalization is still evident today since, for example, many South Africans are compelled to remain living in polluted environments with little or no prospect of moving away. The South African government has recognized environmental justice as a fundamental principle for environmental management (Hamann and O'Riordan, 1999).

Assumption 3 – The relationship between "knowledge – caring/attitudes – behaviour" is non-linear:

The relationship between "knowledge – caring/attitudes – behaviour" is non- linear. There are many discrepancies, disconnects and potential contradictions between values and actions: values may strongly influence predispositions but their influence on behaviour is indirect and they do not necessarily drive knowing (knowledge). As caring does not always translate into action, so knowledge may not drive caring. Often action is situationally determined. Kollmuss and Agyeman (2002: 250) note that in fact researchers generally agree that "only a small fraction of pro-environmental behaviour can be directly linked to environmental knowledge and environmental awareness".

Assumption 4 – The value of freshwater biodiversity:

An appreciation of the value of freshwater biodiversity is essential, but not itself sufficient to ensure its protection. Freshwater biodiversity provides a broad variety of valuable goods and services for human societies, but there is limited awareness in society of the need to conserve freshwater biodiversity. In addition, not everyone values freshwater biodiversity in the same way or to the same extent. South Africans have a very wide array of value systems, evident in the wide spectrum of motivations or

[5] Environmental justice is about social transformation directed towards meeting human need and enhancing the quality of life – economic quality, shelter, species preservation, sustainable use of resources (Kidd, 1999)

explanations as to why people value (or do not value) freshwater biodiversity. Furthermore, there is severe competition among multiple human stakeholders for freshwater resources. There are also significant constraints on knowledge about freshwater resources, because of the complexity introduced by for example catchment divides, climate change, and lack of sufficient data.

Assumption 5 – Differentiation between individual and institutional (organizational) responsibility for and ability to influence freshwater conservation:

It is important to differentiate between individual and institutional (organizational) responsibility for and ability to influence freshwater conservation. There is a broad spectrum of influences that determine the actions of both individuals and institutions. On the one hand are the poor and marginalised (both individually and collectively) for whom the link between ecosystem services and their livelihoods may or may not be immediately obvious. The utility value of aquatic resources for survival is most important to these people but they may or may not engage in governance for the protection of water resources. On the other hand, for certain industries the financial bottom line is of primary importance and overrides any interest in Sustainable Development imperatives. These examples illustrate the importance of context in determining knowing, caring and acting. The role that individuals may play in influencing institutional behaviour toward the environment is contingent upon a range of political, cultural, social and economic factors, and is also influenced by personality, temperament, gender and age.

THE ACTOR CLUSTER GROUPS AND THEIR ASSOCIATED CHARACTERISTICS

The different complexes of knowledge-values-attitudes-actions of individuals and institutions have been broadly categorized below. The common consequence of the behaviour of all these groups is their contribution to declining resilience and quality of freshwater ecosystems. The six groupings identified are:

1. **People or institutions that know that conservation of freshwater ecosystems and resources are important and who care, but act selectively.**

Know	Care	Act
√	√	X act selectively

This actor cluster group is composed of individuals and institutions who have the general knowledge and care about freshwater conservation, but who selectively choose to act – either consistently or on some occasions or in certain circumstances.

Acting selectively is both about choice and exposure, and the associated action may be deliberate or coincidental. Selective acting may be caused by a range of factors such as:

- *Self-interest*: The industrial polluters often fall within this grouping – organisations that are driven solely by profit, but may simultaneously belong to or support other conservation initiatives. Other examples are households that consume vast amounts of water for large gardens but who are 'deeply concerned' about freshwater conservation within their local river or dam.

- *Selective application of values (applied in some situations or to some components of the environment, and not others):* Depend on context and circumstances and what is considered important (can be within an anthropocentric or ecocentric worldview) – which can translate into either focusing on human well being at the expense of ecosystems, or on the other hand protection of the environment without awareness or concern for others' livelihoods. The 'not-in-my-backyard' attitude is evidenced in the many examples of hazardous waste facilities for handling, storage, treatment and disposal that are located within the proximity of poor and minority communities (Musee, n.d.)

2. People or institutions that know that conservation of freshwater ecosystems and resources are important and that care but do not know how to act appropriately.

Know	Care	Act
√	√	X do not know how

These are people or institutions that have broad knowledge only (and care in general) but may not necessarily have the specific know-how to act appropriately on a specific issue. This may be due to:

- Lack of knowledge of cause and effect;
- Lack of required knowledge and skills;
- Lack of conscious internalization of the issue; or,
- Too many structural constraints (financial and physical resources).

3. People or institutions that know that conservation of freshwater ecosystems and resources are important and that care but don't act.

Know	Care	Act
√	√	X

The reasons for failing to act are determined by any one of a range of factors such as:

- Apathy and/or laziness
- Individualistic and selfish attitude – will not be 'put out'
- A prevailing attitude of having rights without responsibility; 'passing the buck'
- Structural barriers or constraints such as lack of time, money, resources, information.
- The complexity of problems is overwhelming/incapacitating

4. People or institutions that know that conservation of freshwater ecosystems and resources are important, but do not care and do not act.

Know	Care	Act
√	X	X

The reasons are similar to the preceding group and will also include individuals or institutions compromised by environmental injustice. Examples are:

- Lack of voice that translates into defiance;
- People who have never learnt the importance of taking responsibility (somebody else's problem); and
- People who have no comprehension of the consequences of their own actions, or failure to act.

5. People or institutions that know that conservation of freshwater ecosystems and resources are important but do not have the resources to act.

Know	Care	Act
√	√	X no resources

There are many contexts in which knowledge and caring alone do not translate into action because people face huge restrictions to being able to act. These may be structural barriers such as:

- Lack of financial sources
- Lack of material resources.

The crucial concepts social and/or political capital provides a nuanced understanding of the differences in power and voice, and the disparities in access to resources that exist between people. Examples of the kinds of people described are as follows:

- People who have subsistence livelihoods. Their options for acting are limited or non-existent with few alternatives or ability to innovate.
- People without secure tenure and/or who may be living in areas where population densities are high and lands are marginal or degraded.
- People with no incentive to protect water resources as there no or few effective ways of linking ecosystem services directly to improved livelihoods. This requires demonstrating strong evidence of a "win-win" approach and creating political coalition – voice and choice – to pursue them.

6. People or institutions that don't know that they need to care for freshwater ecosystems and resources, and therefore, do not care and do not act.

Know	Care	Act
X	X	X

This is the category of people and individuals that:

- Are not informed or educated about the environment and the human dependence on goods and services emanating from ecosystems.
- Are misinformed, e.g. have misperceptions about abundance or use levels and patterns by others and see no reason to care; believe that environmental problems translate into creation of jobs
- Have no reason to know or care (their livelihoods are not dependent on resources)
- Are fatalistic (external locus of control)
- Believe in a religious right to water
- Cultural perceptions of past, present and future are such that they have no future orientation

Barriers to change

In total, thirteen barriers were identified during the workshop, of which a few are discussed below. The identified barriers are:

1. Worldview influenced by for example culture and social norms
2. Info/knowledge – quantity and quality: internalization
3. Infrastructural constraints
4. Governance
5. Lack of ownership of problem
6. Pricing – supply and demand

7. Ability and willingness to recognize aquatic resources as common property and to balance private and public interest
8. Insufficient opportunities to expose and share values; unwillingness
9. Apathy
10. Powerlessness – overwhelmed by complexity
11. Voice and choice – not aware of alternative ways of doing things; unable to choose
12. Process of interdisciplinary work
13. Implementation effectiveness – policy neither explicitly expressed nor acted on. Lack of harmonization of policies; no implementation of M&E.

Pollution in the name of job creation:

The barriers to behavioural change are significant in that existing behaviours are entrenched because they are socially and economically, but not necessarily environmentally sustainable. For example a mine, industry or commercial farmer may be a polluter of water (e.g. untreated effluents, including sewage, industrial waste and other chemicals), but because it creates many jobs, this serves to justify the polluting action. This allows these industries or farmers to continue polluting and avoid prosecution, despite policy and legislation being in place. It calls for understanding how social and political framings are woven into both the formulation of scientific explanations and environmental problems (Forsythe, 2003).

Lack of incentives:

More practical steps such as the economic motivators of different pricing strategies are important incentives for behaviour change, but are not a panacea, especially in a developing country like South Africa where there is so much inequity. It is because of such factors that predicting behaviour purely on economic grounds can never reveal the whole picture. In fact, these may be a lack of incentives for the poor to engage in the governance of water resources due to their inability to contribute to the financing of water. This makes it important to understand who will benefit from the behaviour change: “buy-in” will be difficult to achieve especially of those who are marginalised and have no voice or choice (and thus no locus of control) because of past or persistent environmental injustices.

Lack of direct experiences:

Direct experiences generally have a stronger influence on people’s behaviour than indirect experiences because reliance on secondary information removes people emotionally from the issue and usually leads to non-involvement. The complexity of environmental concerns, (such as climate change; environmental degradation) are often not just overwhelming – and thus incapacitating – but the changes are slow, gradual, diffuse and seemingly abstract and intractable and this makes it difficult to understand, engage with and respond to. When the locus of control appears to fall outside of the

individual or institution, there will be a lack of ownership of the problem that may present as apathy.

Cultural and social norms:
Cultural norms play a very important role in shaping people's behaviour and can present strong barriers to changing behaviour. It calls for a sensitive appreciation of and respect for differing worldviews that is rooted in disciplines such as cosmology, anthropology and sociology. Habits and desires for comfort and convenience may also present strong barriers to changing caring and acting.

Cultural and racial diversity:
South Africa is culturally and racially very diverse, and presents huge gaps between the rich and the poor (a high Gini-coefficient). As a result there are widely disparate views of what is 'sustainable' – from those that equate development with growth to views that see conservation as "anti-poor". These are issues that have a strong bearing on determining issues of good governance, equity, choice of trade-offs that must be made, and the willingness to balance private and public interests. Balancing the triple helix of economic growth and redistribution, democratic empowerment and environmental protection (as envisaged by the government's embracing of the sustainability concept) is a combination that is extraordinarily difficult to achieve (Hamann and O'Riordan, 1999). Institutions exist within an historical, contextual and relational network and when dealing with the contradictions and tensions we face in this country it is these, and not individual agents or ideologies, that "shape the production, dissemination and reception of knowledge and thus the possibilities of such social practice as sustainable development" (Hattingh *et al*., 2002: 4).

Lack of enforcement:
Lack of enforcement can also be a barrier to change, particularly at the institutional level. South Africa faces significant difficulties in the effective execution and enforcement of the National Environmental Act and the National Water Act because of severe staff and financial shortages (Hamann and O'Riordan, 1999). Lack of harmonization of policies further frustrates effective enforcement.

No common understanding:
There is no generalized solution to the strategies essential to preserve freshwater ecosystems (including water quantity, water quality and biodiversity) as the initiation of pro-environmental behaviour is affected by several interacting factors. It calls for an interdisciplinary approach that takes into account the interaction of the various variables that are understood by the different disciplines – economists, sociologists, political scientists, geographers, anthropologists, social ecologists and so forth. Policy interventions, for example, are "most effective when they simultaneously address

several barriers to change" (Stern, 2000: 525). And because behaviour change is influenced by so many factors and often blocked by institutional and contextual barriers, educational interventions on their own have little or no effect in promoting pro-environmental behaviours. Fear tactics used as a tool to motivate behaviour also do not usually have the desired effect as other variables also play role. When a highly perceived threat is not accompanied by the perceived ability to cope, responses may be inappropriate or incapacitating. There is, therefore, a need to understand how knowledge producers and processes can together play a more active role.

FINDINGS FROM THE EXPERT DISCUSSIONS

There are three main findings that have emerged from these discussions, these findings deal with how the concept 'society' can and should be defined; the importance of understanding the link between cause and effect when it comes to behaviour; and, understanding the importance of trust as motivation for behaviour change. The following sections discuss these findings briefly.

Defining society: Society is heterogeneous and can be categorised in many ways – scientists, advocates, experts, government, NGOs, lay-public, etc. Society can also be differentiated by age, race, education, etc. One should be conscious of how one defines society and the assumptions one makes when categorising society with certain attributes. There are minorities of pro-environmental or conservation conscious people at all levels of education, wealth, location, race, age, etc. – these people can become agents of change for pro-environmental behaviour in their local communities.

As society can be defined in multiple ways so can pro-environmental behaviour, similarly knowing, caring and acting. The way each of these terms is defined is context specific, value laden and no one way of defining each term is better or more right than another. As a researcher one must be aware of this and not necessarily prescribe what is the right or wrong way of behaving in, for example, a pro-environmental manner. One needs to adopt an open ended approach when examining how individuals and society define these terms, the understanding of which will be as heterogeneous as society itself.

Understanding the link between cause and effect: There is a schism in the understanding of cause and effect (and supply and demand with regard to water resources). This schism is often because the problems caused by actions are not seen or felt immediately or even within the lifespan of the individual that causes the problem. Raising awareness can help bridge this schism. Most people understand at some level that the environment is important. There is however a lack of knowledge of what this means specifically. Another reason for this disconnect is that there are mixed messages being received by people. On the one hand the government is requesting that people conserve water within the

household but down the street there is a burst water pipe that is not being fixed resulting in severe water loss. A comprehensive approach is needed by government that does not try to address these issues in isolation from each other. So, for example, a campaign such as fixing all water leaks should go hand in hand with a campaign to educate people to turn the tap off while brushing their teeth.
Linked to this and possibly a reason for a lack of behaviour change is a lack of understanding by the implementers of policy or operations managers of the history or context of the issue they are dealing with. The issue or problem may appear to be simple to solve on face value but there might be a history of neglect, being sidelined or powerlessness by the community involved. All this needs to be taken into account when trying to convince someone to change their behaviour or attitude.

Trust as motivation for behaviour change: Trust is a major issue when requesting people to change their ways. The spatial layout of different community functions is often used as evidence by communities as to whether, for example, they are living in a healthy environment and whether the regulatory structures care about them. Both community and government must live up to their responsibilities if something is to be successfully implemented or changed – this builds trust and a sense of fairness. This sense of fairness is especially important in South Africa where there is a history of inequality. Government needs to target people who have benefited from water conservation first in order to for example, encourage the reduction of water consumption and only then target people who have not benefited in the past. This is called distributive justice and is important in South Africa where there is still a racist discourse linked to environmental protection and conservation.

The question as to whether one should focus on the individual or institution depends on the context of the problem being examined. One needs to identify where the best entry point is, for example, through the child to family to community or through community to individuals. This will differ depending on the problem and context but strong leadership or a stance taken by industry / community is sometimes more powerful to initiate change. One point that relates back to how people understand conservation or the importance of the environment is that it is pointless to try to change whole ideologies, in other words, convert people such that their value systems and beliefs are now perfectly aligned to being pro-environment. One should rather focus on specific ideas / activities that might fall within pro-environmental ideology, behaviour or activities but does not require a wholesale value system shift.

A suggestion of linking the need for distributive justice and finding the ‘correct’ entry point to initiate change, one way might be to identify situations were environmental injustice is occurring. These can be used as triggers for action. For example one could mobilise a community that has ancestral connections to a specific forest that is being

slowly polluted by a factory upstream to lobby the factory or government to address the issue. This strengthens civil groups to be able to have an impact. These groups can then be introduced to more information / knowledge of the problem and thus enhance their ability to act – initiate a co-learning, empowerment cycle.

In support of assumption three, the relationship between "knowledge – caring/attitudes – behaviour" is not linear. Knowing does not necessary translate into caring which in turn does not necessarily translate into acting. This poses the question of whether when trying to understand how to influence and change people's behaviour to become more pro-environmental whether efforts should not be focused, at least initially, on the 'acting' or behaviour component, rather than the knowing and caring components.

FINDINGS FROM TESTING THE UTILITY OF THE ACTOR CLUSTER DYNAMIC TO EXISTING FRESHWATER CONSERVATION INITIATIVES

Findings revealed that the actor cluster dynamic, as a tool for understanding participatory processes and mental models on conservation, and the degree to which people act on these, was useful but inadequate in capturing the dynamism and multi-faceted nature of people and the mental models they have relating to conservation. It was found that pre-conceived notions of what water conservation or pro-environmental behaviour is, confined to a pre-defined actor cluster matrix with associated characteristics and barriers to change, did little to illustrate the diversity of perspectives on conservation beyond the four initial actor clusters. Moreover, it increased the risk of producing over-simplistic policy recommendations that were too rigid and unable to adapt to mental models that are constantly changing.

That said however, it still displayed some utility in providing an understanding of pro-environmental behaviour as defined by strict criteria. Additionally, it provided useful insights on the set of precursors for every activity (behaviours) and related environmental issues and environmental state changes that demand a public participation process or that strives for inclusivity and transparency in decision making. Within the context of South African environmental legislation, the purpose of public participation is to discuss and design resolutions for issues that arise from the dynamic dissonance between human values, norms and behaviours in relation to the state of biodiversity and natural resources. One of the responsibilities of Catchment Management Agencies is to facilitate participatory processes and they plan for these through their catchment management strategies (CMSs).

Rather than trying to categorise society in order to understand its heterogeneity, one should engage with society to find out how they interpret and understand freshwater

conservation. This will provide the researcher/practitioner/implementer, etc. with an entry point to initiate, for example, new water conservation measures.

CONCLUSION

This chapter gives an overview of the thinking and research that has gone into the testing of the Actor Cluster Dynamic. Initial actor cluster research emphasised the heterogeneity of society and highlights the need to incorporate this into a contextual understanding of conservation planning and management. In conjunction with these findings however, experts in the field as well as our own testing taught us that a linear understanding of these actor clusters and consequently their behaviour is counterproductive to the ethos inherent in the original notion of the knowing, caring and acting dynamic. In hindsight, the grouping of actor clusters may not have provided the explanatory power of pro-environmental behaviour that the team originally anticipated however, it provided valuable guidance which was later incorporated in the case study research.

In conclusion, probably the important point that needed to be carried across into the development of research questions and research method design for the case study phase of this project is that the project team must not begin with a pre-conceived notion of what water conservation / pro-environmental behaviour is nor a pre-defined actor cluster matrix with associated characteristics and barriers to change. As such, the outcome of this Chapter is that the team needed to adopt a participative approach to define the elements of the project. Chapter Four illustrates how the team went about this task.

CHAPTER FOUR: CASE STUDY

INTRODUCTION

Implicit in this project's aims and objectives has been the questioning of the often unspoken dichotomy of western-scientific understandings of conservation and local socio-cultural realities and the perceived moral superiority of existing conservation planning models as processes of "teaching" conservation practises to "uninformed local community members". The view that society should be influenced by, and should adjust their knowledge systems, their values and behaviours in greater support of conservation, is an enormous socio-cultural and socio-political challenge. While unsustainable and environmentally damaging practices are rife at the local level, this view can often undermine the needs and challenges of local communities.

Because of this need to map out the multiplicity of understandings of conservation, the project team, looked to a case study which could illustrate (and test) much of what has been learned throughout the life of the project.

Chapter Five therefore takes the learning of the previous chapters and examines the findings of two fieldtrips undertaken by the project team. It also presents the analysis of these findings and gives some recommendations, and provides a summary of the case study area with a justification for its selection criteria. The selection criteria for choosing the Greater Kruger as case study site relates mainly to the demographics of the area, prior scientific research that have been conducted in the area as well as collaborative partnerships that have been set up to support this project.

SELECTION CRITERIA

The Greater Kruger area, and particularly the areas of Bushbuckridge and Hazyview, represents an interesting canvas on which to explore the concept of conservation and the varying perceptions, understandings and meanings attached to it. Moreover, it is a suitable case study area because of the centrality of conservation to the Kruger National Park and surrounding private game reserves and concessions, including the Timbavati, Sabi Sands, and Thornybush. This centrality of a conservation mind-set has an impact on towns, cities and ultimately the people resident in this area although to varying degrees. Complex socio-cultural, economic and political realities therefore overlay environmental issues of conservation.

Demographics

Demographically, the region differs biogeographically from north to south and scientifically this provides an interesting variety of phenomena to observe. There is also

a large range of social conditions in the area. The study area includes rural areas (including former Apartheid homelands), small and large towns, as well as large areas on natural vegetation. Major land uses include urban, subsistence, irrigated agriculture, mining and industry, grazing and conservation. Moreover, the area is reasonably well studied and a large range of ecological, social and economic data exists from which to draw.

Geophysical Context

The Greater Kruger Area is situated in the north-eastern corner of South Africa, delineated by the drainage boundaries of the Crocodile River in the south, the Luvuvhu River in the north, the border between South Africa and Mozambique in the east, and the upper limits of the drainage boundaries of the Crocodile, Sabie, Olifants (including its tributary the Blyde River but excluding the Olifants River Catchment upstream of its confluence with the Blyde River), Letaba and Luvuvhu Rivers in the west.

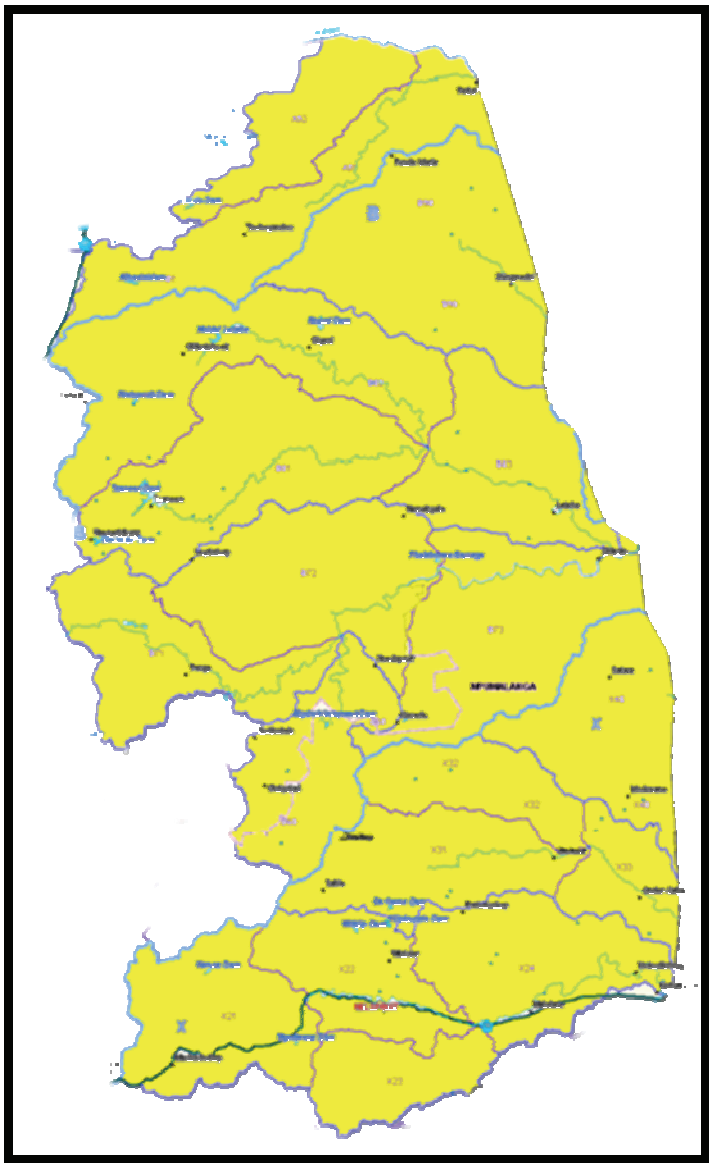

Figure 5. Map of the Greater Kruger Study Area.

The total study area (including the Kruger National Park) covers an area of 56,937 km², with 18,907 km² (33.2 %) falling within the Kruger National Park (KNP). The KNP has an average west to east width of 60 km, spans a distance of 350 km from south to north and has a 1,050 km boundary. All of the perennial rivers that form part of this study arise in mountainous terrain outside the KNP and flow through the park in an easterly direction. It is worthwhile to note that these rivers are of major importance as sources of water for sustaining the heterogeneity and ecosystem processes in the KNP (Gaylard *et al*., 2003). However, most of the catchment areas and river lengths associated with these rivers fall outside the KNP's boundaries, and the KNP

management only has indirect control over the quality and quantity of water that reaches the KNP. This leaves the KNP vulnerable to the many different activities that take place outside its area of jurisdiction.

Within the Greater Kruger, the municipalities studied in this project include Bushbuckridge and Mbombela, both of which offer a complex and sensitive environment of human settlement, commercial agriculture and nature reserves.

The Bushbuckridge Local Municipality is situated in the south-eastern part of Limpopo Province and north-eastern part of Mpumalanga Province. Bushbuckridge is cornered in east by the Kruger National Park, and in the west by the watershed and forests of the Drakensberg Mountains (Thornton, 1997). The terrain consists primarily of a sandy plain with rocky ridges that extend from the escarpment eastwards into the South African lowland bush that grades continuously (Thornton, 1997).

The Mbombela Local Municipality, of which Hazyview forms part, is situated in the North Eastern part of South Africa within the Lowveld sub-region of the Mpumalanga Province. Pretoria and Johannesburg are located approximately 320 km inland, with the border post at Komatipoort approximately 120 km to the east and the Mozambican coastline being around 200 km away. Other urban areas in Mbombela include Nelspruit, White River, Hazyview, Kabokweni, Tekwane, Kanyamazane and Matsulu as well as other peri-urban areas situated mainly in the eastern parts of Mbombela.

Socio-Economic Context

Several socio-economic challenges persist in the Greater Kruger Area that may or may not affect various socio-cultural perspectives on conservation. As indicated in Figure 6, the prevalence of household piped water, refuse removal and flush or chemical toilets is particularly low. Figure 7 and Figure 8 includes a statistical summary of socio-economic challenges including education and unemployment.

In Bushbuckridge, for example, unemployment is very high in the municipal area especially in rural areas, with less than 15% of the total population employed. This is coupled with high levels of poverty resulting in low income per household in the Buchbuckridge municipality.

A key sector overview of Bushbuckridge reveals that after government, the key economic sector is retail, which contributes some 15% to GDP and employs 17% of the

economically active population. This sector is heavily reliant on the large local population, and on government expenditure and employment. Despite its close proximity to the Kruger National Park and surrounding nature reserves, tourism currently contribute some 2% to GDP.

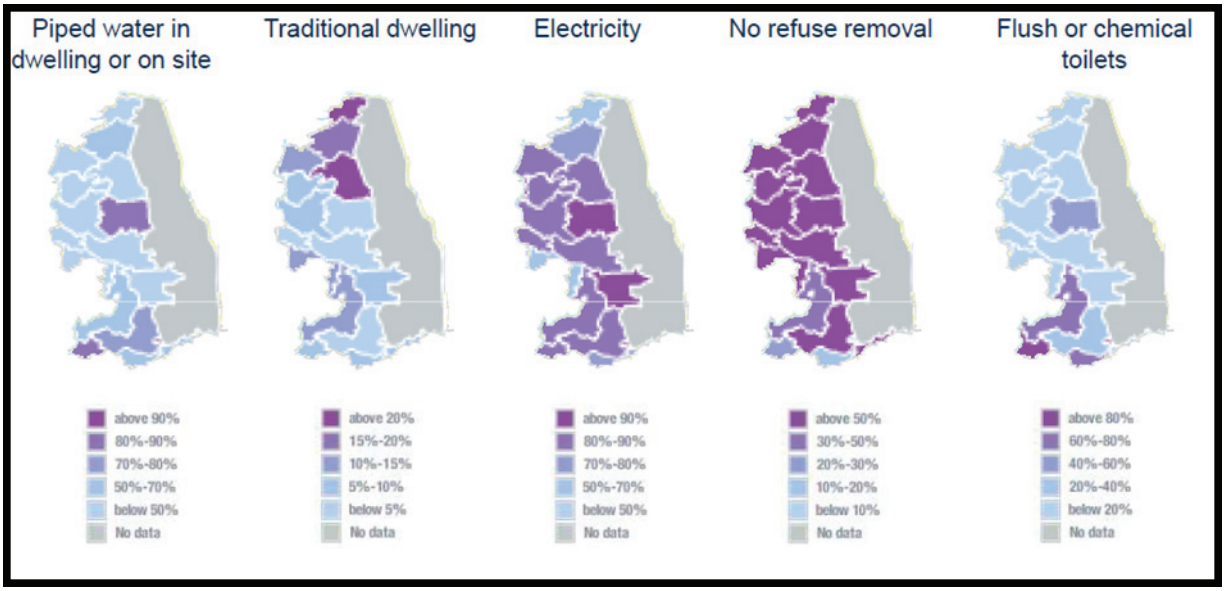

Figure 6. Socio-Economic Challenges in the Greater Kruger (Infrastructure) (StatsSA, 2007 Community Survey)

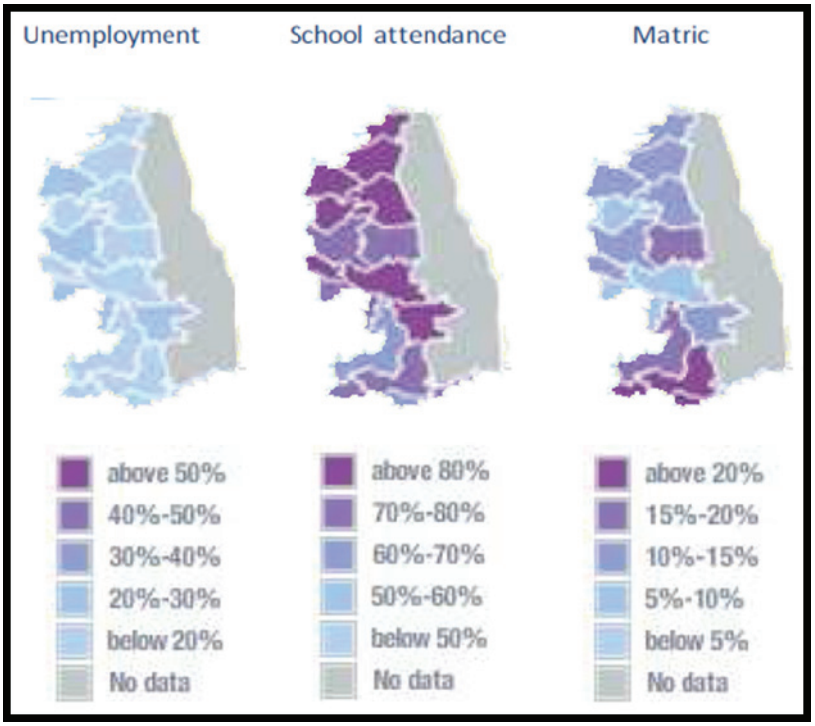

Figure 7. Socio-economic Challenges in the Greater Kruger (unemployment and education). (StatsSA, 2007 Community Survey)

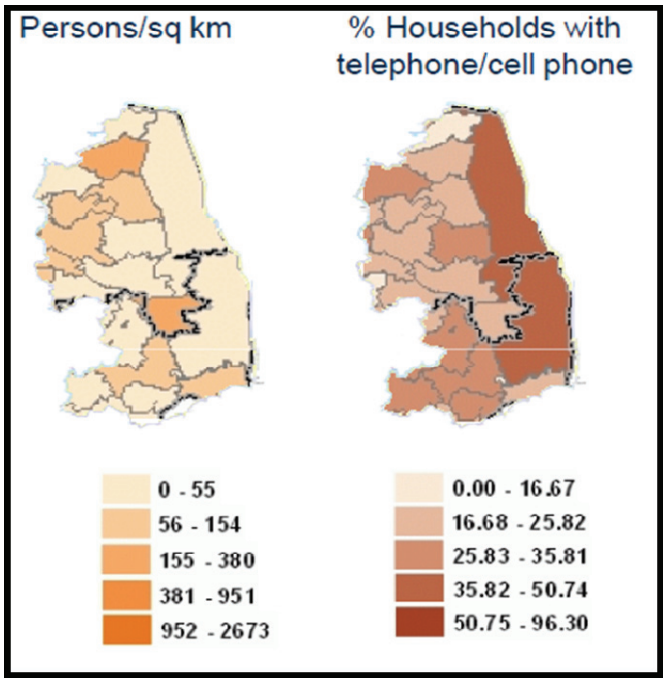

Figure 8. Socio-economic Challenges in the Greater Kruger. (StatsSA, 2001 Census)

In addition, it is important to note that these areas also rely heavily on the Social Grant system of the government (see Table 1). The social grants available to are the Child Support Grant (CSG), the Care Dependency Grant (CDG), Foster Care Grant (FCG), the Disability Grant (DG), the Old Age Grant (OAG), the Ware Veteran's Grant (WVG) and the Grant in Aid (GIA)6.

Table 1: Number of grant recipients by grant type and region as at 31 March 2009 (SASSA, 2009)

	Grant Type							Total		
Region	OAG	WVG	DG	GIA	FCG	CDG	CSG	2006/07	2007/08	2008/09
EC	448,436	198	209,520	6,572	83,403	19,297	1,564,602	**2,244,303**	**2,228,201**	**2,325,456**
FS	144,517	37	91,899	762	44,270	4,228	467,743	**723,698**	**752,763**	**752,694**
GP	299,416	416	134,601	716	59,767	12,834	1,022,984	**1,406,445**	**1,450,009**	**1,530,018**
KZN	494,048	182	369,496	18,605	124,941	32,040	2,282,246	**2,931,722**	**3,119,502**	**3,302,953**
LIM	373,333	138	109,992	5,726	51,306	12,353	1,358,313	**1,751,512**	**1,802,325**	**1,905,435**
MPU	168,060	61	82,922	976	27,041	5,617	690,944	**901,386**	**924,958**	**974,645**
NW	205,720	40	103,787	2,069	40,606	8,946	661,807	**1,001,629**	**982,904**	**1,020,906**
NC	63,351	64	46,681	3,267	15,094	3,790	200,387	**232,102**	**303,974**	**329,367**
WC	193,662	364	137,985	7,376	28,331	7,960	516,328	**790,344**	**821,760**	**884,630**
Total	**2,390,543**	**1,500**	**1,286,883**	**46,069**	**474,759**	**107 065**	**8,765,354**	**11,983,141**	**12,386,396**	**13,026,104**

[6] For more information visit: http://www.sassa.gov.za/HOME-613.aspx

The South African Social Security Agency (SASSA) also reports that in general there has been a growth in the rate of beneficiaries accessing social grants in both the Limpopo and Mpumalanga Provinces (see Table 2), Mpumalanga Province having one of the highest growth rates.

Table 2. Growth in the number of Social Grants by region (SASSA, 2010)

Province	April	May	June	Growth	Growth %
EASTERN CAPE	2,488,615	2,499,301	2,515,729	27,114	1.09
FREE STATE	834,723	839,611	843,992	9,269	1.11
GAUTENG	1,704,100	1,720,081	1,735,234	31,134	1.83
KWAZULU-NATAL	3,573,346	3,546,612	3,584,255	10,909	0.31
LIMPOPO	2,050,710	2,051,096	2,071,762	21,052	1.03
MPUMALANGA	1,034,533	1,043,936	1,053,957	19,424	1.88
NORTH WEST	1,086,954	1,092,588	1,104,109	17,155	1.58
NORTHERN CAPE	364,610	365,957	367,596	2,986	0.82
WESTERN CAPE	1,046,209	1,062,294	1,065,121	18,912	1.81
Total	**14,183,800**	**14,221,476**	**14,341,755**	**157,955**	**1.11**

Socio-Cultural Context

Culturally speaking the Greater Kruger Area is richly diverse. The Limpopo and Mpumalanga provinces which make part of this region are dominated culturally by the peoples of the Shangaan[7], Pedi[8], amaNdebele[9] and tshiVenda[10] cultural groupings.

A large part of the case study area is governed by traditional leadership (especially Bushbuckridge and surrounds). This traditional leadership is mainly patriarchal (Thornton, 2002) and as a result, in some instances, have an impact on gender equality in relation to land ownership. The leadership structures have been heavily influenced by the past especially the Apartheid vision of land division into Bantustans and by placing their own political leaders (those in alliance) in positions of power (Thornton, 2002). Today however, the traditional leadership still plays an important governing role in the area (see Image 1).

The Greater Kruger area is also characterised by rich spiritual beliefs regarding nature and especially water. Cultural traditions such as found in this area regard water as sustenance for both physical and spiritual life (Bernard, 2003). Here water, river systems

[7] Generally including the Shangaan, Thonga, Tonga, and several smaller ethnic groups they make up approximately 1.5 million people in South Africa.
[8] The Pedi are Sotho speakers, the second largest African language group in South Africa.
[9] The amaNdebele is classified as one of the Nguni 'tribes' which represents almost two-thirds of South Africa's Black population.
[10] The tshiVenda is a smaller group, however they have managed to preserve much of their culture and tradition.

and riparian zones are often infused with cultural and spiritual meaning where human ancestors and zoomorphic spirit manifestations such as the snake and mermaid are said to reside in water (Bernard, 2003). Due to the cultural meaning attached to many of the rivers, pools and water sources in Southern Africa, they have gained sacred status which in turn has had implications regarding their profane access and utilisation. For example, in the Phiphidi Falls in the Limpopo Province of South Africa the Vha-Venda maintains good relations with their spiritual ancestors by placating the water spirits who reside in the Falls by leaving beer and grain on a sacred stone near the top (Zenani & Mistry, 2005). The reasoning behind this behaviour is that if they foster good relations with their ancestral spirits they will be granted good rainfall during the year which would sustain their agricultural and livelihood practices (Zenani & Mistry, 2005).

Image 1. Image of precautionary notice in Limpopo Province with regards to deforestation – particular emphasis on the support given to the cause by the Traditional Leaders.

Another good example of such cultural and spiritual beliefs is the belief in the rain-making powers of Modjadji the rain-queen and transformer of the clouds. The Kingdom of the Lobedu has existed since the 1600s and while certainly not the largest, wealthiest, or most aggressive kingdom it has survived with their queen revered, even by the colonists who invaded their land (Krige & Krige, 1943). The main reason for this

miraculous survival is situated in the apparent power Queen Modjadji holds over the rain (not only to make rain but also to withhold rain). Her would-be enemies, keenly feeling the pressures of drought and rather than threatening her people, paid tributes.

This section has provided a summary of the case study area and a preliminary justification for its selection criteria. The Greater Kruger area, and particularly, the areas of Bushbuckridge and Hazyview, is suitable because of the centrality of conservation to the Kruger National Park and surrounding private game reserves and concessions. Moreover, complex socio-cultural, economic and political terrain overlay environmental issues of conservation, which may lead to varying understandings of how conservation is perceived, the degree to which people care about it (or can afford to care), as well as the degree to which people act on it. The choice of case study area has also facilitated collaborative partnerships with the University of Johannesburg's Department of Anthropology and Development Studies as well as other institutions. Additionally, it is closely linked with an existing WRC-funded project on institutional landscaping with both projects benefiting from the other's input.

METHODOLOGY

Approach

In order to gather perspectives from a multiplicity of actors, a multi-method approach with an emphasis on qualitative methodology was employed, based on a case study descriptive-analysis of the Mbombela and Bushbuckridge municipalities. The participant pool comprised of school children, professionals within various environmental and/or governmental institutions, informal trade vendors, part-time farm labourers, as well as unemployed individuals. Additionally, this study adopted a mixed-method data collection strategy consisting of semi-structured and theme-based interviews, questionnaires, and participatory approaches such as focus groups, and participant observation techniques to determine the relationship between the "Knowing, Caring, Acting" dynamic of conservation (Nortje *et al.*, 2008).

Method (description of fieldtrips, research techniques)

Research Techniques

Interviews: Interviews are one of the most widely used methods for data collection in qualitative research. Interviews are a good way of accessing people's perceptions, assigned meanings, and definitions of situations and constructions of reality. This research made use of semi-structured interviews as one of its methods. Semi-structured interviews are based on a clear plan, but also characterised by a minimum of control over

the informants' responses (Legard *et al.*, 2003; Bernard, 1995). The semi-structured interviews were guided by a research schedule/guide (Appendix E).

Questionnaire: A questionnaire (Appendix G) was developed and administered in order for the team to solicit input from school children relating to the questions the project is interested in. The team approached various classes (under the supervision of a teacher) at a time and administered the questionnaire.

Focus Groups: A focus group or group interview is a useful way of gaining insightful information from a group of people in a short time. More specifically, what makes a focus group advantageous to the data collection process is the interaction between people and the 'real-time' reaction of people during the session (Punch, 1998). The team held three focus groups with locals from the Hazyview region. Initially the team had only planned two focus groups; however three opportunities presented itself for focus groups. The first (chronologically) focus group consisted of young and middle aged women only, the second consisted of a variety of men and women of different ages and the last of women of a various age groups but with the majority being 'elders' in the community. (See Appendix F for themes addressed by the Focus Group discussions)

Fieldtrips

Field trip #1: The first field trip took place between 14 and 18 September 2009. The focus was to get feedback from school children through questionnaires, as well as stakeholders in institutional positions. The project team spoke to a member of an environmental activist group, a member of a canal association, two school teachers and staff at the Bushbuckridge and Mbombela municipalities (see list of respondents in Appendix D).

Field trip #2: The second field trip took place between 9 and 11 November 2009. The focus of this field trip was to complement the findings of the first trip by obtaining "community responses" from members in several peri-urban communities in the Mbombela and Bushbuckridge municipalities. A total of twenty two semi-structured and theme-based interviews, as well as three focus groups were conducted. Interviews and focus groups were conducted in siSwati, isiZulu, isiTsonga, and/or Setswana translation utilizing student translators. The participant demographic pool comprised of mostly women over the age of 30 years, unemployed or home-based care givers, informal trade (i.e. curio) vendors.

Interview Consent Form and Interview Cover Sheet and Checklist

Informed consent means that the people and organisations that is asked to take part in the study or project understand that they are voluntary participants in a study; that their privacy will be maintained; how the research team plan to carry out the research; the

purpose of the project; how the information gathered will be used. Researchers may get informed consent through a written or oral statement which briefly outlines the answers to these five points above. This project used an Interview Consent form (see Appendix H) in all circumstances where it makes sense to do so, in the other cases informed consent was obtained orally.

FINDINGS

The findings are arranged according to the responses sought during the two fieldtrips, i.e. institutional, school children, "community", as well as the research techniques employed, i.e. interviews and focus groups. Please note that the findings are written in such a way as to complement the research process utilised in the field. Thus where interviews were used findings often take the form of a narrative, however where the questionnaires were used percentages are quoted although we also make an effort to quote some of the respondents.

Field trip #1: Institutional findings

The following section elaborates on findings in main issue-areas held by stakeholders in institutional positions. These included, for example, an environmental activist, San Parks representatives, and staff at the Environmental Desks of the Bushbuckridge and Mbombela Municipalities, as well as representatives of the Sabie River Canal Association.

Activism

Jacobus Pretorius[11], a member of several environmental activist groups, spoke of his efforts to oppose the activities of mining companies in the Delmas and escarpment areas. The "*absolute deluge of applications*" after the start of the implementation of the Mineral and Petroleum Resources Development Act (2004) has led to the formation of several activist groups: the Mpumalanga Lakes District Protection Group, the Ermelo and Wakkerstroom Protection Groups and the Wonderfontein Community Association. He argues that several cases have been taken to court and attempts are being made to influence high-level business and government decision makers (for example by engaging with key players who are able to influence them).

The rise in environmental activism in the coal fields area in the Mpumalanga Province is indicative of the increasing disgruntlement of land owners, farmers and residents living in the area with the effects of coal mining on water resources and the quality of soil (which is important for agricultural activities). This links concerns around freshwater conservation to the pollution and environmental damage caused by mining operations.

[11] Respondents were given a choice of whether their real names can be used or whether they would like to remain anonymous. As such real names are used unless otherwise specified with an *.

The value of water – problems of pollution and scarcity

Findings relating to the value of water centered around the problem of pollution, scarcity and the linkages with the fluidity of water, i.e. upstream-downstream "*flows of polluter responsibility*." According to Jacobus Pretorius, South Africa has "*a very limited supply of less contaminated water*", or as Godfrey, a teacher at a local secondary school told us, "*It is impossible to care for water if you don't have any!*" Freshwater conservation according to Vusi Zwane from the Mbombela Municipal Environmental Desk, has to do with "*not polluting*" and "*looking after the streams*". It is important to highlight the perceptions that water resources can be used, but responsibility should be taken to clean this water before re-releasing it into the natural water course (Godfrey, 2009; Pretorius, 2009). Here problems arise around water treatment of polluted mine water (which is very expensive as treatment plants have to be rebuilt every 15 years), and around evaporation techniques used for mining operations which affect freshwater systems as a whole (Pretorius, 2009).

Contaminated water (containing sewerage), rather than polluted water (containing litter), is a concern for Darryl Cross from the Sabie River Canal Association. Contamination affects water users, conservation areas and water-based recreational activities (Cross, 2009). There is a need for technical capacity in South Africa to be improved. This includes the need to improve and repair, where necessary, filtration devices, pump systems and sewage works (Cross, 2009; Pretorius, 2009). The "polluter pays principle", which is found in legislation, should be much better applied than it currently is, rather than pollution being externalised (Pretorius, 2009) and there is a need for South Africa's National Water Act to be properly implemented says Craig McLoughlin from SANParks . The externalisation of costs is being fuelled by the perception that water is "free and cheap" (Pretorius, 2009).

An additional factor is that all water in South Africa is currently over-subscribed, which begs the question of where additional water will come from when demand for water rises even more (Cross, 2009; Pretorius, 2009). Any new water use which is approved to replace an existing one will have to be more sustainable than the one it is replacing. Although efforts are being made in parts of the study area to provide more water to households (Hlobela and Mahlalela, 2009), overall there does seem to be a problem with service provision and capacity at the municipal level (Hlobela and Mahlalela, 2009; Zwane, 2009). Individual farmers in the Hazyview area are making an effort to conserve water through methods such as using a "drip" irrigation system (Cross, 2009). However, there is a concern about institutions related to the National Water Act (such as Water User Associations that would give farmers a united voice) not being up and running yet and mechanisms such as the licensing system not being properly applied (Cross, 2009). Similarly methods of increasing South Africa's water supply need to be looked into. These

include inter-basin transfers and desalination plants (Cross, 2009) and water recycling measures (Godfrey, 2009, Hlobela and Mahlalela, 2009).

There is also a need to stop illegal fishing activity in the Hazyview area. Offenders can only be apprehended by poaching units linked to the government if caught in the act, which has had a limited success rate. There is also little awareness or education about the effects of poaching (Cross, 2009).

The value of soil

The rich kind of soil suitable for agricultural production also happens to be where coal deposits lie. There is a concern, as it can take up to 120 years for soil to be naturally rehabilitated once a coal mine has closed and there are questions around the agricultural productivity of the soil post rehabilitation (Pretorius, 2009). This is a concern for farmers who need to conform to strict standards to sell their produce to clients such as Woolworths or the European Union (Pretorius, 2009).

The need for a holistic picture

Findings also reveal the need for an integrated and holistic picture of conservation planning and industry development. In essence, relevant government authorities should not consider mining applications one by one, but rather construct a holistic picture of developments taking place in a particular area (Pretorius, 2009). This also holds for freshwater conservation initiatives in general. Freshwater conservation should be viewed as more than just a biophysical challenge. The adaptive management of catchment areas as a whole should be addressed as part of an integrated approach that also includes socio-economic and political factors. SANParks has such an understanding (McLoughlin, 2009). Plans such as Spatial Development Frameworks or Environmental Management Frameworks could be useful here. It is also important to involve different sectors (water, economic, mining and environment) due to the considerable long-term economic implications of treating mine water and rehabilitating the environment (Pretorius, 2009).

Other initiatives

There are numerous organisations which focus on freshwater conservation initiatives. These include the *Save* and the *Vaal Initiative*, activist groups dealing with sewerage and James Harris from the Democratic Alliance (Pretorius, 2009), as well as AWARD, focusing on wetlands, SANParks also has school initiatives where children are taught about conservation (McLoughlin, 2009). Bushbuckridge Municipality and Mbombela Municipality have environmental programmes (not necessarily linked to rivers) that encourage residents to pick up litter (Hlobela and Mahlalela, 2009; Zwane, 2009).

Field trip #1: School Findings

Questionnaire responses from 231 learners in total were analysed. These included 23 grade 7 learners from Skukuza Primary school, 57 grade 11 learners from Lowveld High School, 96 grade 10 and 11 learners from Phatfwa Secondary School, and 55 grade 10 and 11 learners from Rindzani High School.

Image 2. Fieldtrip #1: School children filling in the questionnaire.

What do you understand with freshwater conservation?

From responses gathered pertaining to what the respondents understand by freshwater conservation, almost 80% of the Skukuza and Lowveld learners showed a "fairly good" understanding of conservation as perceived in the scientific/epistemic community[12]. This percentage increased to 96% of respondents from Phatfwa and decreased to 71% from Rindzani. An average of 1.2 issues per respondent was mentioned; per school the average ranged between 0.8 for Lowveld and 1.5 for Phatfwa.

Main issue areas raised can be summarised as follows (see Figure 9). Human health related issues made up 23.2% of the total number of issues addressed (44% of the respondents), with a further 16.8% addressing other human needs and uses (32% of the respondents).

[12] See Chapter 1, in the section that deals with finding a definition of conservation.

Water quantity with the focus on saving water was addressed by a third of the respondents (17.2% of all issues mentioned). Water quality with the focus on keeping water clean by 22% of the learners (11.6% of the total number of issues addressed), and a further 21.5% of the learners (11.2% of the total number of issues addressed) mentioned the need to have access to clean water for human need and/or that the water should be cleaned before use .

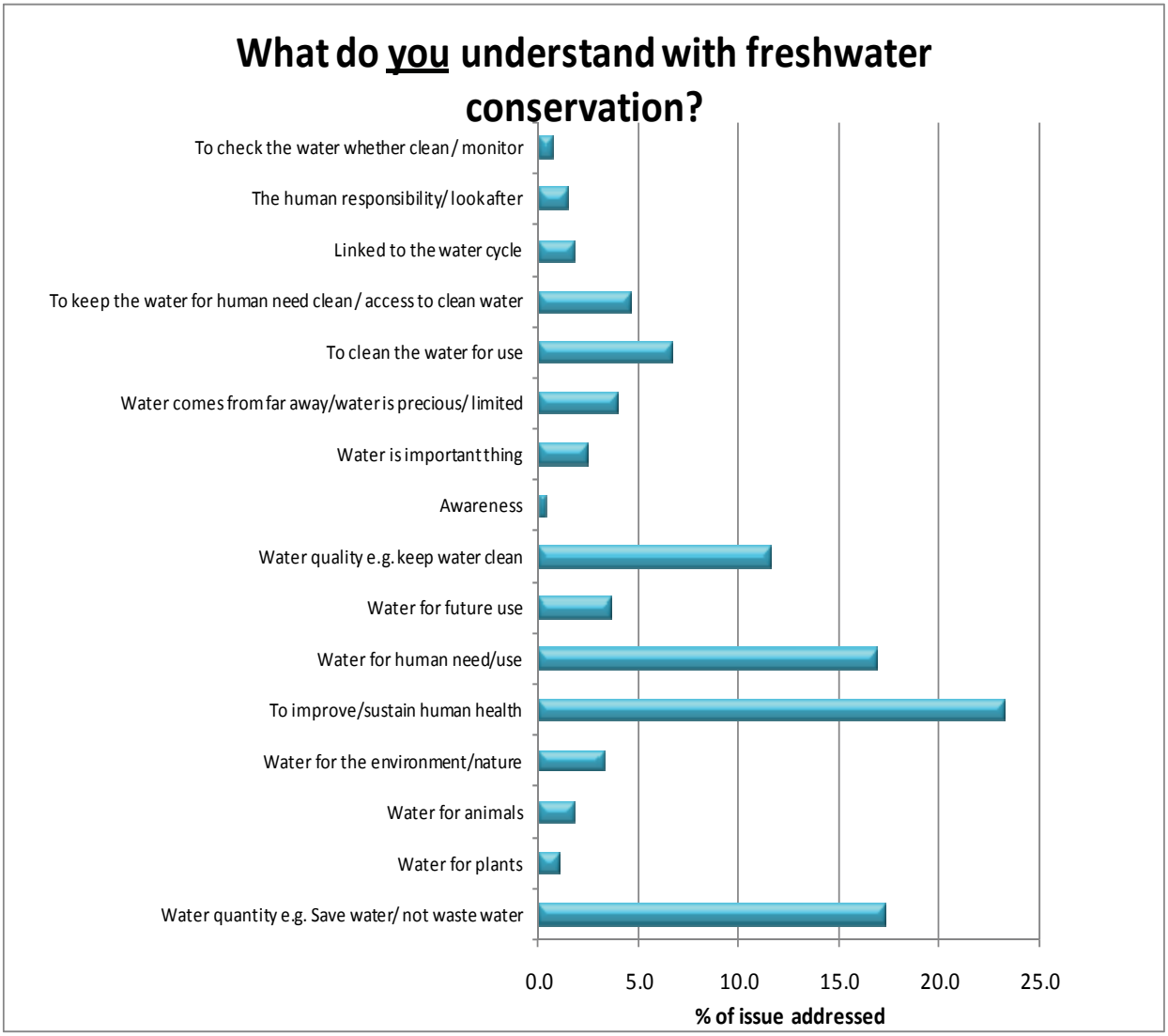

Figure 9. Percentage of issue addressed with regards to the question: What do you understand with freshwater conservation?

Other items listed as forming an understanding of freshwater conservation, and expressed as a percentage of the total number of issues addressed, are: the environment, plant and animal life (6.0%), future use (3.5%) and awareness (4%). While the overall expression of water for future use was low (6.7% of total number of respondents and 3.5% of total number of issues addressed), it was mentioned by 22% of the Skukuza respondents (14% of the total number of issues addressed). The same

applies to water for the environment and plant and animal life: in Skukuza 22% of the respondents (14% of the total number of issues addressed) addressed this issue, followed by Phatfwa with 12% and 8%, respectively.

Responses ranged from innovative ideas on how to solve the water shortage in the country to a concern about people's attitude towards water. Innovative ideas included the following:

> *"Conserving all the fresh water and then distributing it evenly and to areas which have a shortage of fresh and clean water"*
>
> *"... Prevent over-exploitation of our water resorces..."*[13]

Concern about people's attitude towards water included for example:

> "*...people still don't understand how important [water] is..."*
>
> "*... Water is precioius and people who have access to clean and fresh water take it for granted by wasting and over-using the priviledge of clean and fresh water ...".*

Several respondents showed a realization of the dependence of humans on our water resources and thus the importance of conserving our water resources, for example:

> *"...we need water to live and water come from the rain and goes in to the sea and from the it goes in to the rivers and from the te are taps taps that supplie to us and we need to take care of our water because it is important"*
>
> *"Conserving all water resources that are not salty. Cleaning, taking care of rivers, lakes, underground water tables, etc."*

Some respondents understand the importance of caring for the environment, for example:

> *"...if look after fresh water you will keep living things health"*
>
> *"I understand the fact that we need to keep the waters clean around our environment"*
>
> *"Fresh water is the place where fresh [fish] live".*

Human health related issues feature strongly, for example:

> *"its a way of protecting us from geting any sicknesses that dirty water might have"*
>
> *"clean water, it doesn't have germs or other things that can make our water dirty. And it hasn't polluted"*
>
> "*Fresh water is water that has been searched and has no germs on it such as mineral water. This water is good to be drink you woont have the thing called cholera"*
>
> *"... Is to conserve water for the health status of a human being and all living things"*

[13] Please note that these quotes are given here as written by the learners this include spelling and grammar.

"Water that is conserved for all people living in the world so taht we all receive clean water. Not water from streams and dams because they are not health enough"

"*Is that if you save water and protect water, we will have water and we won't drink dirty water witch [which] will give us deases [diseases]".*

Respondents from the rural areas that do not receive tap water in their homes are very much aware of the everyday challenges of having a safe water supply, for example:

"... Not exposing it to flys and other creature that can keep it unclean"

"Water that is conserved for all people living in the world so taht we all receive clean water. Not water from streams and dams because they are not health enough"

"... We must stop the pollustion of water and we must protect our lakes so that animals do not drink from where we drink. And that we must not wash our clothes inside the river or throw waste products"

"We get water from the tank and the water come from the river. And we must clean the tank and water every day... When we are not clean the water we can get diseases because of dirty water".

Respondents also expressed the view that those with easy access to clean water do not use it sparingly enough, for example:

"...freshwater conservation ...is no wasting water. People who are conserving water are the ones who are strugling to get it/water."

"... Water is precioius and people who have access to clean and fresh water take it for granted by wasting and over-using the priviledge of clean and fresh water ..."

Despite broad awareness of what is considered to be wise use, several respondents acknowledged that their basic knowledge of freshwater conservation is lacking, for example:

"I clearly understand nothing about fresh water conservation"; "I don't have any idea about water conservation because is the first time I heard about it".

Some respondents also showed an understanding of the concept of conserving water for future use, for example:

"that people should take care of water so that we can have fresh water when we older"

"Ons moet dit bewaar voordat daar niks meer oor is nie"[14]

Several respondents do not seem to see a link between the environment and freshwater conservation, for example:

"...water come to the different taps ..."

"It is the spring water that you paying in the shopping ..."

Some respondents recognise the responsibility of humans towards the conservation of our water resources, for example:

"That we must look after it and protect it and not pelute [pollute] it".

[14] Our translation: "We have to conserve it before there is nothing left"

What do you think caring for or looking after our water means?
An average of 1.5 issues per respondent was addressed; per school the average ranged between 1.8 for Lowveld and 1.35 for Rindzani.

The majority of respondents (53.2%) related “caring for or looking after our water” to saving water and/or not wasting water (21.6% of the total number of issues addressed). Closely related to this issue was the careful use of water (or not misusing water) where 22% of the respondents (9% of the total number of issues) addressed this issue. Forty one percent of the respondents thought that "caring for or looking after our water” means that water should be kept clean and not be polluted (17% of the total number of issues addressed in this section). Human related issues were also frequently mentioned (a third of the total number of issues addressed and more than 80% of the respondents), i.e. a third of the respondents mentioned items linked to human health (13.5% of the total number of issues); 22.7% mentioned other human needs (9.2% of the total number of issues); and 25.5% of the respondents mentioned that water is needed for life (10.4% of the total number of issues addressed). Ten percent of the respondents relates “caring for or looking after our water” to taking care of or not destroying the resource, e.g. wetlands (4% of the total number of issues addressed). Almost 9% of the respondents (3.5% of the total number of issues addressed) think cleaning water for human use as a way of “caring for or looking after our water”. Other issues addressed include saving water for future use (6.4% of respondents; 2.6% of total number of issues), and that water should not be played with or used for recreation (6.4% of respondents; 2.6% of total number of issues).

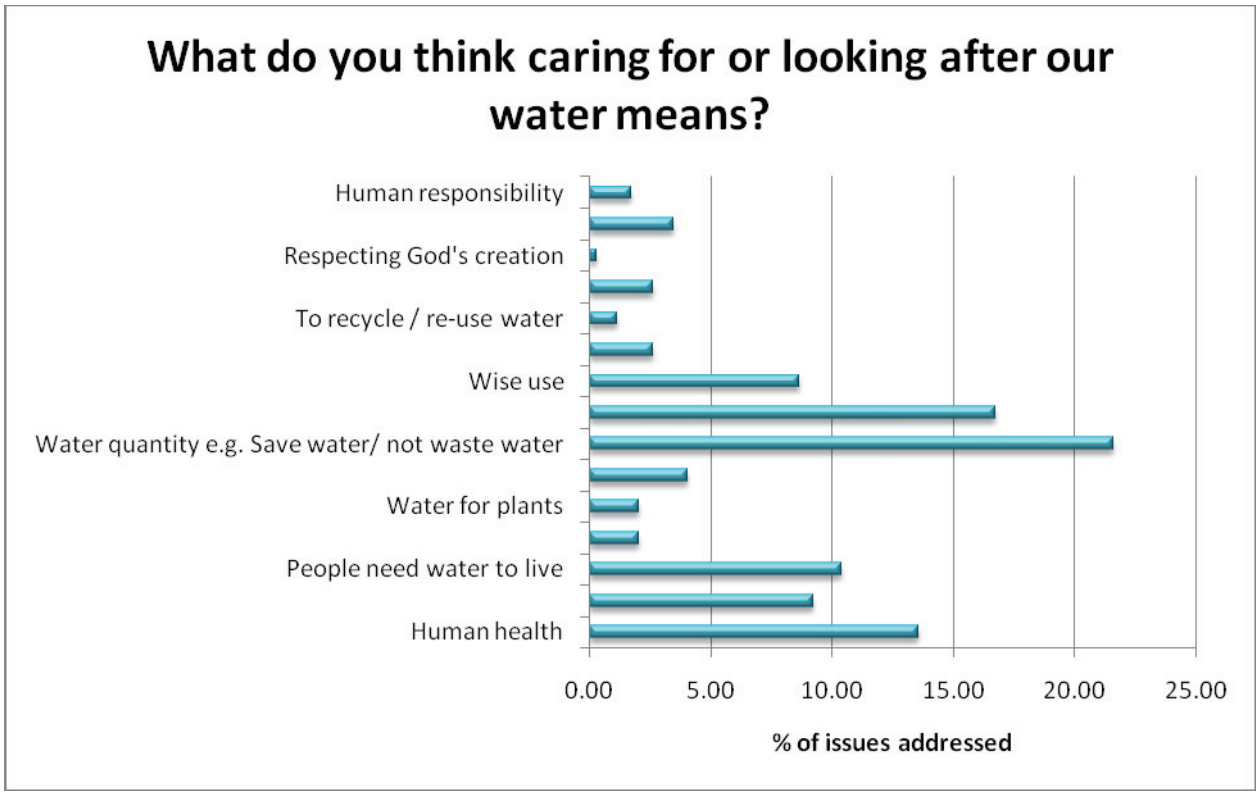

Figure 10. Percentage of issues addressed with regards to the question: What do you think caring for or looking after our water means?

While some respondents were very specific on what "caring for or looking after our water" means: *"we make restrictions for people not to misuse, pollute water; means respecting God's creation ..."* and *"means to clean the water that is on our dam and river. And not to put waste of oil in our water"*, others were very vague and just addressed the consequences if water is not conserved: *"...if we don't look after our water we will end up drinking unhealthy water...".*

Responses related to saving water included:

> *"... Using water wisely and not wasting it"*;
>
> *"... If you open the paipe [pipe?] and if you are finished you must close the paipe*"
>
> *"It means that we haave to save water because nowadays water are not available at any places. People sufer from water they dont get water near their homes they go and fetch water far from their homes".*

Human related responses (human health and human needs) include the following:

> *"It means alot on our behalf because we care about our health, washings, cooking"*
>
> *"Means that you must look after our water so that you can not get sick"*
>
> *"Is actually caring for ourselves because water is on of the important sources in a human body's life."*

"It means more extended life because if you drink dirty water there will a lot of infections and deaths from diseas liki corella, etc.";

"Is to make sure that we drink clean water everyday and be save for disease like cholera. Looking after our water means that we care about ourself bcause we want to drink clean water everyday and everytime".

While the majority of respondents focused on human related issues, some also recognised animal and plant life as being important and made the link to not pollute the water resource, for example:

"Caring for our water is important becaue water is needed in animals, plants and us as human beings. Is good not to polute water because it can cause deases [diseases] for us".

Other responses include:

"I think it means keeping it pure, not polluting ect. And using it sparingly for future generations"

"... To use our water sparingly so that we still have enough for the next coming years. ... Using the correct chemicals to cleanse it

"we are caring but the water is not clean and health"

"...to make sure people know the importance of preserving water"

"Maintain the natural equilibrium of ecology...".

How would you care for or look after our water?

Sixty three percent of the total number of issues addressed in the responses related to how the respondents would care for or look after our water, and preventative measures such as saving water and not polluting water. A total of 25% of all issues addressed related to after care actions such as cleaning up, or cleaning water for human consumption (13%) and that verbal action such as informing people and protesting (12%) would be a way to show that they "care or look after our water". Eleven percent of the issues addressed related caring for our water to the provision of water for human use: this would include providing clean water for human health, supplying and up-keeping of water infrastructure.

Responses related to preventative measures include:

"fence off wetland from the public; do monthly checks on what bacteria and germs are in the water "

"Ek sal heinings om die damme sit sodat mense nie daarin besoedel nie, ek sal hekke ook daar sit sodat mense R2 moet betaal om in te gaan, en as iemand iets in damme gooi kry hy 'n boete"[15]

"The first thing I would do is make shor [shure] that nobody make it durty [dirty] and then make shor that nobody wastes it, then I would make shor that everyone takes care of the water and does not make it durty"

[15] Own translation: "I would put fences around the dams so that people can't pollute them, I would put gates there too so that people can pay R2 to go in, and if someone throws something in the water they will get a fine".

“...and I will stay out of dams so it doesnt get dirty”;

"Ban any forreign substances (chemicals) from industry from gathering or being poured into rivers."

"...by making sure that big factories with toxic waste products do not dump their waste products into rivers..."

“Put crocs an hippo's n the water so people don't even think of going near the waters. Put an electric fence border around dams. Companies dumping rubbish in the water get a fine. Preach the Goodnews all men get saved in we all get discilined to look after God's creation”;

Innovative ways of saving water include for example:

“I would make my roof gutters to make the rain water run into a tank at my house and use the water to bathe, wash dishes and water the garden, etc.”

"Regular tap servicing... Regular plumber visits..."

"... for toilets to operated by sea water...”

"Use the water more than one[ce] e.g. Take a shower have a container where the water can go and be reused as toilet water to flush the toilet."

"...Create a system in our country that will help obtain no water wastage this sysem will include fines and water cutting for different areas at a time."

The responses addressing after care include for example:

“... I will always put jik id dont trust water...”

“Like when you get water from dams or rivers isn't good for us because it is dirty al the stuff, the thing that you must do is to boil the water untill all the dirty is out then you can use the water.”

"Clean out all pollution by 'sieving' the ponds, lakes, rivers, etc."; "I boil it...[before using for drinking and cooking]...”

Ideas to create awareness include the following:

"... Make people aware of the water wastage in houses as leaking taps and broken pipes”

"...Educate people more about water and establish methods on how water would be saved, something that people would know to use and something easy/simple.”

"educate people about the importance of taking care."

"Communities should set up groups who ensure that there is no pollution in their dams. In the case of a burst pipe - the council should be contacted immediately even though they don't respond instantly."

"make people aware of the situation. Let them know that if they carry on the way that they do, there will be nothing left. Everybody has to work together. You can't do it alone."

"...educating people because they are the biggest problem when it comes to polluting water. And then I would implement my findings in a practical manner in order for the rest to star[t] implementing it too."

"I would first start a water is life campign aimed at informing communities on why are the impotants of saving water, inform them about what will happen if we do not save water. Include students in a water cleaning compign. Make post, bill boards."

Responses linking caring for our water to water for human consumption includes:

"... build a big dam and store all the water..."

"I will build a tank where people can get theri fresj water and also build something where animals will be able to drink and not share the water with human beings. And I will put or build a small tank in the lake(s) so that the water get protected and fresh so that people can drink"

"...and if I did have enough money I would make sure that each country have a clean fresh water"

"...water is something that we cook with. And when the sun is to hot we have to drink water

"I will keep our water safe and clean and keep the water in a safe and clean place so it can be protected from germ and any othe things"

"Like most people use water for what I need it for and that is washing, bathing, drinking, etc."

There are those that seemingly do not care, for example:*"That would be difficult, because I would not be concerned about such situations. My life would not evolve around caring for water or its problems.",* and those that know that they should care, but they do not necessarily know how to care: *"I care a lot about water cause I have learn at school in grade 8 that we can not live without water and it is true that we can not live witout water cause we use water to do a lot of things."*

Some learners understood the importance of having access to clean water, but did not indicate that they know how to care for or look after our water: *"...because I must drink fresh water, but if the water are dirty that means I will sick because of the dirty water, but if I drink clear water I will never sick because the water must be clean...".* This is also clear from the examples provided as reasons why the respondent and others care for or look after water*: "because water you must get on the tap but if water cannot get on the tap must get on the sea or river."*

Do you care or look after our water?

More than 90% of the Skukuza learners felt that they "care or look after our water". While almost 70% of the items listed to prove that they care were related to using water sparingly or not wasting water, 28% were related to no littering and pollution (see Figure 11).

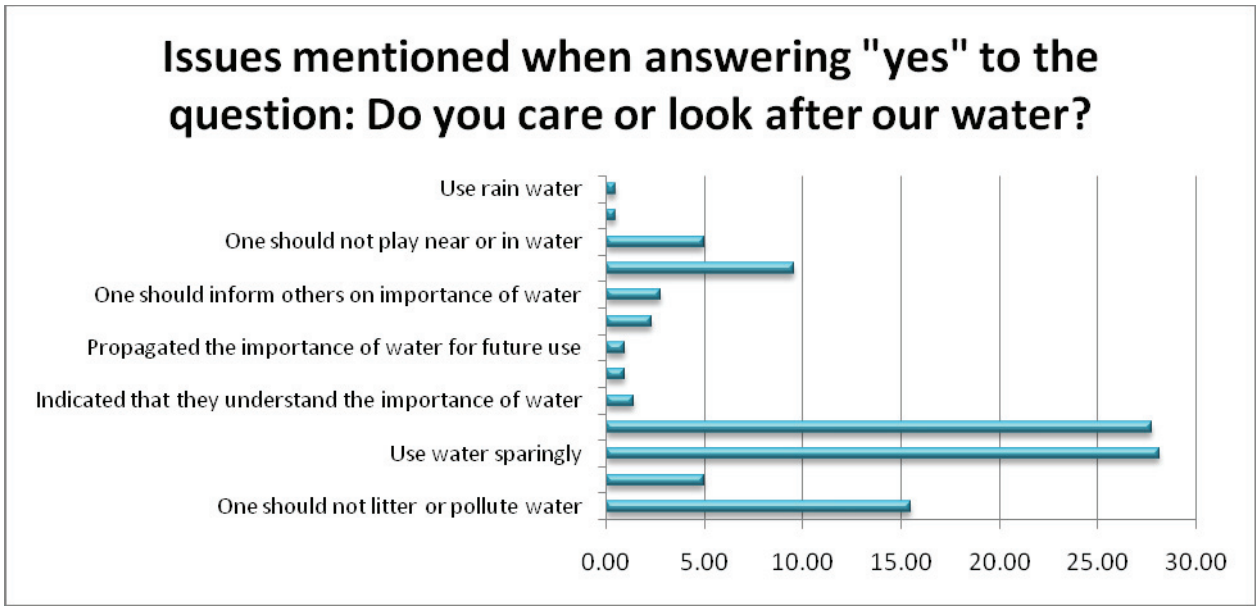

Figure 11. Percentage of issues mentioned when answering "yes" to the question: Do you care or look after our water?

81% of the Lowveld respondents indicated that they "care or look after our water". 72% of items listed were related to using water sparingly or not wasting water. Almost 10% of the items listed address not polluting and another almost 10% that water are re-used or recycled.

Almost 87% of the Phatfwa respondents care: 48% of the listed items made reference to using water sparingly or not wasting water, 16% not polluting or littering and 11.5% that water should be cleaned or boiled before it can be used. A further 6.9% of the items listed address the fact that people should not play near or in water and 4.6% that others should be stopped polluting. Just under 4% of the items address the re-use or recycling of water.

In Rindzani 71% of the respondents indicated that they care. While 37.5% of the items listed address using water sparingly or not wasting, 25% that water should be boiled or cleaned before it can be used, and 15% not polluting or littering.

Overall, 82% of the learners indicated that they care or look after our water. Almost 56% of the listed items address use of water sparingly or no wasting of water, 15.5% not polluting or littering and 11% that water should be cleaned before use. five% of the total number of issues mentioned the re-use and recycling of water.

Responses of those that indicated that they do not care or look after our water include the following:

"because at the place that I stay with did not have water"

"I don't conserve it but I don't litter in it, etc."

"Water is the least of my worries at this current stage in life. I do not have to worry about water bills, my environment or lifestyle is to complex for such worries to cloud me.".

The majority felt that it is not their problem:

"I don't really pay much attention to what happens to water"

"Because I have it and I have not been without water, may be if I was educated about it I would care more."

"... I don't rally think about it because I think I'll always have it around.";

Do others care for or look after our water?

Overall, 38.5% of the total number of respondents thought that others care for or look after our water (see Figure 12). Reasons why respondents thought that others care can be divided into several categories and these differed significantly between the 4 participating schools. In total, 35.2% of all reasons given fall in the saving water category, and 19.3% in the cleaning or purifying for use category. This is followed by the awareness and education (9.1%), protecting for human use (9.1%), not polluting (8%), and re-using of water (8%) categories.

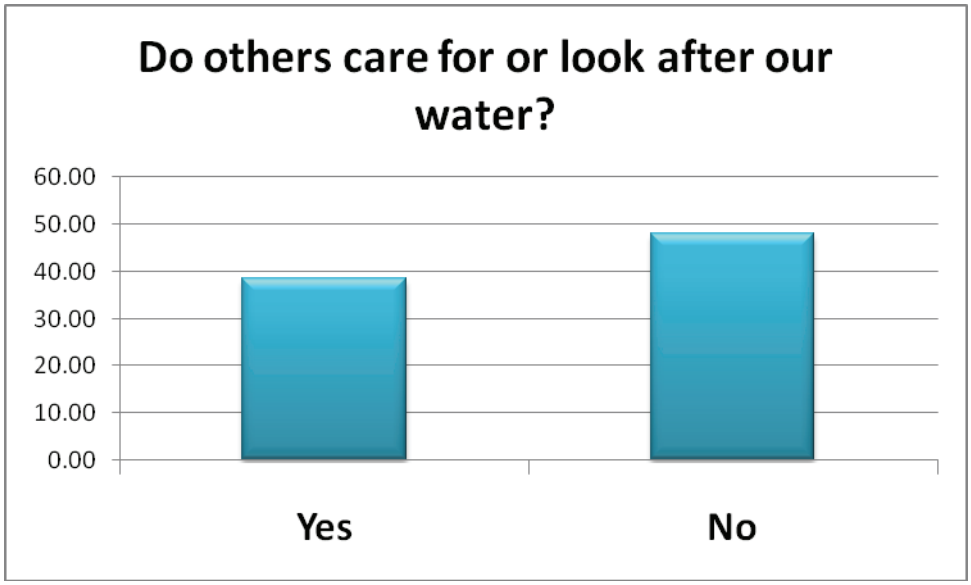

Figure 12. Percentage of learners who thought that others do or do not care about our water

Saving water and using water sparingly form 50% of the reasons why respondents from Skukuza thought people care for or look after our water, followed by awareness and education (30%) and not polluting (20%).

Similarly, 46.2% of the Lowveld school respondents listed people saving water and using water sparingly as an indication that they care for or look after our water. This is followed by awareness and education (15.4%) and the re-use of water (15.4%).

With 39.1% of the listed items, respondents from Phatfwa school also listed saving water and the using of water sparingly as the most popular behaviour that indicate that people care for or look after water. This is followed by the cleaning of water for use (19.6%) and protecting water for human use (13%).

Rindzani school differed from the other schools in the sense that they indicated cleaning water for human use as the most listed human behaviour that indicates a caring for water (36.8% of the total number of items listed). This is followed by the re-use or using of 'grey' water (15.8% of the total number of listed items), saving water and using water sparingly (10.5%), and protecting water for human use (10.5%).

A total of 48% of the respondents indicated that they thought others do not care for or look after our water. The main reason, with 36.5% of the total number of listed items, is that those people are perceived to waste water. People polluting water or dumping waste is second, with 20.4% of the listed items. With 13.9%, the third place is shared between a lack of knowledge and being unaware of the importance of water and a "don't care" attitude.

How can you get other people to care for or look after our water?

More than 85% of the respondents thought that they could change people's behaviour by informing them, telling them or showing them how to look after our water (Lowveld 95.5%; Phatfwa 90%; and Rindzani 85%) (see Figure 13). This percentage is significantly lower in Skukuza school (47.6% of the respondents), where almost 24% of the Skukuza respondents listed items indicating that taking action would get people to change their behaviour (19.2% of all listed items). These listed items expressed as a percentage of the total number of listed items are 13.8%, 2.2% and 12.2% for Lowveld, Phatfwa and Rindzani, respectively.

Taking action include actions such as:

> *"sit hulle water af"*[16]
>
> *"easy pull the plugs (switch off the water) and no water for about two days turn on water for about once every two days."*
>
> *"They must close all the pipes one day and people will never waste water again or make people pay as much money as they can for the water and set dates like Skukuza on when to use water in the gardens."*
>
> *"lay water restrictions ..."*
>
> *"we can hire someone wo has to sit at the tank and look what the people do when they fetching water and when they dont do the right thing he can tell them that what their doing is not good they must do the right things. A person wo qualify to look after our water."*

[16] Our translation: " Cut their water off"

"the government must decide tht if the people do not look after water they will close the taps...".

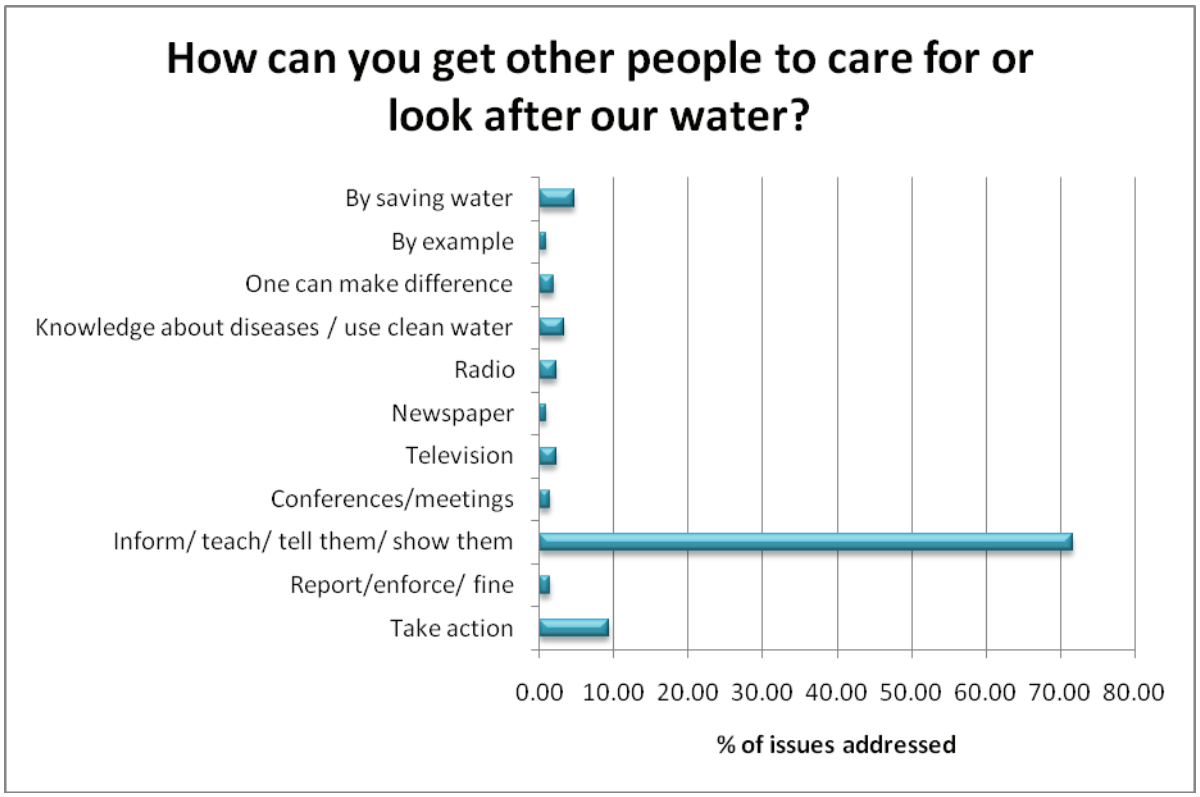

Figure 13. Percentage of learners giving their thoughts on how one can get other people to care for or look after our water

There were also those respondents that thought other professionals can help care for water:

"people who know about and they are the professional can help us to take care of water"

Field trip #2: Community Findings (Interviews)

The findings in this section deal with different perceptions on water scarcity among the local community members in Hazyview, which involves perceptions of whether a water scarcity exists and what the possible explanations for water scarcity involve. Apart from perceptions on water scarcity, more general perceptions and knowledge on water is also explored, specifically knowledge on water quality and dangers to water, as well as how water is viewed and valued. Lastly the attitudes and values related to water conservation behaviour is examined by looking at what the people in Hazyview perceive to be good water conservation behaviour, as well as at what their actual behaviour constitutes.

Image 3. Fieldtrip #2: Project team members and participants in the Hazyview area.

Perceptions on water scarcity

For this section respondents were queried about their views with regards to whether there is water scarcity or not. This involved asking them if they think there will be enough water for their children and grandchildren, as well as whether they think water is a limitless resource. During the interviews it was also ascertained whether those respondents who believe there is water scarcity believe this to be a permanent situation or only seasonal, as well as if this is caused by human activities or if it is a "natural" phenomenon.

Overall, slightly more respondents believe there is a water scarcity, with 50% answering that there is scarcity of water, and 41% saying there is no scarcity (for 9% of the respondents no information was gathered on water scarcity perceptions). With the focus groups that was conducted all the participants of one of the groups agreed that there will always be water and that we will never run out of water (ironically this was the focus group who complained the most about not having water. When asked: "Is there any water here?", there was lots of reaction and animated talk with everyone immediately saying "*No, there's no water here*"). The other focus group that was asked about whether we would always have water could not agree, with some participants saying that water would never get depleted, as past generations have been using water and there "*is no way it can go finished*", while other participants argued with them as they said that rivers can run dry and therefore water "*can go finished*".

Anna, a 50-year old street vendor, doubts whether her grandchildren will have sufficient water as "*the water is getting less*". Lucy, a 31-year old street vendor, agrees with Anna

that there will not be sufficient water as "*even at the moment it is not enough for them*". Another Anna, a 60-year old pensioner, also believes there will not be enough water for their grandchildren stating that:

> "*from my observation rivers run dry, I do not think future generations will have water because rivers clearly does run dry. If that happens it would clearly be the end of us, because water is life and we cannot live without it*".

Respondents were also asked about what they as a community would do if it does not rain enough in the area. Many of the older respondents told how they used to go to a mountain called "Sganda" when the chief decided they had to go, and then they would pray on the mountain, to ask God to bring the rain. According to Linah, a pensioner, this does not happen anymore, which would explain why the younger respondents, when asked this question, simply answered that they do nothing; or as 18-year old Valencia said: "*I don't know what can we do. Rain is a natural thing, so no-one can do something about rain"*.

For those who do not believe that there is a water scarcity usually expressed the belief that there will be enough water for their children and grandchildren, like 60-year old Gogo who do not believe water will ever get finished, as "*we will always have water*". Miriam said "*there will be enough, because you can't live without water, so there will be enough*". Constance and Elizabeth both agreed that if the rain "*keeps coming*" their children and grandchildren will have enough water, with Nimrod and Oli simply saying that there will be enough water. What was interesting about Oli's view is that he related the availability of water to the supply of water, saying that water will never get finished and will always be available because "*they (i.e. government) will never close the water*". This indicates that Oli acknowledges that water is a basic human right.

There are a number of different factors which can influence perceptions about a potential water scarcity, as well as the reasons given by those who believe that there is water scarcity. These factors include age, gender, formal education, and lifestyle/livelihood[17], it is these factors that will be used further to analyse the interview data. The following figures[18] give an indication of how influential each of these factors can be in influencing perceptions on water scarcity in Hazyview.

[17] For this study, gender is not included in the figures which follow as the sample contained only three men and is therefore not a sufficient number to compare with women

[18] It should also be noted that these results only pertain to the respondents of the interviews and not to the focus group participants. Also, for all the interviews which were conducted there were two research teams doing the interviews independently from each other. As the interviews were semi-structured there were cases where the same questions were not always asked for all interviewees, therefore there were interviews for which no information on certain questions is available.

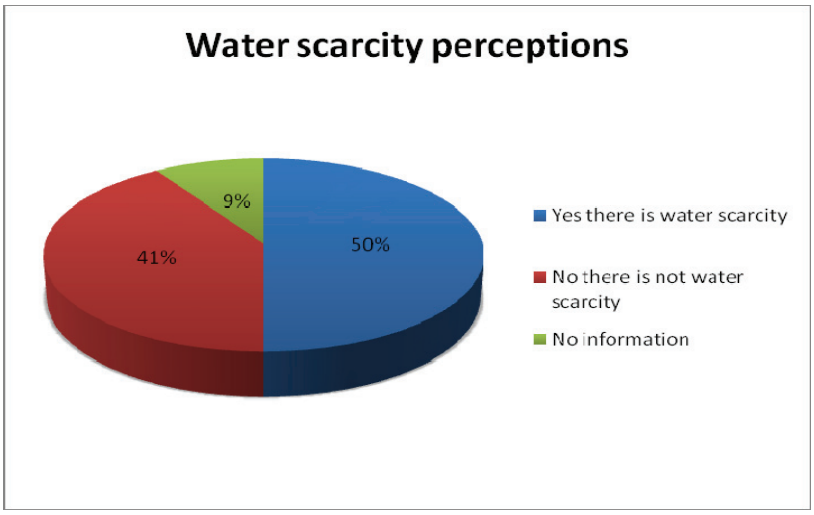

Figure 14. Whether or not people believe there is water scarcity

Figure 14 indicates that, of the people interviewed, the majority agree that there is water scarcity. When that is broken down into age categories, Figure 15 reveals that people between 18-29 years more often answered "yes" to the question of whether there is water scarcity, while for the 30-39 year olds more answered "no"; – for the ages 40-49 year age group the "yes" and "no" answers are equal.

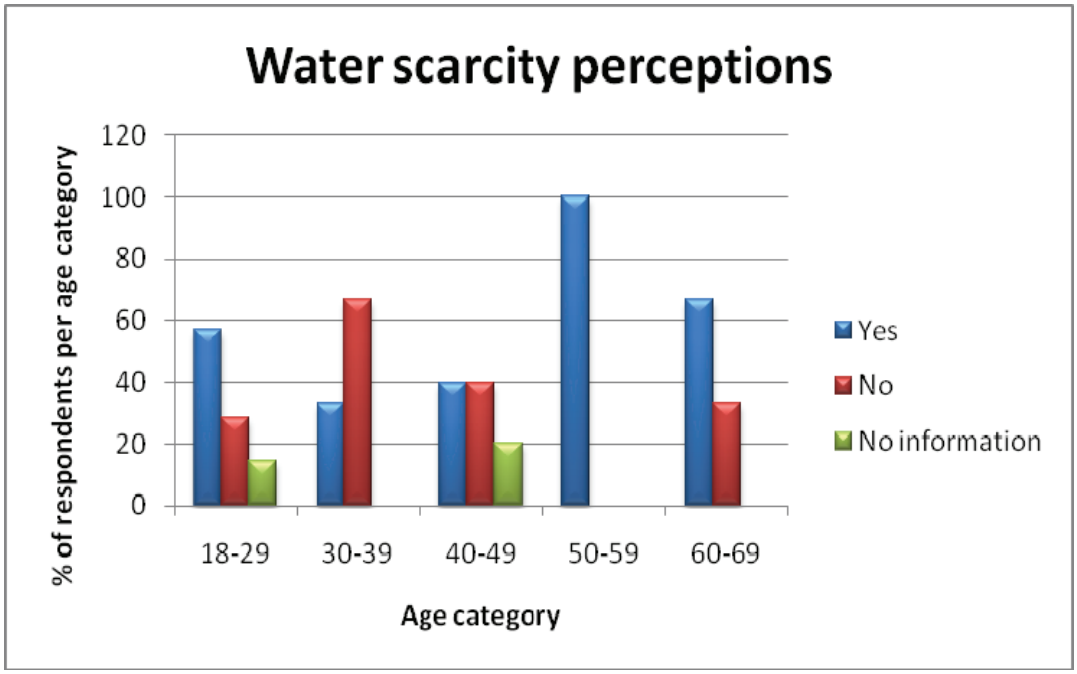

Figure 15. Age category and water scarcity perceptions

The age categories of 50-59 years and 60-69 years correspond with the 18-29 category with more respondents believing there is a water scarcity for these categories. This shows that the categories 30-39 years and 40-49 years do not correspond with the perceptions of the other categories. In the literature (Gronhoj and Thogersen, 2009) it was found that adolescents are less committed to environmental issues than their parents but this is not what this data shows, since the 18-29 year olds have more

awareness about water scarcity than those between 30 to 49 years of age. If awareness leads to more commitment it can be assumed from their awareness that the 18-29 year olds will be more committed to environmental issues than those older than them. This can most likely be attributed to better school education which has been provided to the youth in South Africa more recently, compared to the education their parents received under apartheid. The perceptions of those older than 50 years, which correspond with the views of the youth, can possibly be attributed to their life experience and not to formal education.

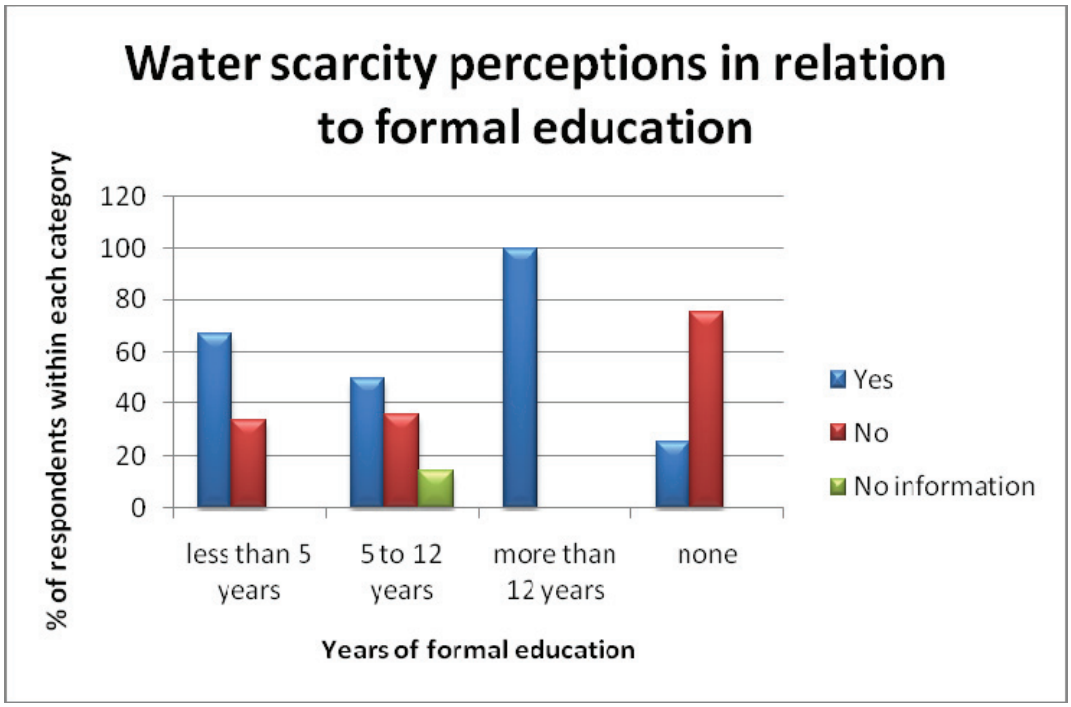

Figure 16. Formal education and water scarcity perceptions

In Figure 16, for the category 5-12 years the data follows the overall trend for "yes" and "no" answers to whether there is water scarcity, with slightly more answering "yes". What is interesting is that it is only for those respondents with no formal education where "no" answers dominate. This data shows a slight trend that those with no formal education tend towards a belief that there is no water scarcity. In the literature, formal education is mentioned as a factor which influences environmental perceptions. However, when comparing Figure 15 and Figure 16 it would seem as if the link between formal education and water scarcity perceptions is more complex than simply saying that formal education influences views on water scarcity. Figure 16 indicates that the current formal education the youth in South Africa receive might influence their perceptions on water scarcity. At the same time life experience and thus age also influence perceptions on water scarcity. Still a larger sample would be necessary to provide more certainty on the link between formal education and perceptions of water scarcity.

Figure 17 shows that livelihoods or lifestyles (together with income) can influence the perceptions and values people have towards water. This study shows that the most significant difference with regards to livelihoods is that those who are dependent on water believe that there are no water scarcity problems, while those not dependent think that there are water scarcity problems. The difference however is very slight and not necessarily significant enough to say that livelihood affects water scarcity perceptions. The reason why those who are dependent on water for their livelihoods might not perceive water as being scarce could be because it would be problematic for them to acknowledge that the resource, on which they depend for their income, is becoming scarce. It might also be difficult for them to gauge. People might also not see a scarcity in water especially if they make no discernable distinction between the quality of water they use. As such, larger quantities of poor quality water would not enter into their perceptions of whether or not there is a scarcity of water.

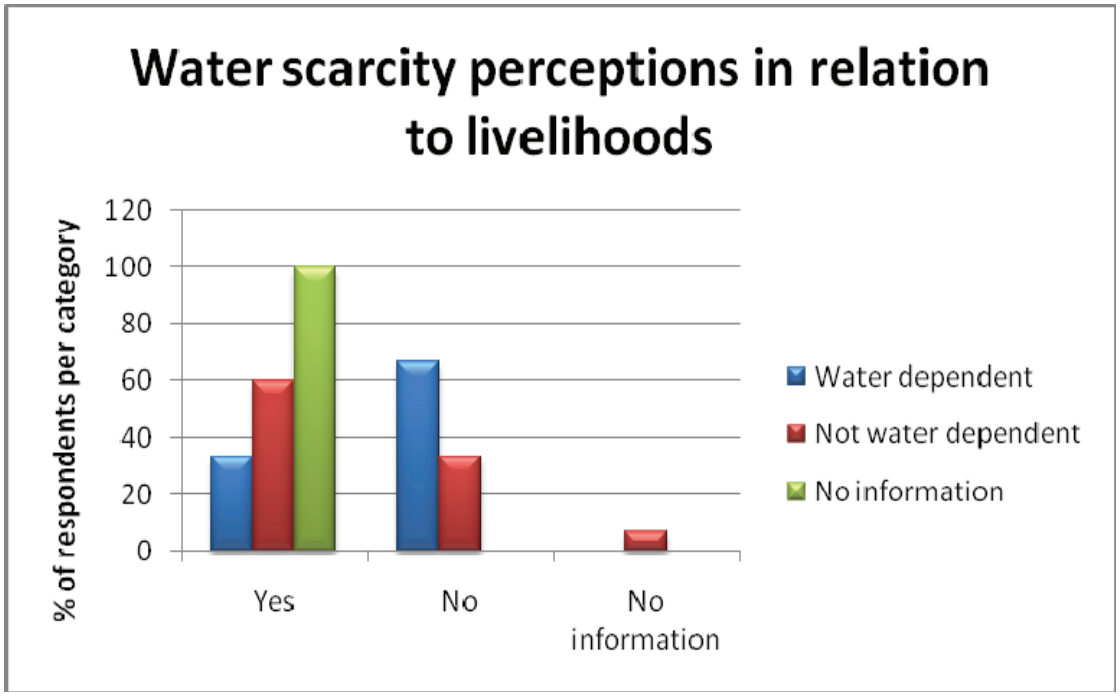

Figure 17. Livelihoods and water scarcity perceptions

Data for Figure 17 indicates that livelihoods or lifestyles (together with income) can influence the perceptions and values people have towards water. This study shows that the most significant difference with regards to livelihoods is that those who are dependent on water believe that there are no water scarcity problems, while those not dependent think that there are water scarcity problems. The difference however is very slight and not necessarily significant enough to say that livelihood affects water scarcity perceptions. The reason why those who are dependent on water for their livelihoods might not perceive water as being scarce could be because it would be problematic for them to acknowledge that the resource, on which they depend for their income, is becoming scarce. It might also be difficult for them to gauge. People might also not see a

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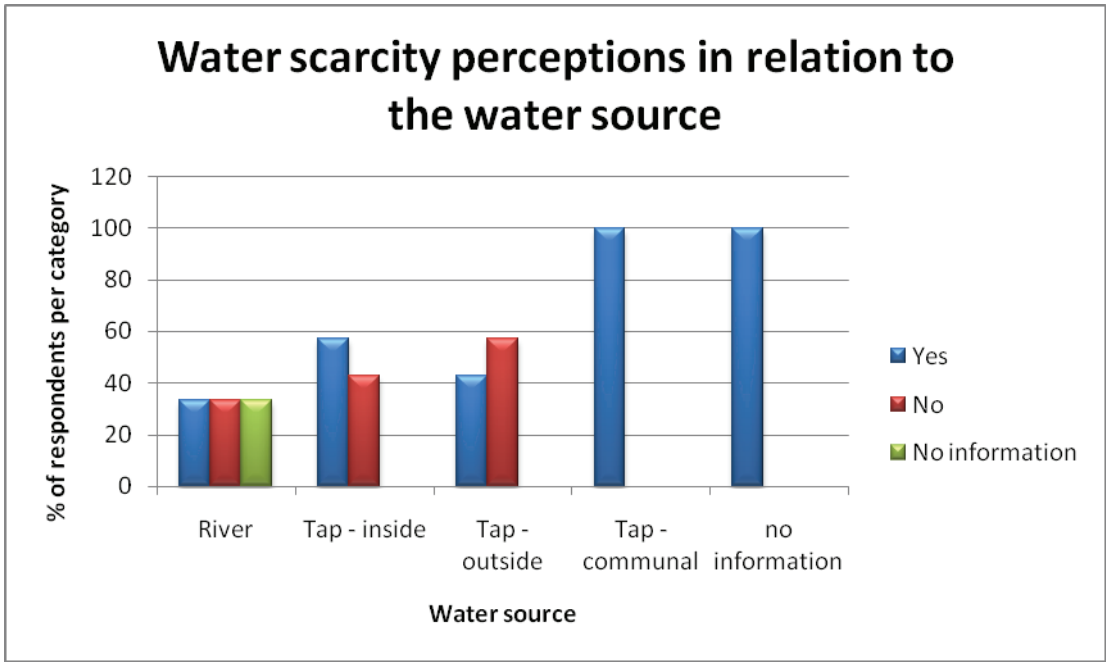

Figure 18. Water source and water scarcity perceptions

When looking at the link between people's source of water and their perceptions of water scarcity Figure 18 shows that the differences between the different sources are slight and not significant enough to conclude that water source influences views on water scarcity. Those respondents who answered in the affirmative when asked about whether there is water scarcity, were further questioned about what they believed to be the reasons for water scarcity, specifically about whether it is "natural" or human-induced, as well as whether it is permanent or seasonal.

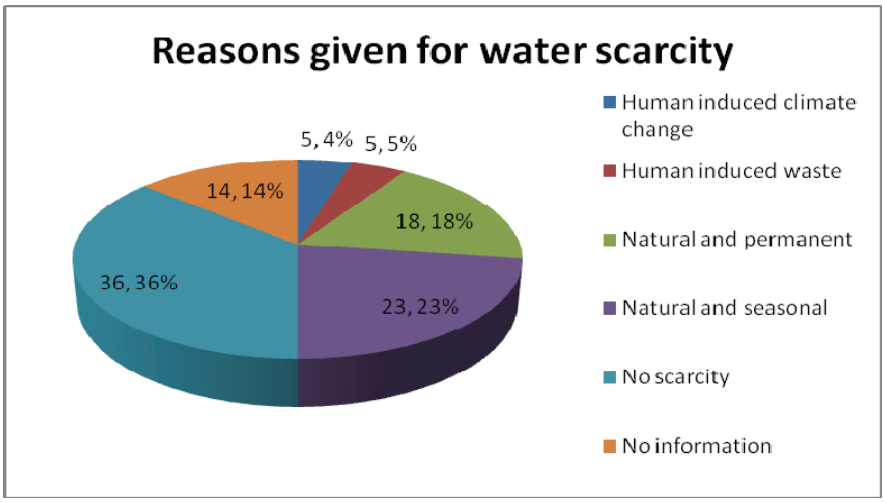

Figure 19. Reasons for water scarcity

For those respondents who believe that there is water scarcity by far the highest number believes water scarcity is due to natural factors and of that, more believe it is seasonal than those believing it is permanent (Figure 19 above). Fifty-year old Anna's answer illustrates this:

> *"there will be less water when it is not raining too much, then there will be less and less, but when it rains then there is water again".*

The rest of the respondents who believe there is water scarcity attribute it to natural factors, with most believing that as long as there is not a drought and the rain keeps coming there will be enough water for their children and grandchildren.

Only two respondents attributed water scarcity to human factors, with one – 18-year old Valencia – believing there is water scarcity because humans are wasting too much water, saying that "*the way we are wasting water, already we are using too much for my grandchildren to have the same as I do have*". Here Valencia's answer indicates that she is picking up that the current use of water might be unsustainable. When 28-year old Mabutho was asked about whether there will be enough water for his children and grandchildren, he answered "*not with this confused climate, I don't think so*". Mabutho's answer possibly indicates local perceptions with regards to climate change.

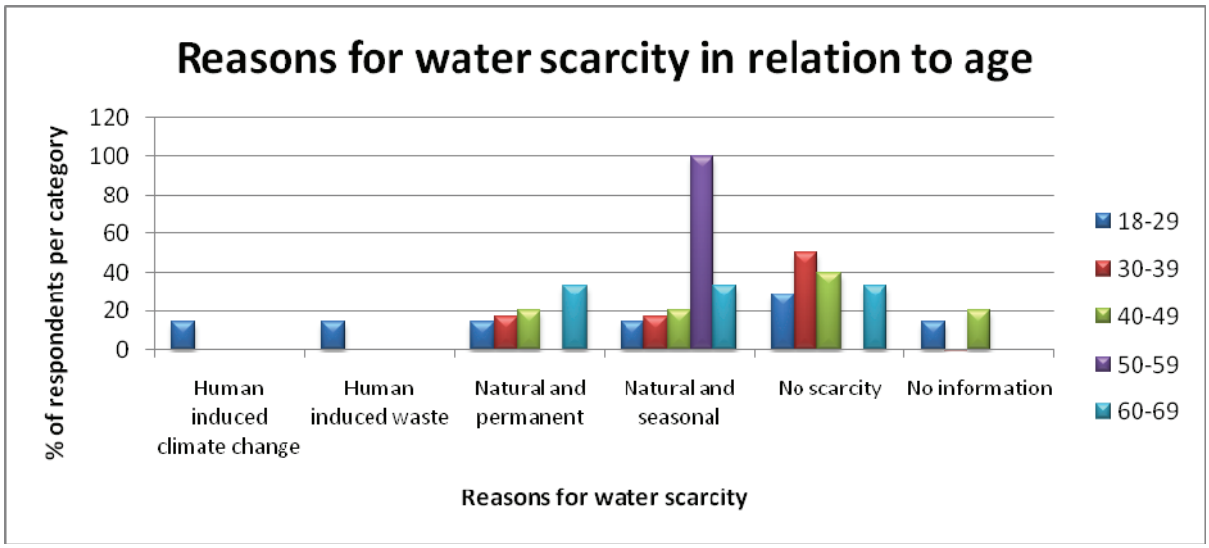

Figure 20. Age category and water scarcity reasons

Figure 20 shows that it is only in the youngest age category, 18-29 years, where reasons for water scarcity are attributed to human activity (for example human induced climate change and waste). Therefore age might influence reasoning behind why there is or is not water scarcity as it seems with this sample that only younger people attribute water scarcity to human factors. This can once again be attributed to better formal education of the younger generation. Similarly it is also interesting to note that it is the older age categories (50-59 and 60-69) where people note natural and seasonal reasons for water scarcity

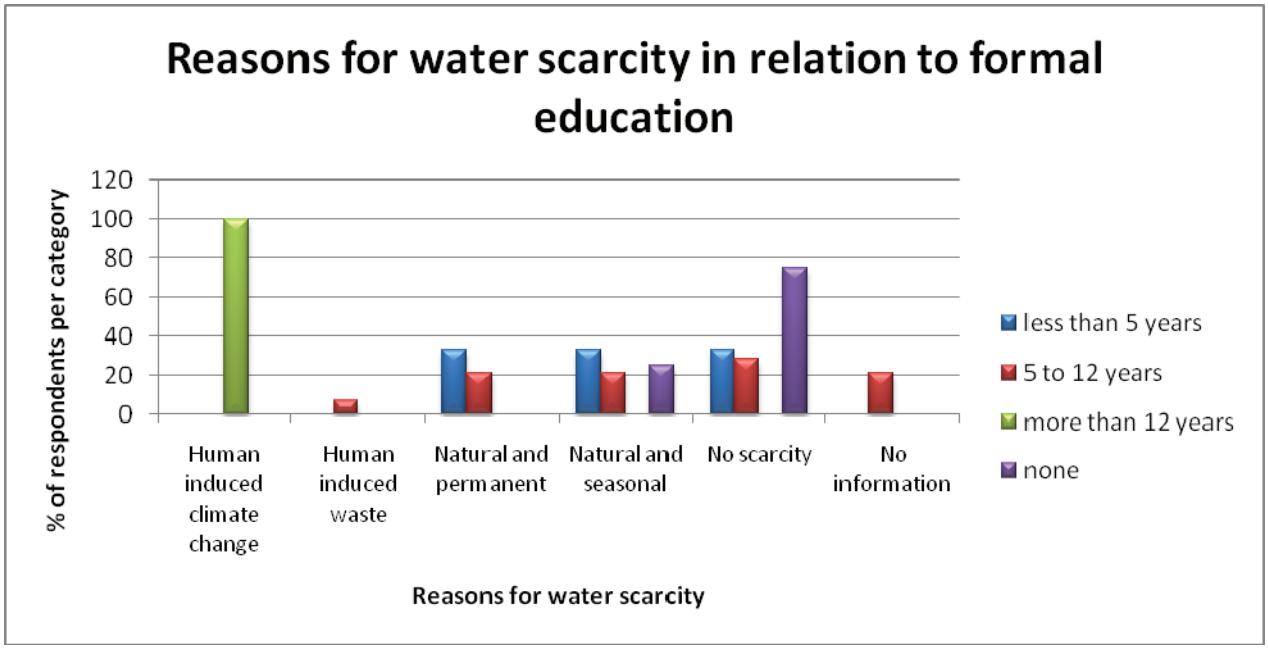

Figure 21. Formal education and water scarcity reasons

Figure 21 shows that for those who believe that there is water scarcity only people that fall in the category of 5-12 years with formal education, and those with more than 12 years of formal education, attribute water scarcity to human factors; the rest cite only "natural" factors. This shows that formal education might be an influential factor in the reasons given for the existence of water scarcity, as is also indicated by Figure 16, this can be attributed to the improved formal education the youth in South Africa is now receiving, although it was also shown that age and life experience play a role, emphasising again that the link between formal education and views on water scarcity is complex.

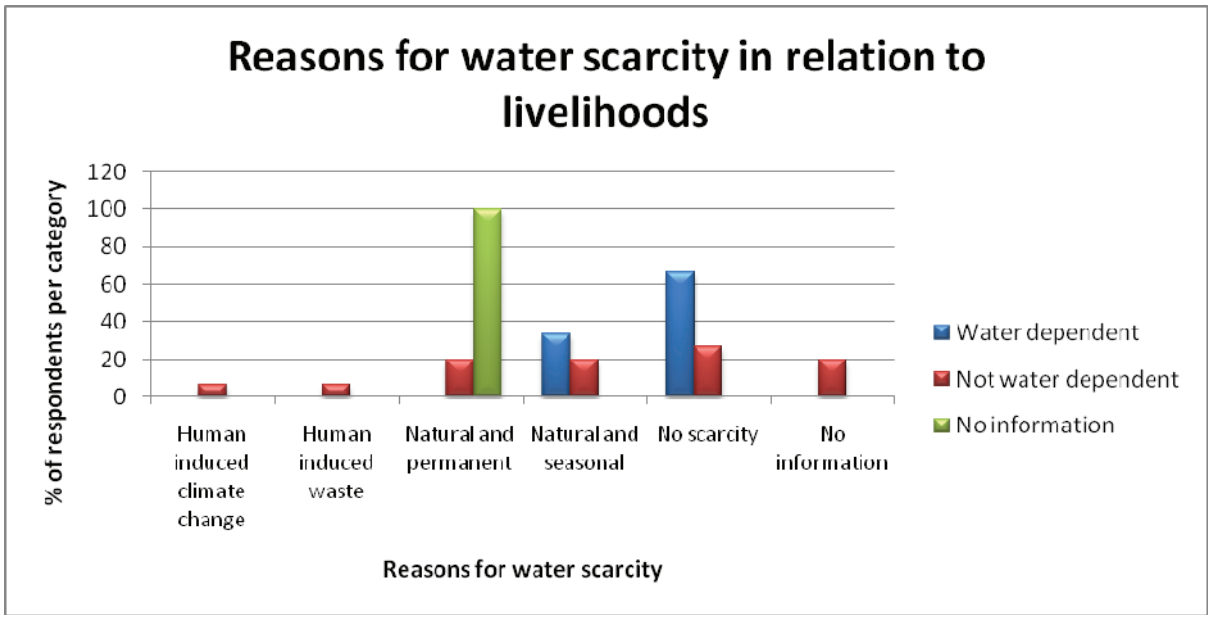

Figure 22: Livelihoods and water scarcity reasons

In Figure 22, more variety in answers is given by those who are not dependent on water and they are also the only ones to mention human factors as reasons for water scarcity. The only reasons given by those who are water dependent for their livelihoods are that water scarcity is "natural" and seasonal.

Figure 23 (below) shows that for those who believe that there is water scarcity, the only people who attribute it to human factors are those who have taps inside their households. The rest, including all respondents who get water from the river, cite natural reasons, with most saying water scarcity is "natural" and seasonal. For those with taps, more people believe that there is no scarcity, while for those who get their water from a river; slightly more believe there is scarcity. This could indicate that water source could be influential on people's views on water scarcity.

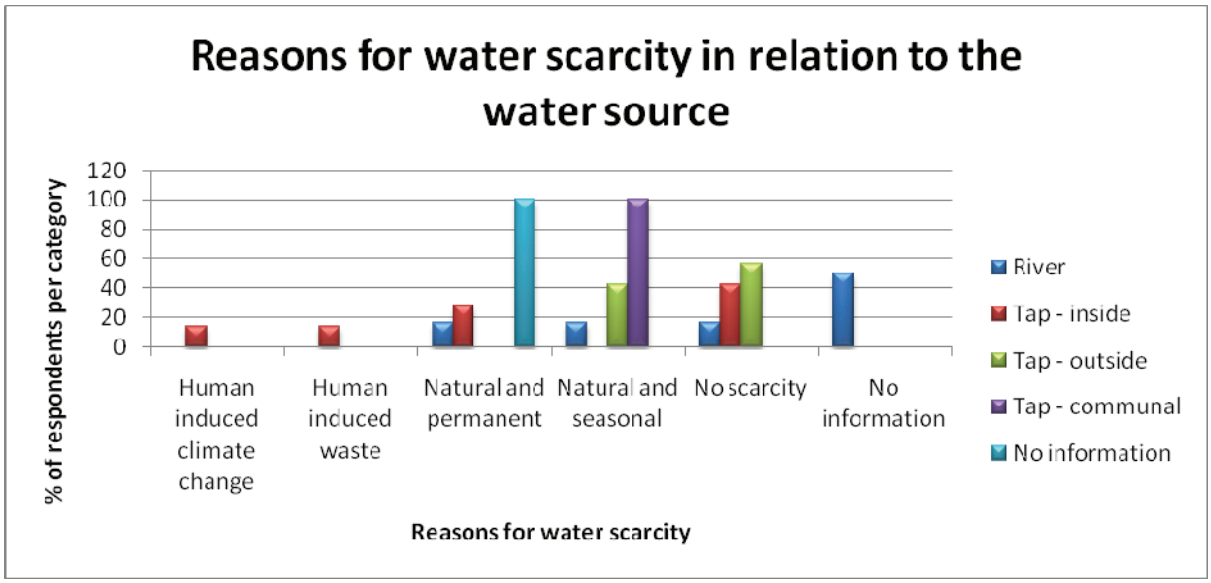

Figure 23: Water source and water scarcity reasons

It is also not clear from the answers given by respondents that those who said that there is water scarcity believed this to be a situation which applies to the rest of the world. It would seem that when asked about water scarcity and whether there will be enough water for their children and grandchildren, that respondents understood this as a question of whether there will be enough water for them "here" (current context), in the area where they are living. Therefore it would not seem as if they related this question to the rest of the world and to whether there would be enough water in general. This can be seen in answers given by respondents that their children and grandchildren will have enough water if *the* river (where they get their water from) does not run dry or if it rains enough. Clearly illustrative of this is the answer given by 60-year old Anna that if she had the money to buy a "JoJo" tank (for storing of water) or sink a borehole her grandchildren will have enough water. This clearly shows that for her the question about water scarcity is related to her house where she expects her grandchildren to continue staying. This shows that respondents tend to focus on the area in which they live when

asked about water scarcity. It could also indicate that respondents possibly view groundwater as an unlimited resource, however more research on this question is needed to substantiate such a statement.

Apart from focusing on the area where respondents live, they also focus on other areas which respondents think does have enough water. When asked about water scarcity a number of respondents would say that there is no water where they live, but would then proceed to name other areas which they said have lots of water. For these respondents a scarcity of water is more related to problems in the supply of water than to an actual scarcity. This emerged also in one of the focus groups where there were lots of complaints about having no water where they live, but at the same time the participants in the focus group all agreed that there will always be enough water for their children and grandchildren. Thus, there is this view that scarcity in one area does not necessarily mean there is scarcity in all or other areas. This was also echoed by 50-year old Anna, a street vendor who gets water from a river, who, when asked about what they do if they see the river is getting drier, answered that "*if it doesn't rain, it's not all the rivers that doesn't get rain, we are supposed to then go far away, you get the car, we pay to that car, we go and get us the water*". This clearly shows that for these respondents, water scarcity is mostly understood as something that is area-specific. This also indicates that they do understand water scarcity as socially constructed, especially since they relate it to problems of water supply.

The data from the community interactions also revealed some of what is called "discursive scarcity" (Mehta, 2001). This can be seen in "narratives of water scarcity" which is a perception among people that it is raining less and becoming drier even though in reality average rainfall may stay the same. This could be seen among the respondents as all who were asked if it is raining less, answered "yes". For example, 60-year old Anna said: "*when I was younger there used to be lots of rain. There's less rain now. So back then when there was more rain, there was more water in the river*". This was echoed by Elizabeth who said there was more rain when she was a little girl. Miriam also agrees as she said that "*back in the day there was more rain and now there's not much rain*", and Tembisine also believes there is less rain now than long ago. From the interviews conducted it is not clear why respondents think it is raining less, as this was not the focus of the interviews. The only interview which touched on this was the one conducted with Tembisine, who when asked about why she thinks it is raining less, gave the answer of "*I think you white people, you block the rain*". When further asked why she thinks this happens, she simply answered: "*We don't know*". However, it may be argued that this is an answer more to the interviewer effect than to what she really believes, although it might also indicate ideas of a way of life, where "white" represents a modern way of living. It would seem that what was found among the respondents corresponds to the findings of Aguilera-Klink *et al.* (2000) where there is a perception that it is raining

less and therefore there is also the view that water scarcity is due to natural factors. It also seems as if the respondents have been influenced by campaigns urging them to save water, which creates the impression that water scarcity is a physical scarcity and thus they have to use less water to ensure they have enough water.

Perceptions and knowledge on water

Studies related to indigenous knowledge systems argue that there is a recognition of the importance of the knowledge and perceptions of local people and how an understanding of their knowledge and perceptions can lead to improved management of natural resources, and water conservation. In response to this view that the knowledge and perceptions of local people can contribute to water conservation this study also gauged the perceptions and knowledge respondents have related to water. This involved questions about water quality, the dangers associated with water as well as an exploration of how respondents value and view water.

Respondents were asked about water quality and specifically about how they can tell when water is of good or bad quality. In answering this question, most respondents in the interviews (almost 65%) (Figure 24) mentioned the colour of water as an indication of its quality, with 41% of respondents mentioning only the colour of water and the rest also naming taste and smell with colour as ways to tell water quality.

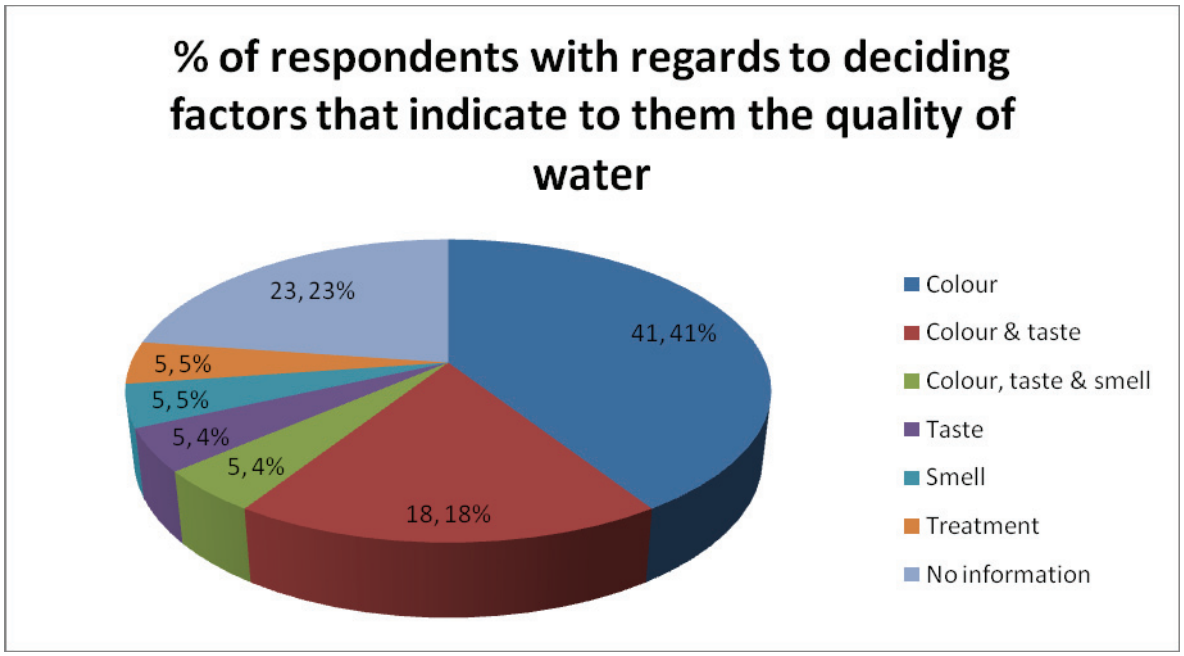

Figure 24. Respondents' factors that indicate the quality of water

Oli, who is also a worker in a steel factory, said that the water sometimes change from a white colour to a grey colour, which means the quality of the water has changed, while Mapule said the colour goes from white to black. A number of other respondents mentioned the colour of water changing from white to brown. This was followed by

some respondents who mentioned colour and taste. Only one respondent answered that colour, taste and smell play a role in determining the quality of water. One other respondent mentioned that the treatment of water, which involved the boiling of water or adding of bleach, is an indication that water will be of good quality. Lucy, a 31-year old street vendor, said that you have to look at the environment where water comes from because if the environment is clean it is likely that the water will also be clean and safe to drink. However, she also said that ultimately she looks at the colour of water, whether it is white or brown, to decide if the quality of the water is good or bad.

Respondents' knowledge about water quality can also be compared to different factors in order to determine if any of these factors may influence knowledge about quality of water. These factors include age, formal education, livelihood, and water source. These factors were only analysed for the interviews that was conducted and therefore the views of focus group participants are excluded from the following figures.

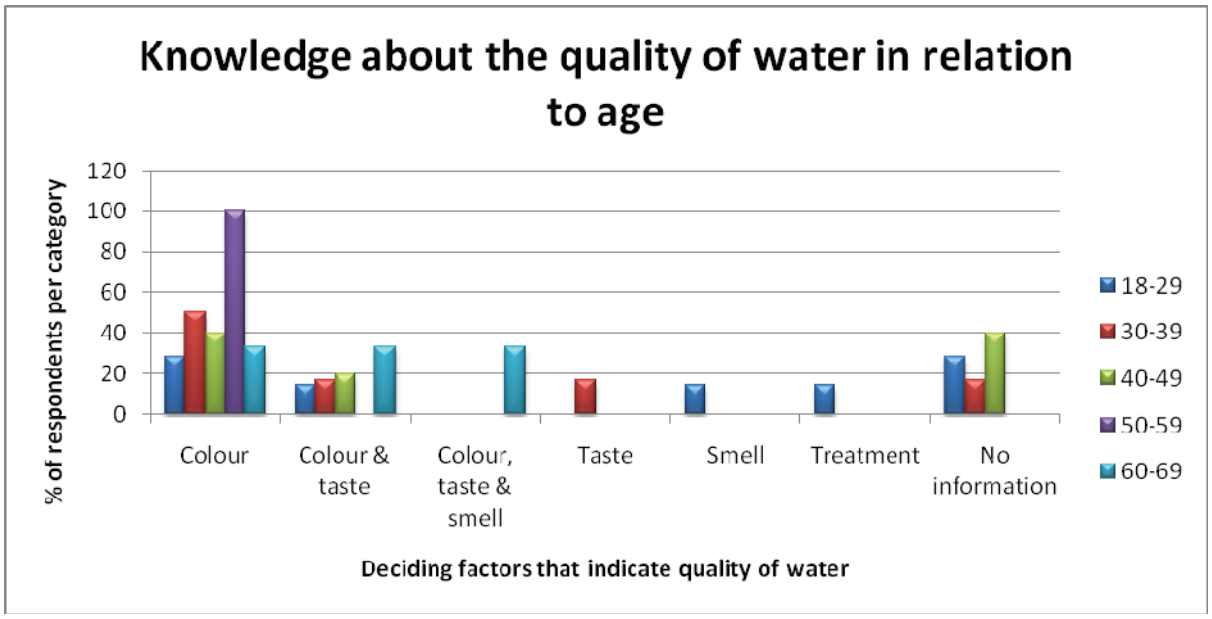

Figure 25: Age category and water knowledge (quality)

Figure 25 shows that for all age categories colour is the predominant feature when judging the quality of water, followed by colour and taste. It is only for the age category 60-69 years where colour, taste and smell are given as ways to judge water quality, showing that life experience can make a difference in knowledge about water quality. Only one respondent, in the age category 18-29 years, mentioned the treatment of water as an indication of whether water is of good or bad quality.

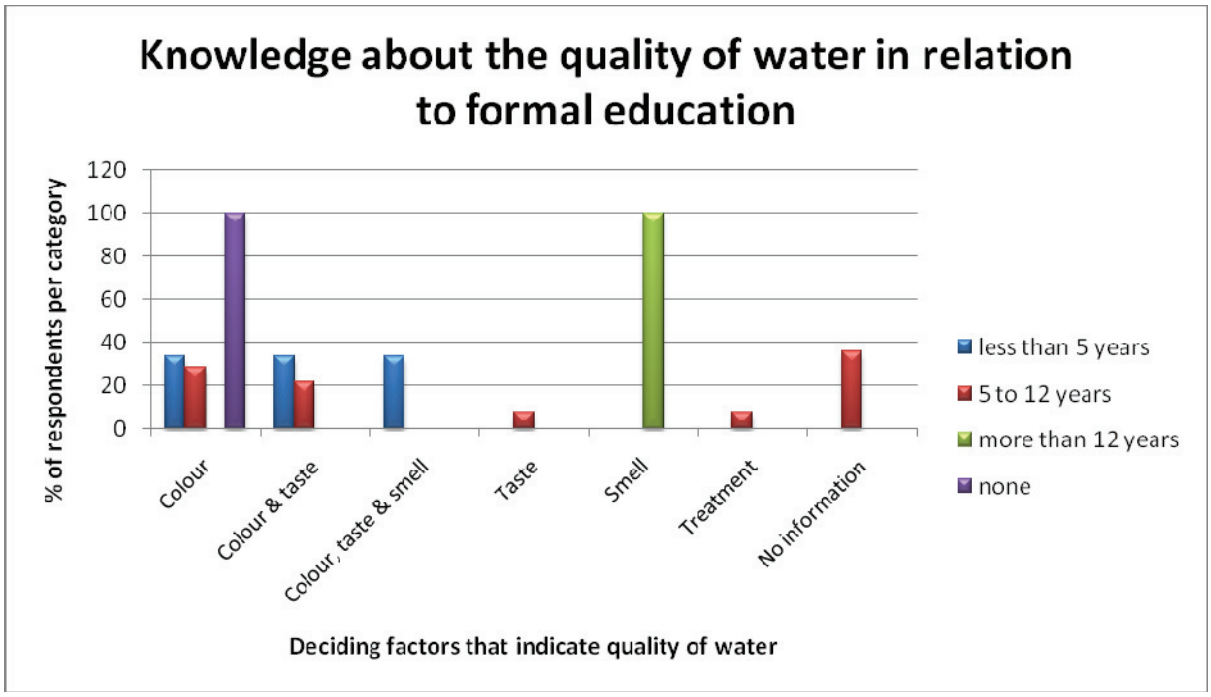

Figure 26: Formal education and water knowledge (quality)

Figure 26 shows that for all categories of formal education the focus is still mostly on the colour of water in assessing water quality, followed by colour and taste. All the respondents with no formal education focus only on colour, however, those with 5-12 years of formal education also focus mostly on the colour of water and the only respondent with more than 12 years of formal education only focus on smell. The only respondent who mentioned colour, taste and smell has less than five years of formal education. As was shown at Figure 16, the link between formal education and knowledge on water quality is complex since life experience is also important in generating knowledge about water quality. In South Africa's case it is even more problematic to show what the link between formal education and knowledge about water quality is, since, as was already stated, there is a difference in the education the youth receive now compared to their parents.

Figure 27 (below) shows that the same pattern continues when comparing water knowledge with livelihoods as both those who are dependent on water and those not dependent on water for their livelihoods focus mostly on the colour of water, although those who are not dependent also focus on taste, smell and treatment. The reason why those who are dependent on water for their livelihoods focus less on the quality of water could be because they have to use the water whether it is of good or bad quality, since that is the only way for them to make an income.

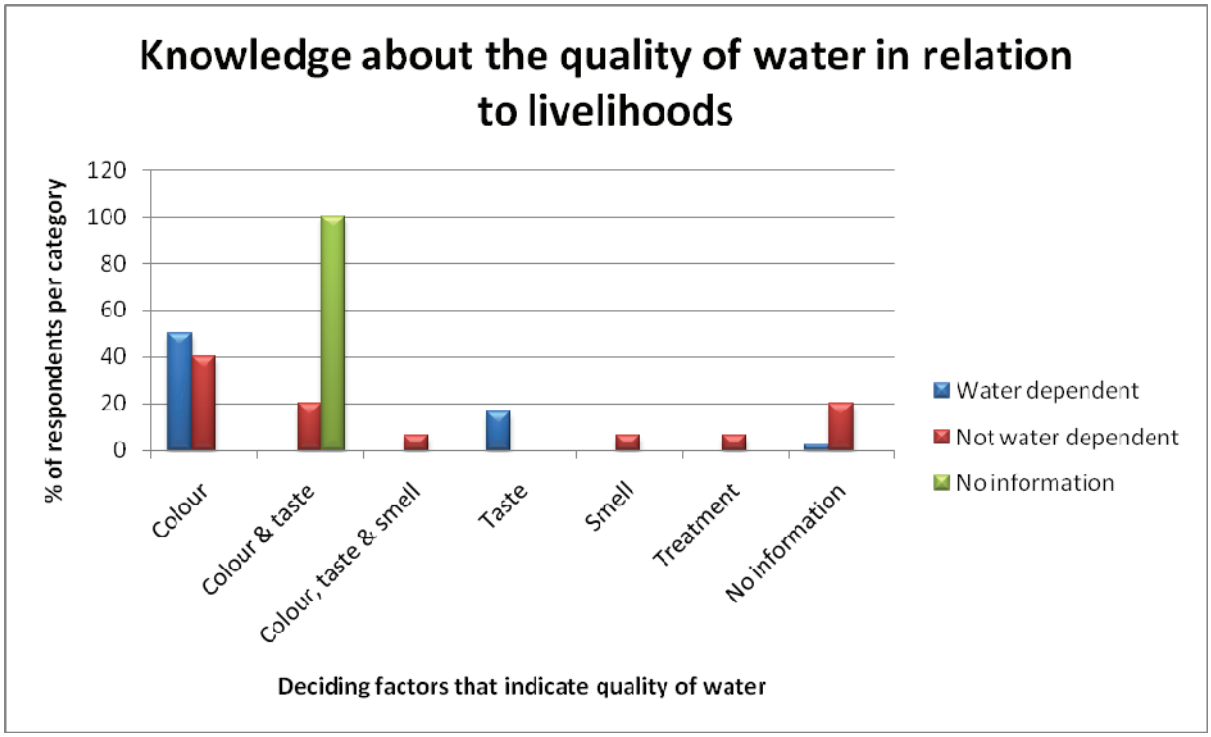

Figure 27: Livelihoods and water knowledge (quality)

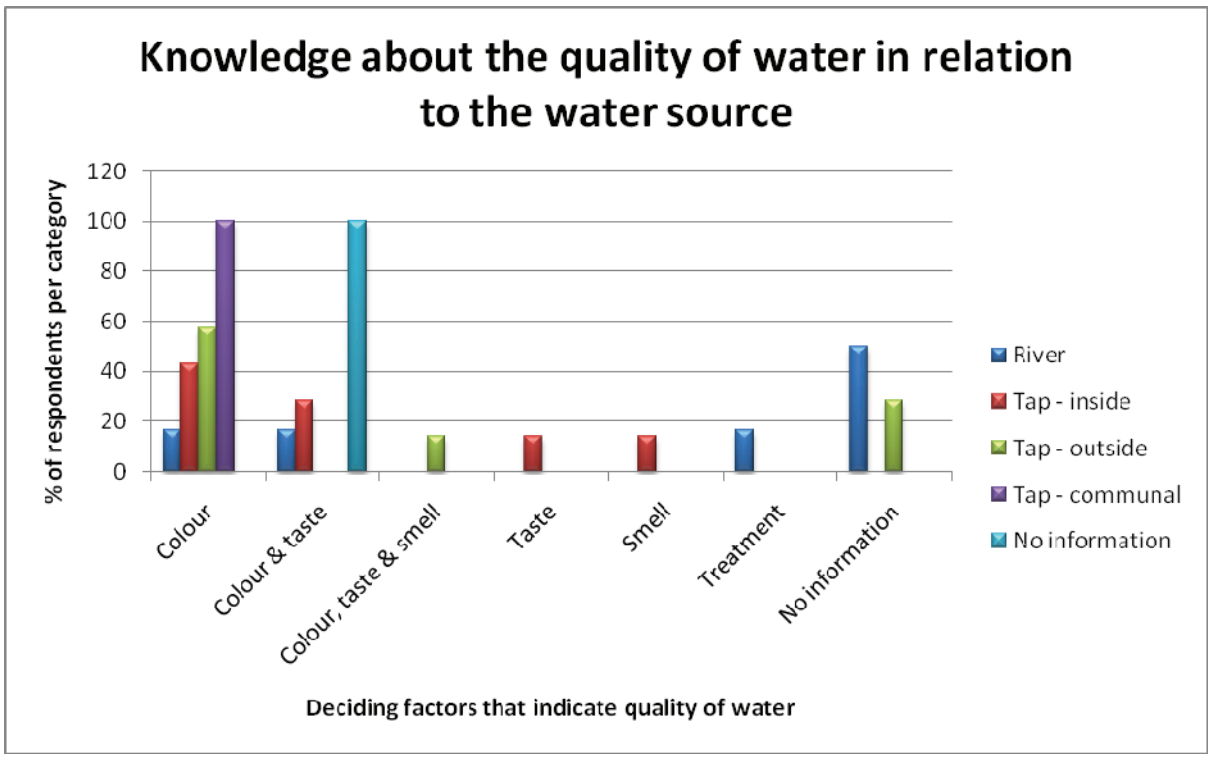

Figure 28: Water source and water knowledge (quality)

Figure 28 shows that when comparing knowledge on water quality with the source of water the focus is mainly on two aspects in the assessment of water quality, namely colour and taste, with most respondents for all the categories focusing on colour, followed by colour and taste. One respondent whose water source is the river mentioned

the treatment of water as an indication of quality. Despite this the lack of taste and smell as indications of water quality for those getting water from the river is noteworthy.

These results lead to the question of why the respondents focus mostly on the colour of water when assessing its quality, and related to that, why is there a lack of focus on the treatment of water? One explanation for this focus on colour among the respondents could be due to the situation which many of them mentioned where rain influences the colour of the water which comes out of the taps. Most respondents indicated that after rain the tap water changes colour and become brown or black. For example, Valencia said that "*sometimes when there's rain, you know, then tomorrow if you go to the tap the water will be a different colour, so you don't use too many of that*". This was also repeated by Tembisine, who said that when it rains the quality of water becomes worse, but when it does not rain the quality stays good. Thus they focus on the colour of water as this is the biggest problem they experience with regards to water quality.

Image 4. Fieldtrip # 2: Student engaged in short semi-structured interview with curio vendors engaged in informal trade (approx 200 meters from Paul Kruger Gate)

As mentioned, these results show that only one respondent overall paid attention to the treatment of water as an indication that water is of good quality. This lack of focus on the treatment of water in assessing its quality led to a second aspect with regards to the water knowledge of respondents, namely whether there are any health hazards or dangers to water. The vast majority of respondents answered that water can be dangerous and does pose health risks, with only two saying that there are no risks or dangers to water. Overall respondents mentioned that water contains germs and viruses which can lead to diseases like cholera, skin disease and diarrhoea. They also acknowledged that these diseases are potentially fatal. Mapule also mentioned the presence of crocodiles as being 'a danger' water holds, while one focus group told a story

about a snake in the river. According to them, when asked about the dangers of water, they told a story they have heard about a snake living in the river which devastates houses and kills children when it rains a lot. This group believes that there is magic in water, but likewise that there is danger in water.

If respondents are aware of the dangers to water, especially with regards to the health risks associated with untreated water which can lead to death, the question as to why so few respondents focus on the treatment of water when asked about water quality needs to be further discussed. One possible explanation could be that most of the respondents' water is already treated, as they are provided with municipal water from taps and therefore they do not feel that the water they get for their household is dangerous. This can be seen, for example, with Miriam saying that she knows water is of good quality when it comes out of the tap because then it is clean. This is a dangerous assumption in the light of the failings in smaller rural municipalities regarding water quality. This is even more so in the Bushbuckridge area which had one of the worst cases of diarrhoea outbreaks in 2008, which was due to contaminated, untreated water (DWAF, 2009). Perhaps respondents feel that since then water quality has improved and therefore there is a lack of focus on the treatment of water. This could be different if more respondents got their water from a river.

The only respondent who mentioned treatment of water as an indication of quality is one whose source of water is a river. A problematic factor in explaining this is also because there is no information available on this issue for half of the respondents whose water source is a river. However, the response given by one focus group when asked about water quality can also shed some light. This focus group complained about there being no water and the participants have to buy their water from a neighbour with a borehole since their nearest river, Sabie, is too far away to fetch water from the river. For them whether water is of good or bad quality was really irrelevant as they "*use it whether it is good or bad*". Another focus group, who obtain their water from a river, agreed with this view as they mentioned that they are aware that the water from the river is not always clean, but they still use it since they have no other water to drink or use. They even admitted that they do get sick from it sometimes, but they still drink it because they have no other choice. This was also expressed by Anna, the street vendor, who said that "*for many years I used the water in the river, even when I see it is 'vuil' (dirty), but I still use it, because there is no (other) water*". Therefore for those respondents who struggle to get enough water for their daily activities the issue of water quality may be less important than just ensuring they have enough water for that day.

To further determine perceptions about water and water behaviour respondents were also asked about how they value water and whether water should be free or come at a price. The majority of respondents, including those who get their water from taps, do not

pay for water and most agree that water should be free. The view that water should be free is mostly related to the feeling that respondents cannot afford to pay for water as they are not used to paying for it. Linah felt that those in the cities should pay for water but those in rural areas should get it for free. Valencia responded that "*we shouldn't be paying for water, because water is a natural thing. It's nature you know, so we mustn't pay for nature; nature will always be nature so why should we pay for nature?*" Since most of the respondents do not currently pay for water it is to be expected that most of them would say that water should be free, as it is normal for a person to not want to pay for something that you are used to getting it at no cost. Nonetheless this does stand in contrast to the focus of municipalities on cost recovery as was explained by Van Wyk *et al.* (2006), as it would seem as if the majority of respondents do not view water in economic terms.

There were two respondents who believed that people should pay for water. Mabutho emphasised that *"if somebody drill their own borehole it should be free, but if somebody has to pump it from somewhere then that production cost it involves, then you should pay some, even if it's not much, but just the little that you can contribute*". He also felt that paying for water would lead to the conservation of water and that then "*maybe the municipality would try some means to purify it instead of just pumping the water through*", this shows that he also believes payment for water would improve the quality of water being received. This view was also echoed by one focus group where it was said that "*if you pay for water, you'll save it*". Therefore it does seem as if there is the view that paying for water will lead to the conservation of water. An interesting view on why people should pay for water was provided by Mapule, a craft producer. She believes that people should pay for water because "*if you pay you will never run out of water and will always get water*". Thus, for her, paying for water will result in a guarantee that you will always have water, a view which resonates very much with Swynedouw's (2006) view that "*water flows to power*". Related to this is also the question of who water belongs to. This question was not pertinently asked to all respondents, but those who were asked this all said that water belongs to God; with the exception of one who said that it belongs to no-one. The view that God owns the water was very well expressed by a participant in one focus group who said that "*water belongs to God, but God has given water to all of us*".

Water conservation behaviour, attitudes and values

Schultz *et al.* (2005) claim that the largest proportion of the world's population believe that an environmental crisis is the most pressing problem facing humankind. This leads to the assumption that behaviour will change accordingly in response to what is needed to address this perceived crisis. However, the literature (Corral-Verdugo *et al.*, 2008; Dutcher *et al.*, 2007; Strang, 2004) shows that it is not as simple as just to assume behaviour would change easily as there is a complex relationship between behaviour,

attitudes and values. This is mostly because people have multiple and often contradictory values. The literature (Corral-Verdugo *et al.*, 2008; Dutcher *et al.*, 2007; Strang, 2004) also pays attention to different factors which can influence behaviour and specifically water behaviour. These include aspects like age, gender, formal education, occupation, lifestyle, water laws, environmental beliefs and knowledge related to water. Sementelli (2008) and Strang (2004) also found that the names and meanings people attach to water influence behaviour towards it.

In order to determine respondents' attitudes and behaviour towards water conservation, questions were asked to establish what the respondents believe to be good water conservation behaviour. This involved them having to give an indication as to what freshwater conservation entails, as well as what it means to care for or look after water.

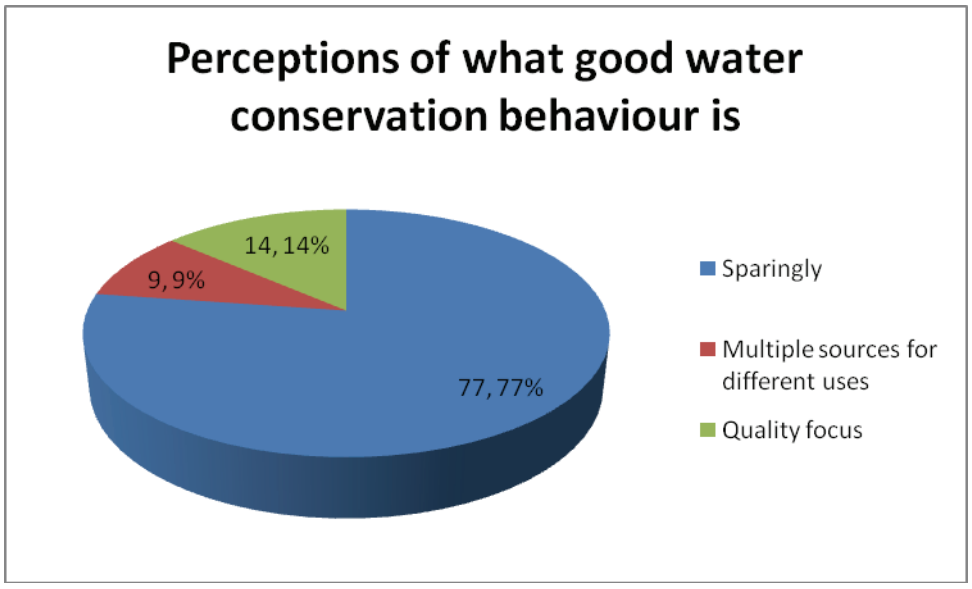

Figure 29. Perceptions of what good water conservation is

From Figure 29, it is clear that the vast majority of respondents (77.77%) believe that good water conservation behaviour is about saving water or using water sparingly. Valencia, an 18-year old student, answered that it is "*to not waste water, but using it carefully*", which she further emphasises by saying that "*we need to save water. At the end of the day water will be less so we need to save water for our future*". This corresponded with the answers given by many other respondents who agreed that water conservation is about saving water, by using it carefully and not wasting it. Sometimes this was illustrated by giving an example, like that given by Mabutho, a 28-year old male: "*if one wants to wash a cup of water, rather wait to wash it until you have two or so cups, then you wash it all one time, because washing once you will use less water*". Miriam, a 33-year old vegetable seller, gave an example of how, when she washes the dishes, she never fills up the tub completely – for her this is an example of good water conservation behaviour. For 60-year old Anna conserving water means saving it by "*making sure that you still have something left when you need it*". Anna also have ideas on how to make

sure her children would still have water in the future, for example by building a borehole or buying a "JoJo" tank, but she lacks the financial resources to do any of this. When she was asked if using less water will also ensure that there will be enough water for her children and grandchildren, she responded by saying that this is problematic as she is not sure whether she or other people can actually use less water. This notion of water conservation being the same as saving water was also reiterated by one of the focus groups which was conducted among women, who all agreed that water conservation is about saving water, which would be ensured by making people pay for water. For many respondents saving water also meant that you have to measure the amount of water you use.

Image 5. Fieldtrip #2: Students engaged in semi-structured interview.

There were three respondents who focused on the quality of water when asked about water conservation and the caring of water. This involved the boiling of water or adding bleach to ensure water is clean and usable. They also complained about people who throw dead dogs or cats in the river, thereby polluting the water. Two respondents, 50-year old Anna and 42-year old Elizabeth, perceived water conservation to be about using more than one source of water for different purposes. Anna, for example, uses water from the river to wash clothes but drinks water from the tap. Anna also mentioned that she does recycle water as she does not just throw water away, but after using it "*puts it in the grass*", thereby using it for more than one purpose. She did however, also emphasise the importance of not wasting water saying that "*you must not 'mors' [waste] the water because inside the ground, water in the level is too little*".

Perceptions of water conservation behaviour can also be compared to age, formal education, water source and livelihood in order to determine if water conservation perceptions are influenced by any of these factors. Once again the following figures only look at answers given by interview respondents and not at those given by focus group participants.

Figure 30 (below) shows that when looking at the relationship between age and perceptions on what is good water conservation behaviour, it is clear that for all age categories, except the 50-59 year age category, perceptions of good water conservation behaviour is to use water sparingly. A significant difference between the age categories is that it is only those who are younger than 40 years of age has a quality focus to water conservation.

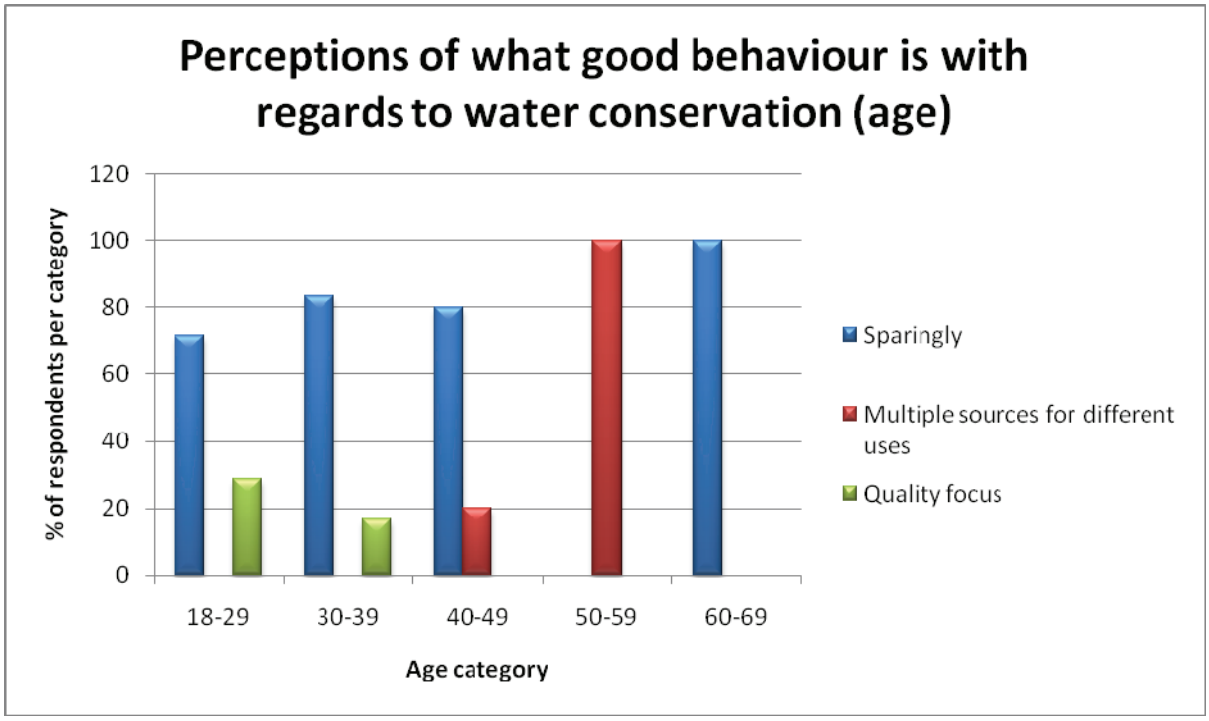

Figure 30: Age category and perceptions of good water conservation

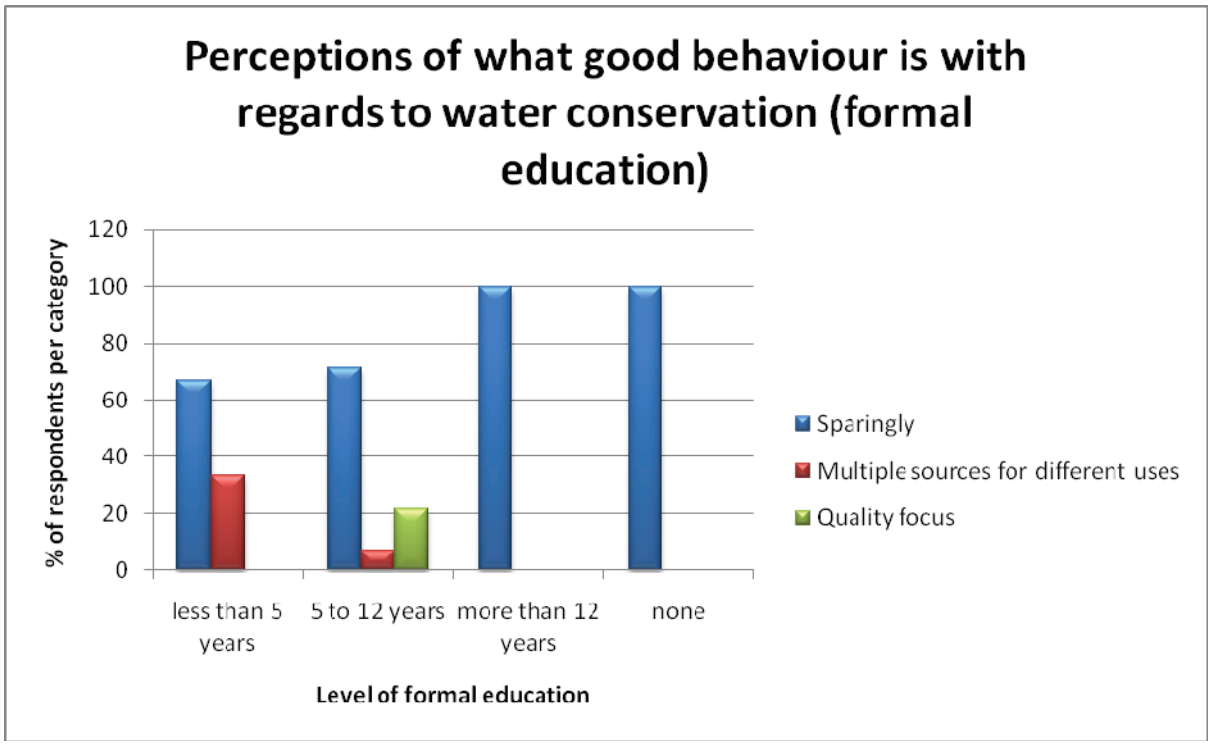

Figure 31: Formal education and perceptions of good water conservation behaviour

Figure 31 shows that most respondents fall into the 5-12 years of formal education category and of those most cite good water conservation behaviour as one where water is being saved. Similarly whereas only those younger than 40 years of age had a quality focus in this regard, this is also the only category with a quality focus to water conservation perceptions. For those respondents with no formal education, all perceive using water sparingly as being good behaviour.

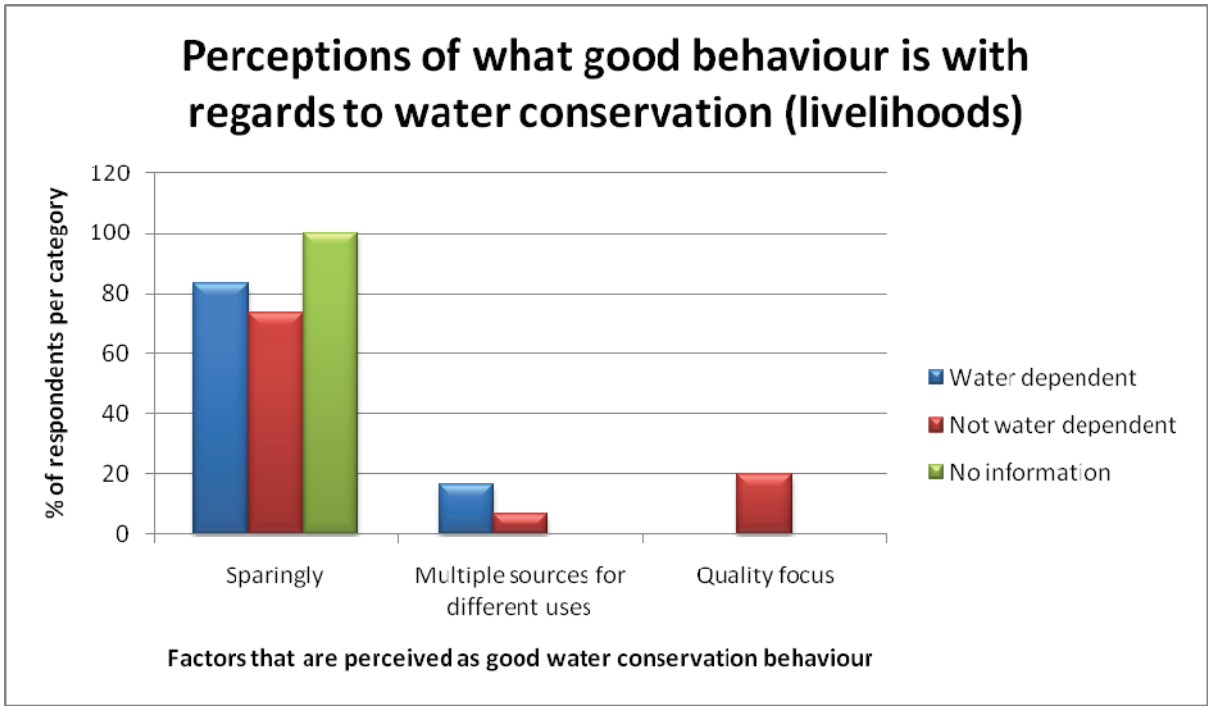

Figure 32: Livelihoods and perceptions of good water conservation behaviour

Figure 32 shows that the same situation is repeated with livelihoods as perceptions of good water conservation behaviour is not greatly influenced by whether livelihood is water dependent or not, as for both categories using water sparingly is the dominant response. Only livelihoods which are not water dependent has a quality focus. It has been shown that the respondents in the Hazyview area do at times experience problems with water quality, especially after it has rained. An explanation for why those whose livelihoods are dependent on water but do not have a quality focus could be linked to these problems of water quality. The same results were gotten from Figure 17 and Figure 27 where for those respondents who depend on water for an income it is likely that they will not be as concerned about water quality as those whose livelihoods do not depend on it, since they have to use water whether its quality is good or not. Thus, for those using water to produce food for example, water quality is not seen as important as when it is only used for drinking.

Figure 33 (below) shows that the situation is largely similar when comparing water source with water conservation perceptions as the focus is still mostly on saving water. Even so, what is interesting is that those respondents who get their water from a river

focus more on water quality than those getting it from taps. This indicates that water source could be a factor in perception on good water conservation behaviour.

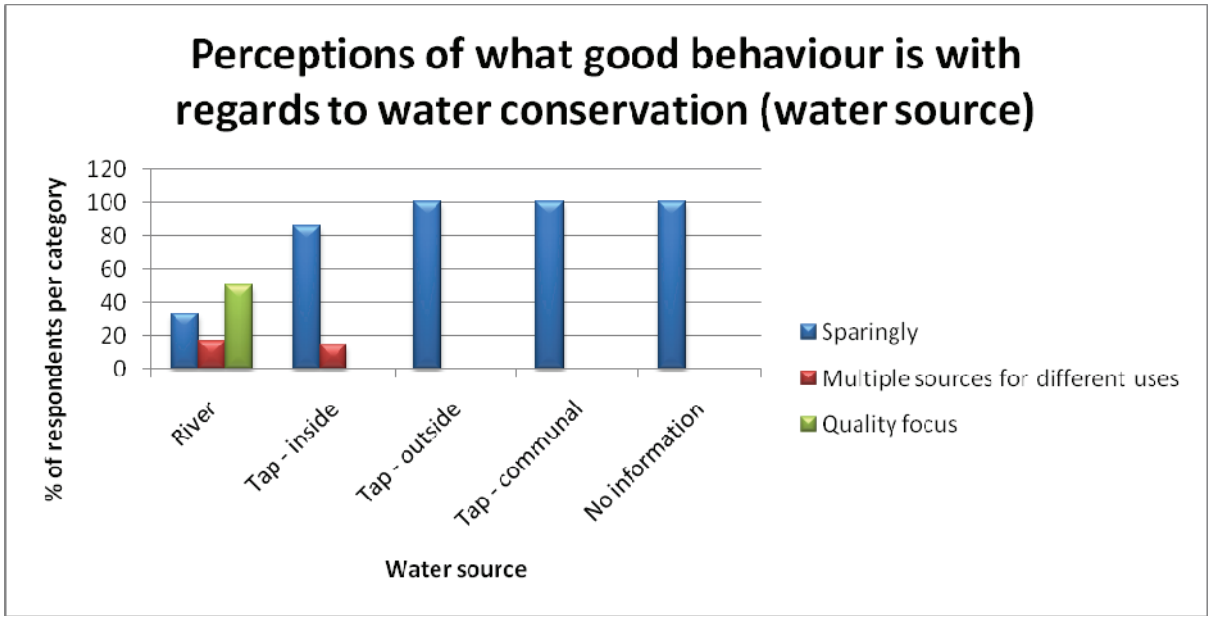

Figure 33: Water source and perceptions of good water conservation behaviour

These perceptions of good water conservation behaviour can also be related to wider perceptions about whether people abuse the environment or not. When respondents were asked this question almost all said that people do abuse the environment. Only two, Mapule and Oli, answered that people do not abuse it. Some linked the abuse of the environment to the waste thrown in rivers and next to the streets, while most mentioned the cutting down of trees as proof that people abuse the environment. As Anna, the street vendor said:

> *"Because we cut the tree and sometimes they will not grow again when I cut it, it dies. If the other one cut it and I cut it, we use it to make the fire and even to make the animal, we cut the trees. The nature she doesn't grow it up because we cut it".*

Respondents were also asked to describe their own actual behaviour with regards to water conservation. This involved questions about what water is used for in the household, how water is used in the household, as well as strategies that is employed to improve water use.

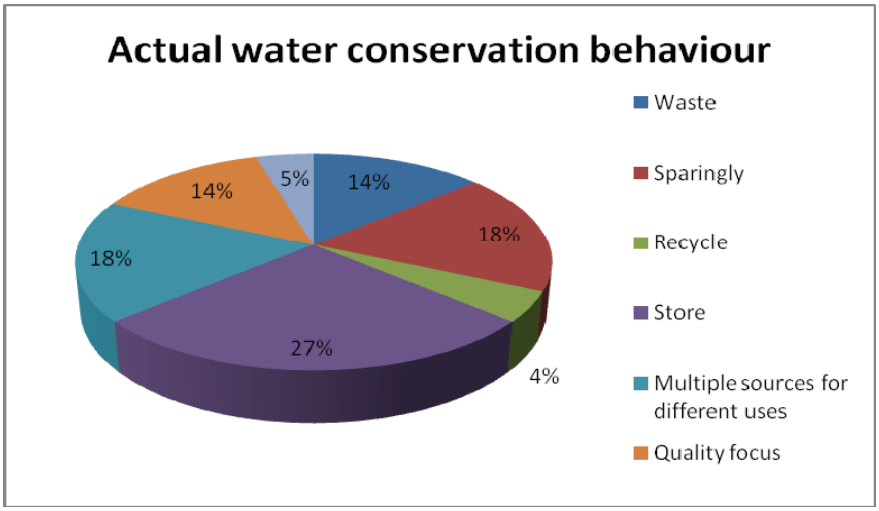

Figure 34. Actual water conservation behaviour

Figure 34, indicates that overall, behaviour tends towards the storing of water(27%). Anna, the 60-year old street vendor, who experienced regular cut-offs mentioned that they conserve the water, because when *"we get the water from the taps we put it in large containers so when the water becomes closed we still have water to live on for a couple of days*". Elizabeth also stores water but does that only when water is dirty, with storing used as a way to be able to use dirty water as "*when water is dirty we put it in a bucket and let the soil settle, we put a salt in, and then the soil settles and we can use the water*". A view which is repeated by Mapule who said that "*we save it (water) because we store water because we don't trust that the water will always be right*". This does show however, that the respondents' storing of water is driven by a need and not necessarily by conservation awareness.

Some respondents like Sindi, who use multiple sources of water for different purposes, separates the water used for cooking and drinking, and also measures the amount of water used. Others said that they conserve water because they do not waste it. Some believe that their own behaviour is conscientious in that they use water sparingly, by measuring the amount of water they use, thereby ensuring that they do not use too much water. Respondents did not indicate how they measure the amount of water they use. For example, Oli said "*when you use water you measure them like through estimation making sure you don't waste water*". This was also repeated by Mapule, who does not pay for water but believes that water should be paid for, he said that women in townships measure water because if they use a lot they will also have to pay more.

14% of the respondents (Figure 34) believed that they and their households do not conserve water but waste it. For example, Mabutho said his household wastes water because "*sometimes you find the water dripping from taps and nobody cares about it, they just leave it dripping or if they see there is a burst pipe, nobody would fix it*".

When actual water conservation behaviour is compared to age categories, formal education and livelihoods, behaviour does not seem to be strongly influenced by any of these factors. However, water source does seem to influence behaviour to a greater extent, as shown in the figures below.

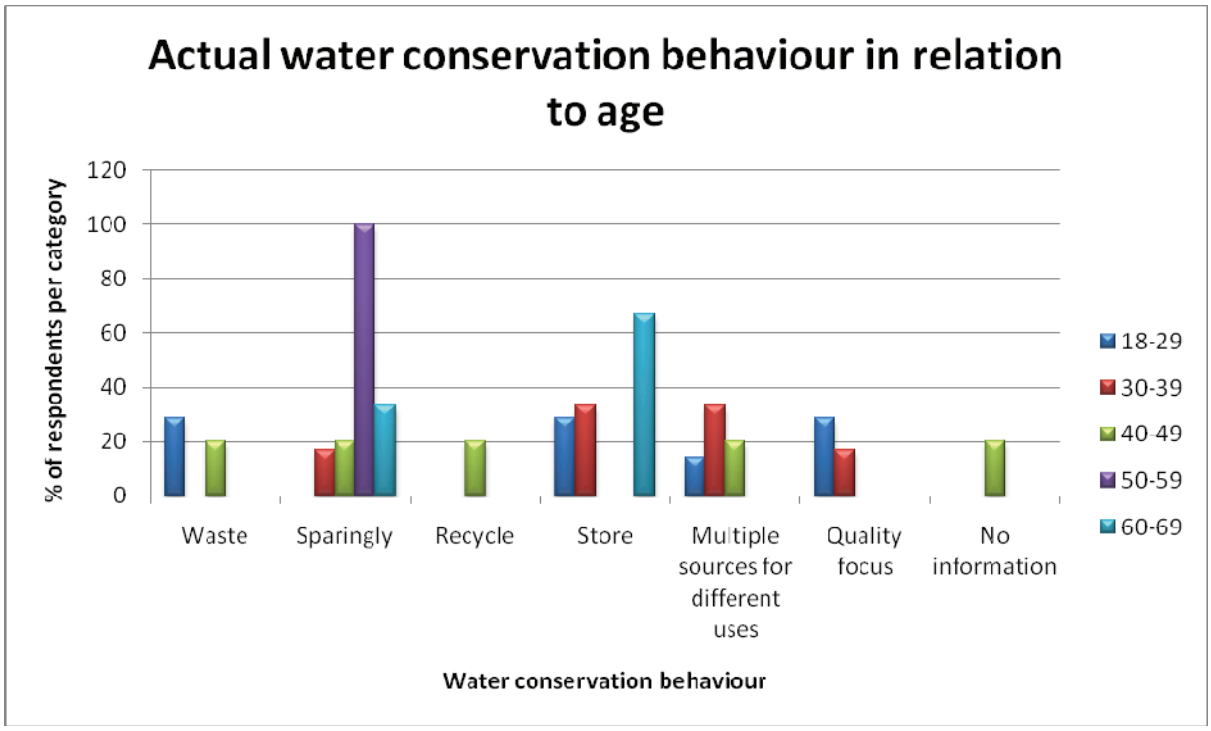

Figure 35. Age category and actual water conservation behaviour

Figure 35 shows that when comparing age and actual water conservation behaviour it seems as if age does not influence behaviour significantly as a great variety of actions are found throughout all the different age categories. But it is only those younger than 40 years who has a 'quality focus' when it comes to water conservation behaviour.

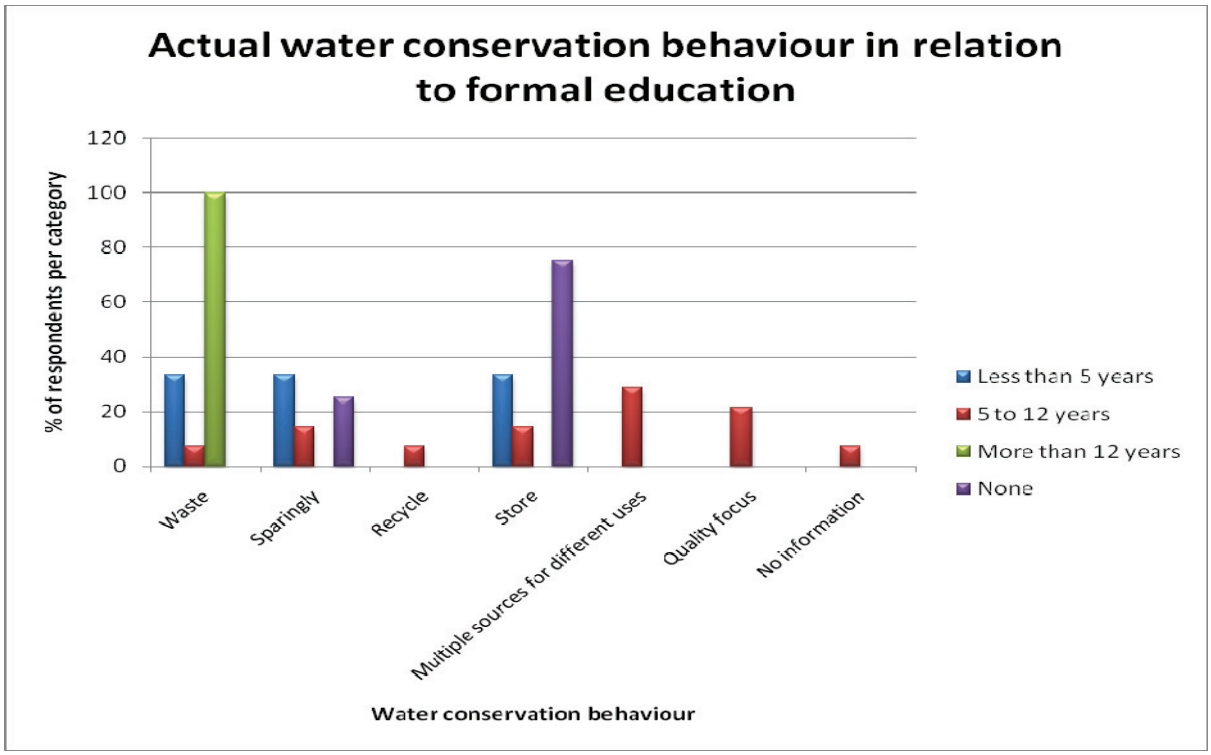

Figure 36. Formal education and actual water conservation behaviour

In Figure 36 the same pattern can be found when formal education is compared to actual water conservation behaviour. The category with the most respondents is the one with 5-12 years of formal education and this is the only category where behaviour involves focusing on 'quality' and using multiple sources for different uses. It is noteworthy that those with no formal education tend to store water more than the other categories. This could be due to them having less income and less ability to pay for water or, them having less access to tap water and thus they have to store water.

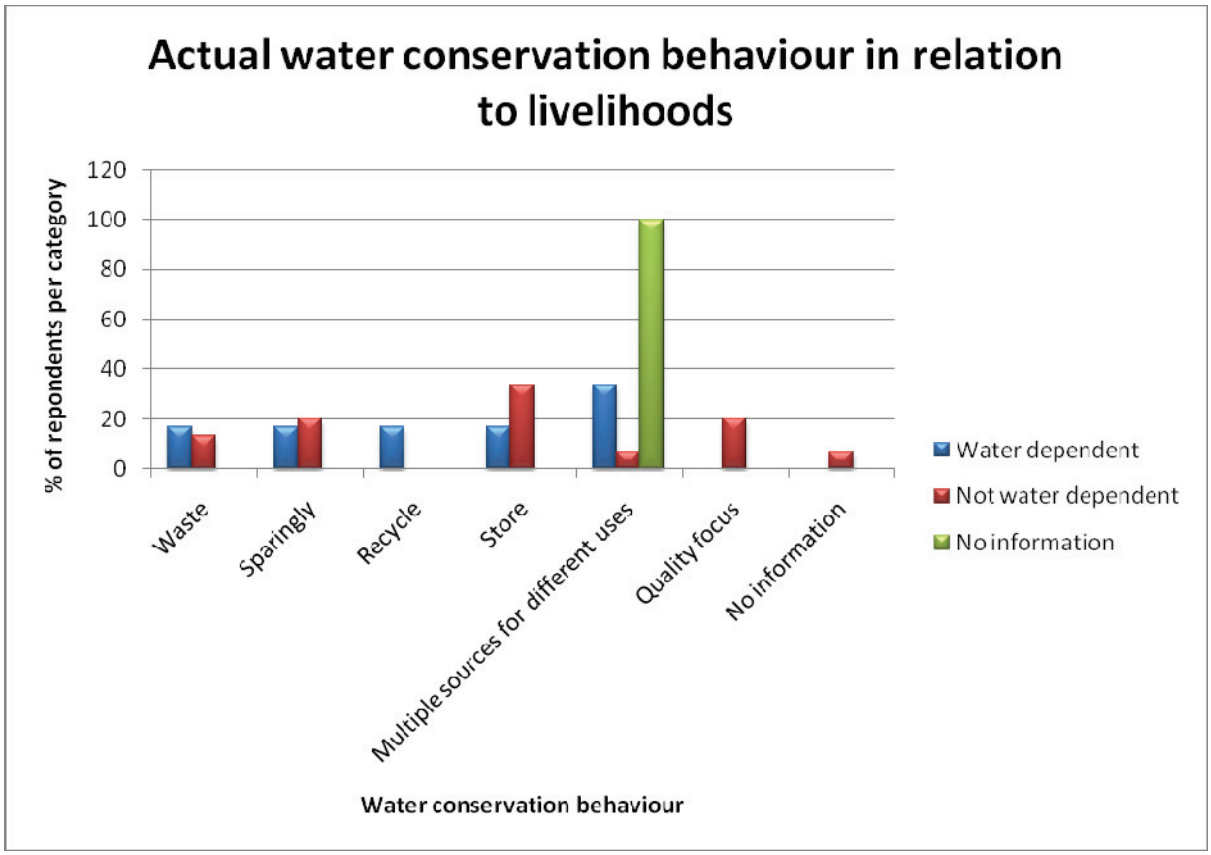

Figure 37. Livelihoods and actual water conservation behaviour

Figure 37 shows that most of the livelihoods are not water dependent but the largest variety of actions is found within this type of livelihood. Again most actions within this category revolve around the storing of water, with this also being the only category where respondents have a 'quality' focus. Recycling as an act of water behaviour is only found in the water-dependent category. Since these respondents depend on water to make an income it is understandable that they are more likely to use water more than once since this could make their livelihoods more cost efficient.

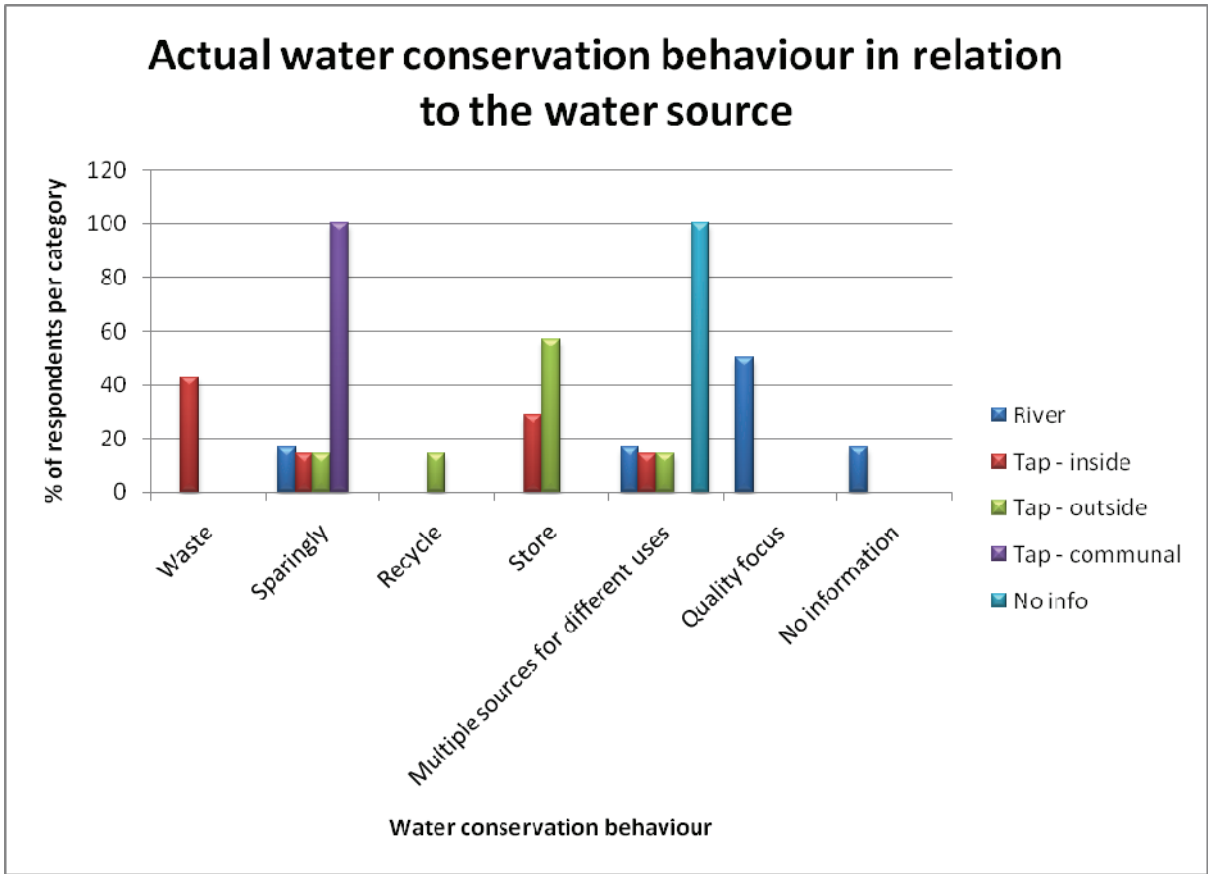

Figure 38: Water source and actual water conservation behaviour

Figure 38 indicates that when comparing access to water source and actual water conservation behaviour, water source does seem to have more of an influence on actual water conservation behaviour. Significantly it is only those respondents who get their water from a river who has a quality focus when it comes to water conservation behaviour. At the same time it is only those with taps who store water. The actual water conservation behaviour of respondents who get their water from taps range between the different actions, with the water storage and using different sources for different uses being the dominant behaviour. The only category whose actual behaviour involves wastage of water is the one which has taps inside the household. What is also interesting is that the only category where there is recycling of water is one with taps outside the household.

When comparing the perceptions respondents have on what constitutes good water conservation behaviour (which for the overwhelming majority of respondents involve saving water), their actual water conservation behaviour shows that a disparity between perceptions and actual behaviour can be found. Even though most of the respondents think that water conservation is about using water sparingly, their actual behaviour comprises a much greater variety of actions which can also be deemed to be water conservation behaviour. Most of the respondents store water as a way of conserving it, with a significant number also using multiple sources of water for different purposes. Yet,

few respondents actually perceived this as being actions of water conservation and none mentioned storing; thus no-one perceived this as being part of water conservation.

Field trip #2: Community Findings (Focus Groups)

Group 1

"Roughly two kilometres from the Paul Kruger Gate on the R506 highway, a group of part-time farm labourers (mango pickers – 25 kgs for R50) sat beneath a shelter along the roadside, waiting for their money, and seeking other employment. The group comprised of nine women between the ages of 19 and 35 years. Innocentia approached them requesting a focus group audience. Upon their agreement, we sat in a circle, all on the floor. Karen was offered someone's jacket to sit on. Danger involved in getting mangoes because of snakes, leopards, etc (farm used to be called Lisbon). Most participants were not married, only two had grade 12. They spoke Tsonga and Zulu."

Reflections on Roadside Focus Group, Inga Jacobs

Key findings from the first focus group included the use of rivers as a primary source of water. Despite being polluted, the river is used due to lack of other water sources (i.e. no tap water). Rivers are used for washing, cooking and cleaning. Water purification methods were discussed such as the use of Jik and the advantages of boiling. The awareness of cholera as a water-borne disease was also expressed, with participants very familiar with the disease.

Perceptions of water conservation centred on saving water. However, a distinction was made between saving paid water; whereas a different standard applies to water they get for free from the river.

Differences in opinion were expressed in terms of the finite versus infinite nature of water. One view argued that if we do not save water, there will not be water left for future use. Another argued that there has always been water since the beginning of man. Suggestions to prevent water from becoming scarcer included building more dams (although other participants cautioned that this too runs dry), and using water wisely.

Participants also expressed the need for conservation areas such as the Kruger Park. However, only two kilometres away from the Kruger gate, four out of the nine participants had been inside the Kruger Park to visit, and one works at the park.

Image 6. First focus group: part time farm labourers waiting for payment of labour, on the R506 approximately 2 km from Paul Kruger gate

Group 2

The second focus group comprised of men and women in a homestead in the informal settlement of Huntington, roughly 5 km from the Paul Kruger gate. Gender inequalities were pronounced in this group as was the racial/social divide between participants and facilitators (women participants sat on the floor, whereas the men sat on small chairs; facilitators were given chairs to sit on; men dominated the discussion).

Participants in this group rely primarily on the rain as a source of water, but when it does not rain, they use river water. They also use groundwater from a borehole nearby. Additionally, water is sold in the community by those who can afford to buy it or have the utensils to collect adequate rain water.

Dismay was expressed at the lack of social responsibility on the part of the KNP. Despite being 5 km from the park, participants indicated that no support was provided by the park to help them get water, i.e. sinking boreholes, etc. One male participant indicated that the *"people from the park think that animals are more important than people."*

Reflecting on how things have changed over the years regarding the availability of water, all participants agreed that when they were growing up, there were no problems regarding water because they would get their water from bountiful streams. Over the years, these streams have dried up causing "*people to compete for water and fight with each other*."

Image 7. Project team engaged in Focus Group at Huntington Informal Settlement on R506 (approx. 5 km from Paul Kruger Gate)

Group 3

The third focus group comprised of women from the Mcobaneni community. The focus group was conducted at the home of a participant, and included previous interview, as well as new participants. The focus group commenced with a word association exercise (See Table 3). Participants were asked to say the first thing that came into their mind when they heard the words: beautiful; water; life, etc.

Table 3. Word association game

Word	Association
Beautiful	Something that is always clean, worth looking at, sunset, something that is lovable, a clean house, something that can provide you with something else, i.e. a garden, rain, sunrise, what brings you joy, people coming together like this focus group, that which is sacred
Water	Life, everything, restores, cleans
Life	Love, taking care, faith,

Childhood stories were shared and about the river: a young man goes to the river and he gets stuck at the river and a young lady goes to save him. She goes home to get beads and asks the ancestors to let him live. They let him go/live, they make love, and then they go home.

The magical power of rivers/water was also discussed. When it rains a lot, a powerful animal moves from one river to another, and on its way it destroys houses, etc. The story of the snake in the water was explained.

Image 8. Third focus group comprising on women living in the Mcobaneni community.

A participatory exercise was conducted where participants were asked to rank five concepts relating to water from most important to least important: water to drink; using water to wash laundry; water for bathing; animals' drinking water; and water to look at. The group was told that they all have to agree on the ranking of the different activities. After much deliberation and discussion the following ranking (from most important to least important) emerged:

1. Water to drink
2. Animals drinking water
3. Water for bathing
4. Water for laundry
5. Water to look at.

Placing “animals’ drinking water” before bathing and washing with water may at first seem surprising, but it is understandable considering that they depend on animals like chickens and pigs for food. This also links with the view of respondents that places like the KNP is important to have, mostly because they feel that it is important to ensure that their children will still be able to see the animals in the Park when they grow up. The importance of this was emphasised by Tembisine who said that :

> *“The animals when it die, our grandson or grandchildren can’t know that animal if that animal die, they can’t know it. But if we protect that water, our grandchildren would know that animal. So it’s not right for it to die. It’s good to see the locusts, even here to see the locusts, because I want my grandchild to know the locusts. If I see the locusts I call my grandchild and say come and see the locusts. So that’s why I think it’s important, because if they grow up and don’t know those things it’s not good”.*

Image 9. Focus group participants engaged in theme-based discussion on the value of water and conservation

This shows that some respondents do have a thorough understanding of the importance of water, not just for people but also for animals. Their perceptions of the necessity of the KNP correspond with western views with regards to the need for conservation and for places like national parks. A main focus of areas like this is the need to preserve this for future generations. This suggests that there are commonalities to be found between knowledge possessed by local people and that of western science.

ANALYSIS

Summary of Mental Models encountered

Characteristics of Water

- *Varying perceptions to the source of water* – a variety of explanations exist and emerged in relation to how people understood where water comes from. Many argued that the water comes from ancestors, however ancestors can also take away water. Some simply had no idea where water came from. For others water comes from "white people" where "white people" have a distinct advantage through power, position and education. Others referred to the natural elements such as the rain/sky, and lastly some argued that water comes from God.

- *Water as a finite resource* – It was observed that one factor affecting the perception of water as a finite versus infinite resource was a generational difference. Older participants/respondents regarded water as limitless whereas younger respondents/participants regarded it as not limitless.

- Water as fluid and connecting landscapes, towns, and cities, etc. – respondents did have mental models of rivers as fluid, i.e. "*if people throw things in the river, it will be taken away.*" However, there were very few connections made to upstream-downstream linkages, i.e. "*if people throw things in the river, it will be taken away to another place, to become someone else's problem*."

- *Community-oriented views on water* – in the Mcobaneni community, water was linked to neighbourliness, i.e. a social issue. This view was reflected in knowing what to do to get water, how to share it, etc. Newcomers would not have the same knowledge and experience in obtaining water and/or sharing it and would have to learn. The social dynamic of water was also fostered by the fact that there was one tap in the garden of a particular property. Families who had no direct access to water on their property would obtain it from these sources. If you live near a tank, it is your job to make sure that you fill it, but you may seek the help of community members.

- *Linguistic differences in "nature" and "conservation"* – as a result of a linguistic dynamic, where in siSwati, no linguistic distinction is made between the words for "nature" and "environment", i.e. "Imvelo," siSwati-speaking respondents oftentimes did not differentiate between nature and environment, or sought clarification which required more translation. This may have implications for understanding how the term "conservation" is perceived and understood.

Use and quality of Water

- *Water for people versus the rest* – in the minds of people water for people is still the main objective and most important issue to be addressed. This impacts the idea of conservation and the reasoning behind conservation quite interestingly. If water is there for people then one only has to worry about quantity for human consumption, and not for more abstract reasons such as aesthetic value or biodiversity (to name a few).

- *Knowledge about water quality* – a Western scientific understanding of water is not the predominant mental model in operation in the local communities visited. The community interactions showed that when people were asked about perceptions and knowledge related to water quality, most focus on the colour of water as an indication of its quality. Nevertheless, this way of judging water quality is not consistently linked to either age (life experience) or formal education.

Value of Water

- *Water is life* – Water is valued in that it is necessary in all aspects of life. The idea that "water is life" emerged consistently.

- *Water scarcity* – The perceptions of scarcity is closely linked to understandings related to where water comes from – in other words there is a multitude of understandings concerning not only if water is scarce but also the reasoning behind this scarcity.

The relationship between "Self" and "Conservation"

- *Racially-related disempowerment* – several respondents and focus group members shared the perception that "white people know everything, they must show us [how best to conserve].

- *"Kruger cares more about animals that people"* – focus group 2 participants displayed a fervent dissatisfaction with the KNPs lack of social responsibility to surrounding areas, arguing that the park cares more about animals than people.

- *Understanding water scarcity and conservation* – the community interactions showed that people who do believe that there is water scarcity mostly attributes this to "natural" factors such as seasonal variation or whether there is enough rain in the area where they live. Very few believe it is due to human factors. With regards to reasons given for the existence of water scarcity, age, formal education and water source seem to be more influential factors than livelihoods, although

the community interactions shows that the link between age and formal education and its influence on water scarcity perceptions is complex.

Role of Authority

- *"The government does not know what they are doing" and/or "The government has other priorities"* – The lack of capacity of local government authorities was expressed in the findings by farmers, and water professionals alike. As previously noted, there is a concern about institutions related to the National Water Act (such as Water User Associations that would give farmers a united voice) not being up and running yet and mechanisms such as the licensing system not being properly applied.

- *Opposition to increasing power of industry* – As noted in the institutional findings, the rise in environmental activism in the coal fields area in the Mpumalanga Province is indicative of the increasing disgruntlement of land owners, farmers and residents living in the area with the effects of coal mining on water resources and the quality of soil. A mental model of local environmental advocacy is therefore emerging as it pertains to damage caused by mining companies.

- *Lack of basic services* – Important issues listed in almost all interviews/focus groups was the need for better roads, and more water of a better quality.

Linkages between the "Knowing, Caring, Acting" dynamic

Social sanctioning around water conservation

- *People think and live differently* – social sanctioning around water conservation, wise use: people may know that it is bad to throw dead dogs in the river, but they may not tell others not to do it if they see them doing it. People fear that others will say, "it is not your water, who are you to tell me", i.e. scared of public response to speaking out about "unwise use." This could be attributed to a generational social consciousness, as this view was more often shared by older participants than the findings from the school questionnaires.

Compartmentalisation of Conservation

- *Who can afford to care?* – Can "afford" to care in some ways (i.e. not wasting water), but cannot afford to care in other ways (some participants expressed the sentiment that they cannot use less water since there is already so little). For some participants caring about the environment is a luxury that only the rich can afford, i.e. going to the Kruger Park and caring for animals there.

- *Juxtaposition of water as utility versus water as aesthetic value* – water is important because we use it, it is life. It is not important as a result of its beauty. Here functionality is emphasised over and above the value of beauty and whatever meaning that may bring.

- *Juxtaposition of water as free versus when you have to pay for it* – according to some participants, when you pay for water and a monetary value is attached to water, then it becomes important to conserve, but if it is free, because you do not own it, you cannot tell others what to do with it. Entitlement, way that value is placed on water, if linked to money then it becomes important.

- *Conservation is not internalised* – community members believe it is someone else's problem. This is contrasted with perspectives held by water professionals or those in institutional positions regarding the "polluter pays" principle, and the perception that this principle needs to be more thoroughly enforced, particularly as it pertains to industry. A lack of capacity of local government to grapple with the challenges of environmental accountability was expressed.

- *Judging what is good conservation behaviour* – The vast majority of people in the communities spoken to believe that good water conservation behaviour involves using water sparingly. When these perceptions of good behaviour is compared with the actual behaviour of respondents it was found that overall behaviour is focused on the storing of water, followed by using water sparingly and using multiple sources of water for different purposes. However, these activities are not perceived by the respondents as being part of water conservation behaviour.

"Knowing, Caring, Acting" dynamic as non-linear and non-sequential

- Knowing may not lead to caring, and this may not necessarily translate into acting. Instead, a complex dynamic exists where individuals may or may not know, and/or may or may not care, and/or may or may not act simultaneously. Other socio-cultural, political and socio-economic factors determine the nature and sequence of this dynamic. Examples that reinforce this finding: "for poor people, thinking about conserving water is a luxury".

"Knowing" dynamic pronounced

- There was broad-based awareness of the need for the wise use of water and conservation by the respondents, as well as focus group and interview participants. Even so, factors translating "knowing" about conservation to "caring" about conversation were identified as largely socio-cultural (societal norms), and socio-economic (can people afford to care?). Similarly, for various socio-cultural norms, "knowing" about conservation did not necessarily translate

into acting. The exact factors affecting this dynamic are context specific, but depend largely on the degree to which mental models of conservation are reinforced by more livelihood security or a belief system characterised by socio-cultural, religious and individual world views.

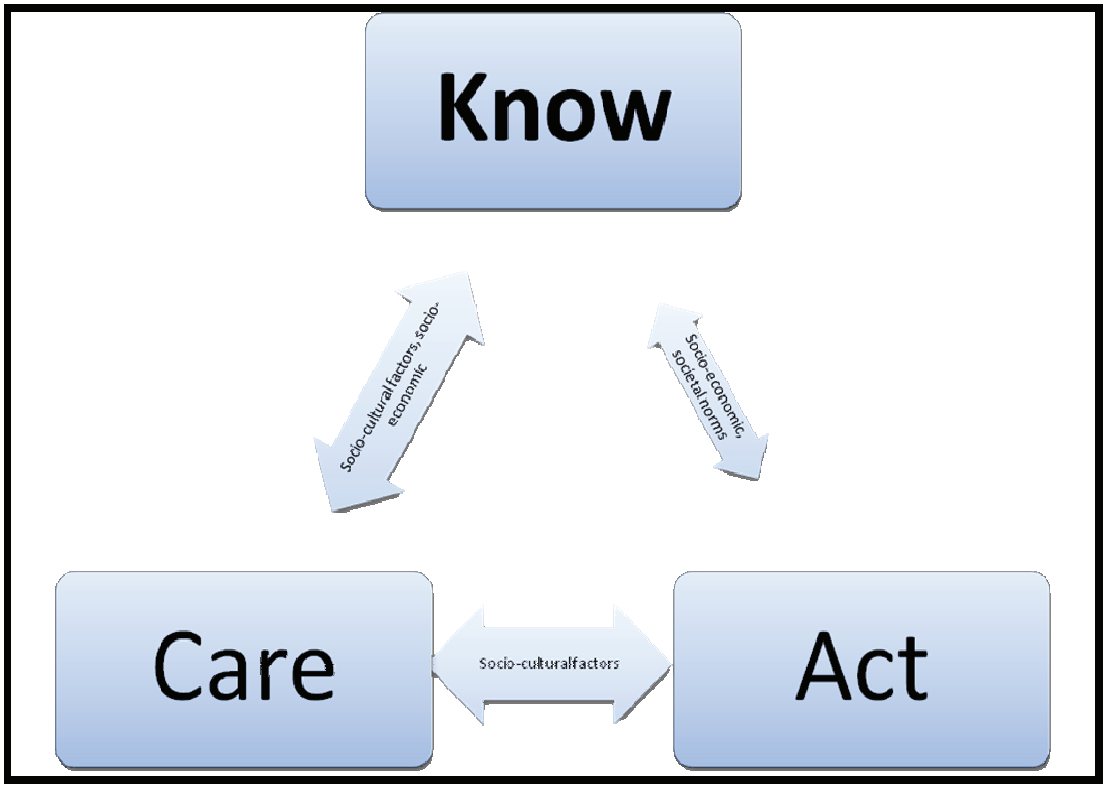

Figure 39. A diagram showing the Knowing, Caring and Acting dynamic.

Conclusion

The focus of the respondents in this study on saving water as part of water conservation behaviour can be linked to the discourse on water demand management where the focus is very much on reducing the amount of water used, which would come through as bringing a message of using water sparingly and not wasting water. Water demand management is an approach that is endorsed by DWEA and it would seem from the answers given by the respondents that the message they are getting is that they have to use less water to conserve water. This emphasis on saving water ignores the other actions which have been mentioned which also include water conservation behaviour. These actions, which these respondents carry out, can and should also be considered to be part of water conservation behaviour.

Thus it is shown that water scarcity is not just physical, but also constructed, which means that uneven access to water also comes into play when discussing water scarcity. It is found that there is still huge inequalities in the distribution and supply of water in

South Africa as the people in the Hazyview area still experience problems in the supply and distribution of water. Therefore in order to address this, policy should not just focus on “saving water”, but also on other activities (like storing and using multiple sources of water) which can also form part of a water demand management strategy. To ask of the respondents in this study, who often go days without water and sometimes up to three weeks, to use even less water than they are using at present, is clearly not a reasonable request. While water conservation needs a balance between a reasonable demand for water and the protection of water resources, there should also be a distinction made between different groups (especially those who have to function within a context of poverty) and the stipulations made on them to curb their demand for water in order to conserve water.

CHAPTER FIVE: CONCLUSIONS & RECOMMENDATIONS

This project sought to investigate the relationship between (1) policy intent, (2) conservation planning and management and (3) societal values and behaviours in relation to conservation, and confirmed the initial premise of connections and understandings not being equally distributed.

The two disconnects, i.e. between conservation planning and an understanding of societal values and behaviours; and between values espoused by policy and held by societal (user) clusters, can be attributed to an array of factors that centre around the lack of societal support, community buy-in, the recognition of constantly changing mental models, and the "diversity within diversity" (or the degree of heterogeneity).

These can be summarised as follows:

- **The dynamic and inter-subjective meaning of conservation**

Conservation means different things to different people/groups of people, which in turn shapes the myriad ways in which they act. The apparent disconnect between our knowledge of freshwater systems, relevant policies and legislation, and conservation successes is therefore in part a failure of planning and management processes to incorporate multiple voices, perspectives and mental models.

- **Analytical tools not reflective of reality**

The analytical tools used to formulate policy and guide management processes are often too rigid to grapple with heterogeneity and its implications for conservation planning and management. During the course of this project, the actor cluster tool provided useful insights but proved to be limited in its utility to adapt to constantly changing mental models, and the overlap of clusters. It also assumed pre-defined notions of conservation as well as pre-conceived notions of the knowing-caring-acting dynamic, which did not necessarily reflect all definitions in the field. Moreover, it increased the risk of producing over-simplistic policy recommendations that were too rigid and unable to adapt to mental models that are constantly changing.

- **Social sanctioning around water conservation**

Social sanctioning greatly affects societal values and behaviours in relation to conservation, a factor often overlooked in conservation planning and management processes and policy intent. This relates to a social consciousness that is directly related to the collective, i.e. community, family, etc.

- **Compartmentalisation of Conservation**

Several community perspectives reflected a compartmentalisation of conservation that was based on the relationship between conservation and poverty, or poverty and resource use. The notion of caring about conservation highlighted social inequalities, i.e. poor people cannot afford to care about conservation; or the limitations to the availability of resources, i.e. some participants expressed the sentiment that they cannot use less water since there is already so little. This finding explains, to some degree, the perceived unwillingness by communities/individuals to comply with regulations and policy interventions.

- **Juxtaposition of water as utility versus water as aesthetic value**

It can also be concluded that the juxtaposing of water as having socio-economic utility, and water as exhibiting an aesthetic property, contributes to the disconnect between people and societal values in relation to conservation and conservation policy and planning processes. Policies need to be designed to cater to these different perspectives and conservation efforts need to accommodate these different needs if they are to have community buy-in and commitment.

- **Juxtaposition of water as free versus when you have to pay for it**

Societal behaviour, as it relates to conservation, is also strongly affected by whether people pay for services that rely on natural resources, such as water supply. Attaching a monetary value to resources increases the need to conserve. This raises interesting questions on the free basic water, common pool resources and polluter pays principles, and greatly affects policy making processes that negotiate the inclusion of these and other principles pertaining to the value (monetary or otherwise) of resources.

- **Conservation is not internalised**

The need to conserve was given less priority because it was viewed as being someone else's problem, i.e. government, parks, researchers. This was contrasted with perspectives held by water professionals or those in institutional positions regarding the "polluter pays" principle, and the perception that this principle needs to be more thoroughly enforced, particularly as it pertains to industry. This indicates that conservation as an emerging norm has not been fully socialised into the mental models of enough people for it to be regarded as a collective or shared standard of behaviour in many communities. Sticks (enforcement) or carrots (incentives) are still needed to ensure compliance. It is only once conformance with its dictates is no longer (or at least rarely)

questioned that conservation as a principle and norm is socialised and internalised into the individual's sense of self. The individual does this by acknowledging the prescribed behaviour as correct, and makes them 'its own,' thus aligning its existing interests and preferences with them. Increasing an individual's sense of environmental accountability is therefore a major challenge. A lack of capacity of local government to grapple with the challenges of environmental accountability was expressed.

- **Judging what is good conservation behaviour**

As previously noted, conservation has a multiplicity of meanings. These meanings often dictate what is considered as appropriate or good pro-environmental behaviour. The vast majority of people in the communities spoken to believe that good water conservation behaviour involves using water sparingly. When these perceptions of good behaviour is compared with the actual behaviour of respondents it was found that overall behaviour is focused on the storing of water, followed by using water sparingly and using multiple sources of water for different purposes. However, these activities are not perceived by the respondents as being part of water conservation behaviour. Conservation planning and management as well as policy interventions need to acknowledge the diversity of understandings of what is considered to be "good" conservation behaviour and how this may not always be a deliberate effort on the part of individuals but mere work practice, "the way we do things around here," or culturally prescribed.

- **"Knowing, Caring, Acting" dynamic as non-linear and non-sequential**

The findings revealed that the KCA dynamic is non-linear and non-sequential. Knowing may not lead to caring, and this may not necessarily translate into acting. Instead, a complex dynamic exists where individuals may or may not know, and/or may or may not care, and/or may or may not act simultaneously. Other socio-cultural, political and socio-economic factors determine the nature and sequence of this dynamic. Examples that reinforce this finding: "for poor people, thinking about conserving water is a luxury". This realisation influences policy interventions and conservation planning efforts in several ways. First, planning and policy making processes need to be iterative in design and not assume that efforts to increase awareness and knowledge on conservation will automatically lead to people caring more and acting in a pro-environmental manner. Feedback loops and constant engagement facilitate this incremental process of bridging the divide between society and policy and planning processes. Similarly, conservation projects should be designed with two-way learning exchanges between project members and community members. This approach produces holistic and integrated findings as well as policy recommendations that were locally driven but also provincially, nationally and regionally applicable. In so doing, such projects sketch the social complexity of the issue at hand – multiple understandings of conservation.

❖ **"Knowing" dynamic pronounced**

As previously noted, evidence of broad-based awareness of the need for wise use of water and conservation was found in all research methods used from questionnaire, to focus groups and interviews. However, factors translating "knowing" about conservation to "caring" about conversation were identified as largely socio-cultural (societal norms), and socio-economic (can people afford to care?). Similarly, for various socio-cultural norms, "knowing" about conservation did not necessarily translate into acting. The exact factors affecting this dynamic are context specific, but depend largely on the degree to which mental models of conservation are reinforced by livelihood security or a belief system characterised by socio-cultural, religious and individual world views. The implementation of policy interventions and planning efforts therefore need to articulate which part of the KCA dynamic they will target and how, as well as what the effects would be on the other two parts.

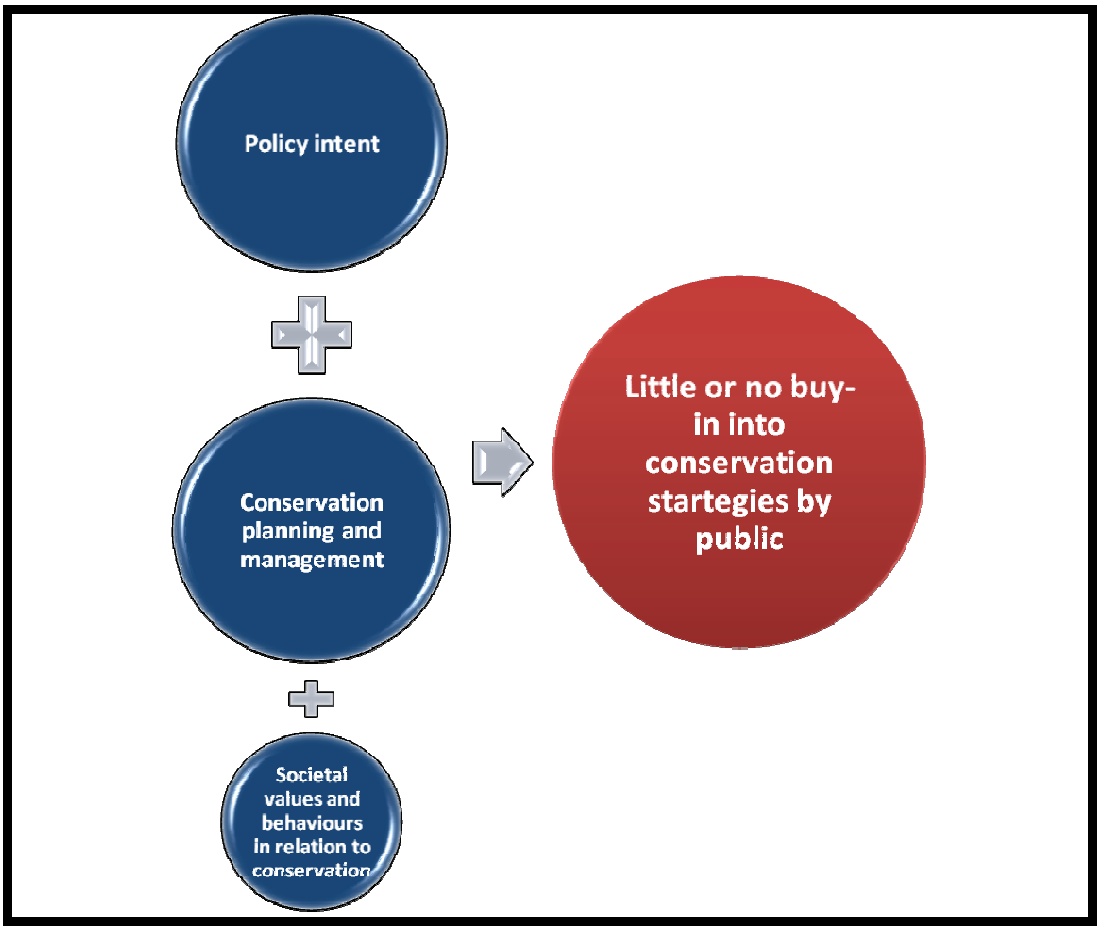

Figure 40. Unequal distribution of input into the conservation planning process.

In conclusion, this report acknowledges that we are currently faced with a situation as presented in Figure 40, where the inputs from societal values and behaviours in relation to conservation is largely ignored, not deemed important or not understood within its context. What we argue is that in order to achieve better conservation (and by this we

mean conservation that is scientifically rationalised and implementable but also socially embedded and internalised), equal footing should be given to understanding the role of societal values and behaviours in relation to conservation (Figure 41).

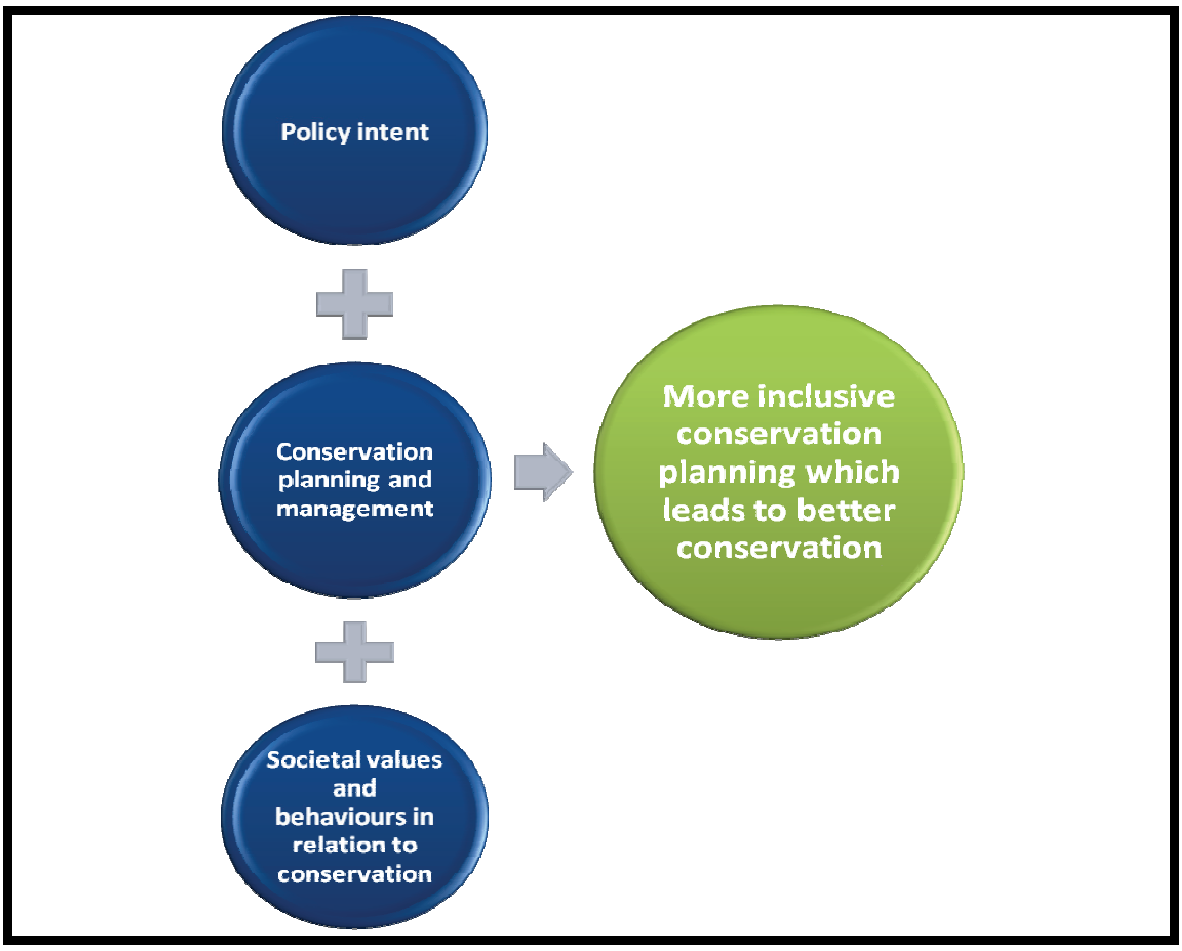

Figure 41. More inclusive approach to conservation planning.

Without seeking and securing societal support (and without understanding shifts in societal support and what it values), policy, planning and management in relation to conservation will take place in a vacuum. Within such a situation, it is unlikely that conservation as a value will secure popular support and any behaviour associated will reflect this attitude. If this situation is perpetuated, conservation cannot hope to achieve its objectives through voluntary support, perhaps only through compliance enforcement and policing mechanisms. Even so, serious note should be taken here. What we are arguing for is not as simple as more public participation, rather what is needed is a different understanding of the process altogether. This understanding needs to recognise not only the complexity of the actors involved but also their embeddedness into different contexts; be they social, cultural, economic, political, etc. Finally we argue that such a process can only be successfully completed by multi-disciplinary teams, as these foster new ways of thinking; and a harmony of different voices made up of policy, science and society.

FURTHER RESEARCH IMPLICATIONS

As mentioned earlier in this document, due to its adoption of a multi-method data collection strategy and an equally diverse analysis strategy, this final report is a useful prototype, serving as a basis for future research on how socio-cultural perspectives influence conservation, whether it is planning, policy or implementation. The following are a few suggestions on how the research conducted for this report can be advanced:

- *Research investigating the hydro-social contract at community level* – not enough research is being conducted which tries to unravel how communities understand, use and value water. Furthermore, how does one effectively harness this understanding to influence conservation planning, policy and implementation in such a way that is it both scientifically sound but also sensitive to the needs of poorer communities.

- *Research investigating the link between poverty and conservation* – this study asks the question whether or not conservation is a 'luxury' for poorer communities. How much does conservation cost – and in this costing where does monetary value stop being the driving force and at what stage is it replaced by perceptions of morality.

- *The conservation process, a culmination of different voices* – this study argues that successful conservation processes requires a harmony of different voices – policy, science and society. Who are the unseen, yet not unfelt actors like big business, and what role can they play here?

- *Urban vs. Rural debate* – research looking at people and conservation tend to focus on those communities who live in the rural areas of the country. This focus has primarily been the result of the so-called close proximity between people and nature in these areas. What about people in urban areas? Here we refer not only to the urban poor but also the urban rich who have both education and monetary wealth at their disposal.

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APPENDIX A
Interview Briefing Note for Experts

Background and Motivation for the Research Project

There is a growing recognition that there is an implementation crisis in the field of (freshwater) conservation (Knight *et al*., 2006). Simultaneously, there has been an ever-growing realization that solutions for this crisis should be sought outside the technical conservation process and beyond the confines of the natural sciences. For this reason, the broader socio-economic and political landscape within which conservation management and planning occurs should be taken into account.

One aspect of this broader landscape that requires further investigation is the need to understand, influence and change the behaviour and attitudes that society has towards the environment. It is necessary for society to be more aware of the value of a healthy environment, for the wellbeing of both current and future generations. But how does one define this 'society' – 'the public at large' – 'the stakeholders'. Often this grouping is assumed to be homogenous and a one-size-fits-all approach is often applied to public participation processes, awareness and communication campaigns, and implementation strategies. A heterogeneous understanding of society is needed if we are trying to identify ways in which to improve the effectiveness of freshwater conservation.

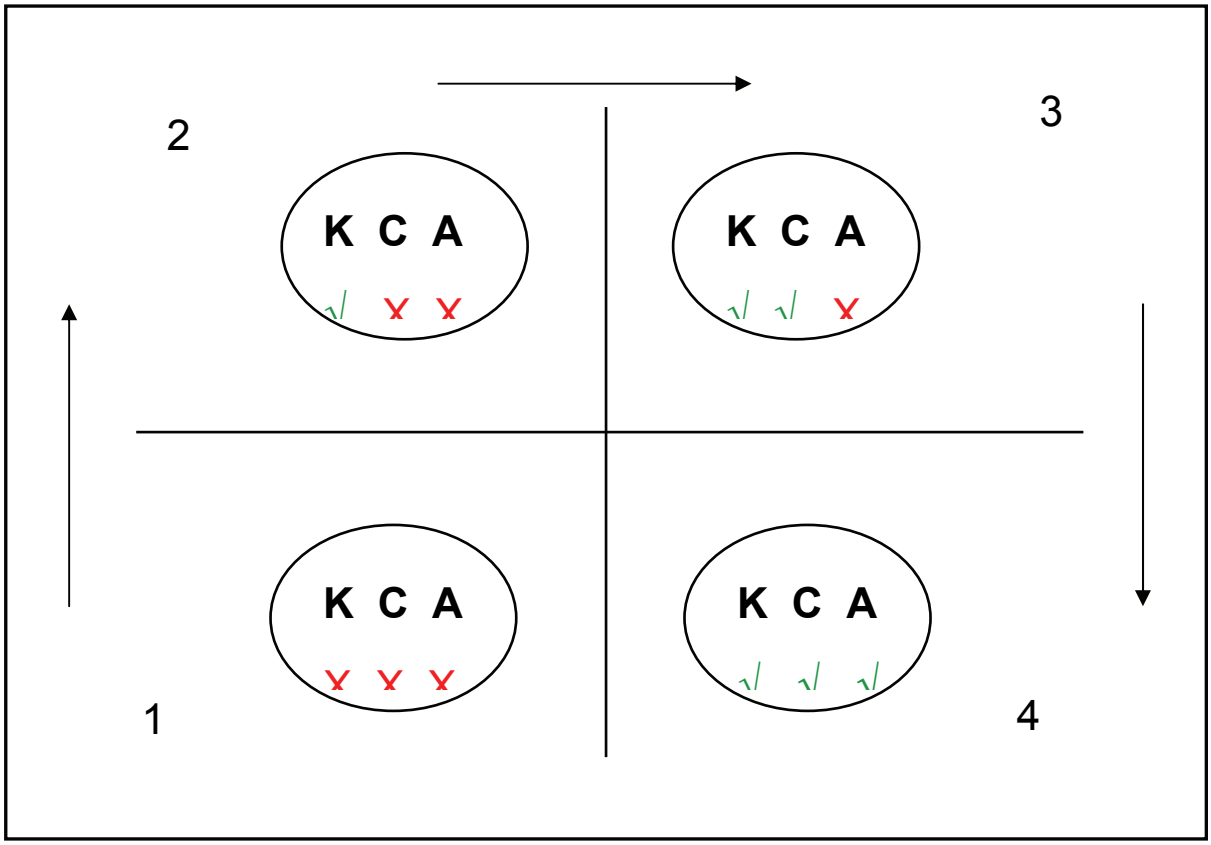
Four potential clusters have been differentiated in an attempt to articulate the heterogeneous nature of society. They are illustrated in below and described as follows:

1. People or institutions that do not know that the conservation of freshwater resources is important, and therefore do not care or act.

2. People or institutions that know that the conservation of freshwater resources is important, but do not care or act for a variety of reasons.

3. People or institutions that know that the conservation of freshwater resources is important and care about freshwater resources but do not act for a variety of reasons.

4. People or institutions that know that the conservation of freshwater resources is important, care about freshwater resources and act in the interests of conserving freshwater resources.



A matrix of four potential clusters articulating the heterogeneous nature of society (individuals and institutions) [K=knowing; C=caring; A=acting]

There are also a number of sub-clusters as this categorization is broad and generalizing. Some of these include:

Sub-cluster 3

People or institutions that know that conservation of freshwater ecosystems and resources are important but do not have the resources to act.

Sub-cluster 4

People or institutions that know that conservation of freshwater ecosystems and resources are important and that care but act inappropriately.

Sub-cluster 4

People or institutions that know that conservation of freshwater ecosystems and resources are important and that care, but act selectively.

The clusters and sub-clusters are by no means neatly defined or delimited and many more no doubt exist.

The aim of this exercise is to discuss and attempt to further understand the conceptual foundations of this concept to understand a heterogeneous society and the knowing, caring, acting repertoire of society and the interlinkages between these steps towards pro-environmental behaviour.

Some Key Discussion Points / Questions

1. The trajectory from knowing to acting – (1) is this trajectory a correct assumption? If so then (2) how does one move from one position to the next?

2. Should we be focusing on individuals or institutions in order to improve the effectiveness of conservation?

3. What are some of the characteristics of the clusters?

4. What are the barriers from moving from 1 to 4 on the matrix?

5. Can we equate Knowing to Awareness; Caring to Attitudes/Values/Policies; Acting to Behaviour/Implementation

APPENDIX B
Participants in Expert Discussions

Participants in Expert Discussions

Name of Participant	**Background Discipline**
Dianne Scott	Social Science (Human Geography)
Zoe Wilson	Political Science
David Hemson	Social Science (Service Delivery)
Sheona Shackelton	Natural Resource Management
Michelle Cocks	Cultural Diversity
Karen Ellery	Education (Environmental)
Carina van Rooyen	Anthropology and Development Studies
Ingrid Marais	Anthropology and Development Studies

APPENDIX C

Agenda of Project Team Focus Group Discussion on Actor Clusters

KNOWING, CARING, ACTING: MAKING USE OF SOCIO-CULTURAL PERSPECTIVES TO UNDERSTAND AND IMPROVE CONSERVATION

MEETING TO DISCUSS DELIVERABLE 2: ACTOR CLUSTER REPORT
1st August, 2008: Lakeside

Agenda – 8.30am to 12.30pm

1. Introduction: Karen Nortje.

   - ✧ Overview of KCA project
   - ✧ Background on "Actor Clusters"

2. Defining the actor cluster groups:
   - ✧ Importance of an interdisciplinary research approach
   - ✧ Unpacking and challenging the assumptions

3. Exploring the barriers to change:
   - ✧ Intent: defining SD; Environmental Justice
   - ✧ Contextual issues
   - ✧ Imperatives to influence change in order to achieve policy coherence and implementation
   - ✧ Overcoming the barriers – legislation, education, governance, etc. Issues of scale – individual; institutional

4. Close of meeting

5. Lunch

APPENDIX D
Fieldwork schedule for data collection

Fieldwork schedule for data collection

Two fieldwork trips have been scheduled for the data collection. The first is a trip to the see Lowveld area (see schedule below) including the local municipality of Bushbuckridge. Another is planned for November 2009 that will focus more on the small town of Hazyview and the communities adjacent to the Kruger Gate of the Kruger Park.

LOW VELD FIELD TRIP
14-18 SEPTEMBER 2009

	Interviewee	Professional Affiliation	Date	Place of interview	Other
1.	Jacobus Pretorius	Environmental Activist • Escarpment Environmental Protection Group • Mpumalanga Lakes Group	14 Sept 2009	Farm (Eerstelings-fontein)	Cherry Farmer
2.	Ester	Mother	14 Sept 2009	Bus buckridge (on the street)	Unstructured interview (not totally questionnaire based)
3.	Philemon	Fruit stall on the roadside	14 Sept 2009	Bushbuckridge (on the street)	Unstructured interview (not totally questionnaire based)
3..	Craig McLoughlin	San Parks	15 Sept 2009	Hazyview coffee shop	Works for San Parks on a WRC contract
4.	Phatfwa High	Rural High School	15 Sept 2009	Just outside White River at the School	• About 80 questionnaires answered • Grade 10 and 11 students • 800 students • Language is mostly SiSwati

	Interviewee	Professional Affiliation	Date	Place of interview	Other
					• Students come from the rural areas surrounding White River
5.	Godfrey	Teacher at Phatfwa High	15 Sept 2009	Just outside White River at the School	-
6.	Dennis	Local craftsman	15 Sept 2009	Stall coming into Hazyview	-
7.	Rindzeni High School	Rural High School	16 Sept 2009	Bushbuckridge	• About 140 questionnaires answered • Grade 10 and 11 students • 600 students at the school • Language is mostly SiSwati • Children all come from Bushbuckridge
8.	Shadrack Ngobeni	Teacher at Rindzeni High	16 Sept 2009	Bushbuckridge	Unstructured interview (not totally questionnaire based)
9.	Julia Hlobela and Nyiko Mahlalela	Environmental Desk: Bushbuckridge Municipality	16 Sept 2009	Bushbuckridge	-
10.	Darryl Cross	Sabie River Canal Association	16 Sept 2009	Hazyview: Idle and Wild Lodge	Deputy director of irrigation board
11.	Skukuza Primary	Primary school for Kruger National Park employees	17 Sept 2009	Skukuza Staff Village	• 23 questionnaires answered • Grade 7 students
12.	Lowveld High	Urban high School	18 Sept 2009	Nelspruit	• About 60 questionnaires answered • Grade 10 and 11 students

	Interviewee	Professional Affiliation	Date	Place of interview	Other
					• 1190 students in the school • Language groups are English, Afrikaans, SiSwati • Children come from Nelspruit, Hazyview, White River, Skukuza, Numbi, Malelane
13.	Vusi Zwane	Mbombela municipality: Environmental Desk	18 Sept 2009	Nelspruit	-

APPENDIX E
Interview Guide for Community Interviews

INTERVIEW GUIDE FOR COMMUNITY INTERVIEWS

General information

1. Have you lived in this area your whole life? If not, where are you from originally?
2. What is the size of your household?
3. How do your family make a living? (jobs, grants, vegetable)
4. Gender, age, education?
5. Would you nominate five issues of concern which you think is most important in your village?

Theme 1 Water source

Where household get water from

Questions to ask include:

1. Tell me about where your water comes from (river, dams, taps, boreholes, rain)
2. Tell me about any difficulties you have in obtaining water.
3. Do you collect rainwater or use water more than once (recycle water)? If yes, how do you recycle water?
4. What is the most often used source of water in your household?
5. What is the most often used source of drinking water in your household?
6. In the past year, how often did you experience cut-offs or interruptions in water service?
7. From what source did your household get water yesterday?
8. If you experienced water interruptions, what do you think is the reason for this?
9. What are your main and what is alternative sources of water (if main sources are not adequate for some reason)?
10. How do you store water?
11. Do you get enough water from the current water delivery system?

Who is responsible for collecting/fetching/paying for water?

Questions to ask include:

1. Who is responsible for collecting water?
2. Who is responsible for hygiene and sanitation in your household?
3. Who is responsible for payment of water in your household?

Payment for water (if pay)

Questions to ask include:

1. How has the cost of water changed over the last 5 (10) years?
2. Has your household has water cut-offs for non-payment in the past year?
3. Do you have Free Basic Water (FBW) here? How does it work?
4. When did you first get FBW?
5. What are the good things about FBW?
6. What are the bad things about FBW?
7. What do you think of the amount you pay for water at the moment?

Theme 2 **Water use: What** (real, changes, historical)

1. What do your household use water for – domestic (bathing, drinking, washing, cooking) & productive?
2. On average, how much water does your household use each day for all purposes?
3. What kind of toilet does your household use?
4. In the past year, did you or any of your household members not have enough water to drink or do any other household tasks?
5. What strategies do you have for improving you water use?
6. What kind of water insecurity do you experience?

Theme 3 **Water use: How** (Behaviour)

Domestic use of water

Questions to ask include:

1. Do you turn off taps after using it?
2. Do you have any water problems related to your household?
3. Tell me about some coping strategies you employ when you do not have enough water.

Productive use of water

Questions to ask include:

1. Do you grow vegetables to sell?
2. Any other sources of income, e.g. business, hair salon, etc.?

Cultural or social use of water

Questions to ask include:

1. Do you have any rules regarding water use in your community?
2. How would you change how you use water if water supply in your community improved?

3. What do you (as a community) do if it does not rain enough?

Theme 4 **Perceptions** on water, water scarcity, value of water

Water

Questions to ask include:

1. Should humans take care of the environment, especially rivers?
2. What do you think about the water usage of your neighbours?
3. Do humans abuse the environment?
4. Should water resources be protected from other people or pollution?
5. What health hazards are there to water?
6. How do you know when water is of good or bad quality?
7. Does the quality of water change often, do you know when it is going to change, how do you know this?

Water scarcity:

Questions to ask include:

1. Do you think there will be enough water for your children and grandchildren in the future?
2. Should we reduce consumption levels of water for the well-being of present and future generations?
3. Do you think water is a limitless resource without restrictions for human use?
4. How would you change the way you use water if you perceive water is getting less?
5. Do you think you live in a land of plenty?
6. Have you ever experienced a situation where you did not have enough water, if yes, how did you deal with it?
7. Are you scared of water scarcity in the future, do you think there will be enough water for the whole community in the future?
8. If you do experience water scarcity, do you think it is seasonal or permanent?
9. Tell me about whether you view water scarcity as an individual or community/village level problem.
10. If you had more water what would you do with it?
11. Is water becoming less? If yes, what do you think are the reasons for this?
12. How do you know when you have or don't have enough water?
13. What is "enough" water?

Valuing of water:

Questions to ask include:

Should we pay for water?

Theme 5 **Source of perceptions** (Attitudes)

Questions to ask include:

1. Do you own a television/radio?
2. Do you have access to Internet or a computer?
3. Tell me about how you got water as a child.
4. Where did you learn about where water comes from?
5. Where did you learn how to use water?
6. Tell me about your perceptions of water quality in your community. Any complaints about the quality of water?
7. What do you think about the safety of water and whether it is safe to drink?
8. Tell me about any difficulties you have in getting water.

APPENDIX F
Focus Group Themes

FOCUS GROUP THEMES

Theme 1 **Source of perceptions** (Attitudes)

Questions to ask include:

- Do you own a television/radio?
- Do you have access to Internet or a computer?
- Tell me about how you got water as a child.
- Where did you learn about where water comes from?

Theme 2 **Cultural or social use of water**

Questions to ask include:

- Do you have any rules regarding water use in your community?
- How would you change how you use water if water supply in your community improved?

a. What do you (as a community) do if it does not rain enough?

Suggestions for activities

b. Tell us a story that you learned from childhood about water?
c. Do you know any songs about water?
d. Are their ancestral beliefs about water? Tell us about them.

APPENDIX G
Questionnaire

QUESTIONNAIRE

Name	
School	
Would you prefer to stay anonymous?	

Question 1a.
What do **you** understand with fresh water conservation?

Question 1b.
What do you think caring for or looking after your water means?

Question 2.
How would **you** care for or look after your water? (The ideal situation – if you have everything that you need in order to do it.)

Question 3.
Do you care for or look after your water?

Yes		No	
How? Give an example.		If not why not? Explain	

Question 4a.
Do others care for or look after your water?

Yes		No	
Who?		Why not? Explain	
How? Give an example.			

Question 4b.
How can you get other people to care for or look after your water?

Question 5a.
Which one of the following statements would describe your situation the best? Mark only one.

I waste a lot of water	
I can use water more sparingly	
I only use the water that I need	
I use water very sparingly	

Question 5b.
Which one of the following statements would describe how you feel the best? Mark only one.

I will use less water if it will ensure that there is enough for all in South Africa	
I will use less water if it will prevent the over-exploitation of our water resources	
I will rather pay more so that I can keep on using the same amount of water that I do at this time	

Question 6a.
Do you think the people who provide us with Freshwater will be able to keep doing this in the future (2025)?

Question 6b.
If not, why will they not be able to provide is with water in the future?

APPENDIX H
Interview Consent From

INTERVIEW CONSENT FORM

Name of Interviewer: _____

Organisation: Council for Scientific and Industrial Research, Pretoria

Funded by: Water Research Commission

Project:

Purpose of Interview: The purpose of this interview is to contribute to fieldwork for data collection.

The researcher/s are: _____

Agreement:

1. I agree to be interviewed for the purposes of the research project named above.
2. The purpose and nature of the interview has been explained to me.
3. I agree that the electronic interview may be recorded for research purposes.
4. Choose a), b) or c):

   a). I agree that my name, and affiliation to _____ may be used for the purposes of the assignment only and not for publication.

   OR

   b). I understand that the researcher may wish to pursue publication at a later date and my name and affiliation to _____may be used.

   OR

   c) I do not wish my name to be used or cited, or my identity otherwise disclosed, in this research project or related articles.

Name of interviewee (Optional)_____

Signature of interviewee_____ Date_____