

The Water Sector Institutional Landscape by 2025 Technical Report

Report to the
Water Research Commission

by

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Executive Summary

The research project set out to build knowledge about key drivers and uncertainties related to the future of the South African water sector institutional landscape. The project team made use of a broad range of methods, such as interactive workshops, semi-structured interviews and a web-based survey to get inputs from rural- and urban-based stakeholders from different cultures and with different educational backgrounds. There are two broad approaches that can be followed for the development of scenarios. The one approach allows multiple drivers to be incorporated in different combinations to describe diverse, but plausible scenarios. The other approach is where drivers are simplified to two key drivers, which are presented as a 2x2 matrix, thus creating four scenarios. This approach results in scenarios that are easier to communicate, but may oversimplify future conditions. The multiple driver approach was followed in this project, with the resultant scenarios and stories from different perspectives being presented in the report. The drivers were then consolidated after strategic conversation workshops, to also produce 2x2 matrix scenarios.

In the first approach, 27 driving forces of the water sector institutional landscape were identified, which were believed to be important influences on the water sector towards 2025 and where the uncertainty about future trends in the drivers were high. These driving forces were grouped into four categories: Strategic planning in South Africa; Operational issues in the water sector; Institutional capacity in the water sector and Societal issues impacting on the water sector. The three scenarios and associated stories presented in the report describe plausible combinations of the 27 driving forces that were identified.

In the second approach, the higher-level uncertainties were clustered, and two pivotal key uncertainties were defined. These were the Decision-making paradigm (ability to deal with complexity) and Sustainability (keenly sensitive to sustainability issues versus exploitation regardless of sustainability). The pivotal issues resulted in the development of four scenarios. In the “Wise Tortoise” scenario, the decision-making paradigm deals with complexity, and is keenly sensitive to deal with sustainability issues. In the “Busy Bee” scenario there is a keen sensitivity to deal with sustainability issues but the decision-making paradigm fails to deal with complexity. In the “Ignorant Ostrich” scenario, there is exploitation regardless of sustainability and the decision-making paradigm fails to deal with complexity. The “Greedy Jackal” scenario represents a landscape where the decision-making paradigm deals with complexity but exploitation continues regardless of sustainability.

Both of these sets of scenarios describe future worlds that hold implications for social and economic development, as well as for water resources and water services. This research provides stakeholders and policy-makers in South Africa’s water sector with valuable insights to strengthen decision-making and to counter undesirable trajectories of change. It also empowers role players such as politicians and policy-makers, government officials, the private sector, civil society, the urban middle class and poor rural communities to engage in participative governance.

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1 Introduction

The Water Research Commission initiated the research project to build knowledge about key drivers and uncertainties related to the future of the South African water sector institutional landscape. The focus was on water resource management in the country, with relevance also to the water services sector. The institutional landscape referred to the context in which water institutions would operate in the future, rather than different operational models or configurations for water institutions. This knowledge has been translated into different scenarios (or stories) that hold potential implications for social and economic development, as well as for water resources and services. This research provides stakeholders and policy-makers in South Africa's water sector with valuable insights to strengthen decision-making and to counter undesirable trajectories of change. The knowledge produced through this project will not only benefit resource managers and decision-makers, but will empower all role players in the water sector to engage in participative governance. Role players include politicians and policy-makers, government officials, the private sector, civil society, the urban middle class and poor rural communities.

The knowledge for this project has been generated and sourced through structured research, by means of targeting existing and new institutional structures, to ensure a far-reaching participative process and the involvement of a broad range of stakeholders. The project team identified water-related needs, priorities and uncertainties from diverse perspectives through engagement with different stakeholder groups. The project team made use of a broad range of methods, such as interactive workshops, semi-structured interviews and a web-based survey to include rural- and urban-based stakeholders from different cultures and with different educational backgrounds. Since the project was built on a process of continuous learning and feedback, participants in the research process also improved their understanding of the development and application of scenarios. The shorter report, which focuses on four different futures for the South African water sector institutional landscape, will be widely distributed to stakeholders to support the overarching objective of strengthening institutional development. Due to the inherent evolution of the social process which underpins the scenario development process, the research has been iterative and has allowed for continuous assessment, learning and adaptation.

2 Method

2.1 Methodological approaches to building scenarios

The National Water Act (Act 36 of 1998) and National Water Resource Strategy (DWA, 2004) introduced significant changes to the water sector institutional landscape. These changes are strong drivers for the democratisation of governance. The redefined roles of National, Provincial and Local Government reflect the decentralisation of power and the increased

opportunities for participation. Furthermore, Forums, Utilities and Catchment Management Agencies (CMAs) are being established and are starting to carry out their responsibilities. The approach to developing scenarios was thus based on broad participation of existing and new institutional entities in the process. This brought about mutual benefit. The credibility of the institutional structures was strengthened through providing opportunities for all stakeholders to voice their opinions on the future and receive feedback and products through the same channels. Likewise, the scenario development process benefitted from facilitated access to a broad range of stakeholders. The uncertainty associated with the social process of scenario development called for an adaptive process, where new information may become available or our understanding or expectations may change.

The concept of scenario planning has its origin in military applications, with the United States (US) Air Force developing "scenarios" of what the enemy might do and preparing alternative strategies. It was thus aimed at achieving a desired outcome in an uncertain future (Mietzner & Reger, 2004). At the end of the 1940s, researchers at the RAND Corporation (Santa Monica, California) started to investigate the scientific use of expert opinion in planning for the future (Landeta, 2006). The Delphi method became a popular technique for forecasting and decision-making based on the opinions of experts on issues of the future (Glenn & Gordon, 2003; Landeta, 2006; Banuls & Salmeron, 2007). Mietzner & Reger (2004) summarised various definitions of scenarios, ranging from "*... narrative description of a possible state of affairs or development over time ...*" and "*... useful to communicate speculative thoughts about future developments to elicit discussion and feedback, and to stimulate the imagination ...*" so "*... they can dramatise trends and alternatives, explore the impacts and implications of decisions, choices, policies, etc., and provide insights into cause-and-effect sequences*".

The Royal Dutch Shell company employed scenario tools to good effect in the 1970's, when they improved their size and profitability by being prepared to act quickly during the oil price shock of 1973 (Daum, 2001). Royal Dutch Shell is often seen to have led scenario development internationally, but Clem Sunter is credited with popularising the use of scenarios in South Africa, with "*The World and South Africa in the 1990's*", which described the "High Road" and "Low Road" scenarios (Sunter, 1987). The publication was based on work from Anglo American Corporation teams in London and Johannesburg, which included Pierre Wack and Ted Newland, who were both previously with Royal Dutch Shell. Scenarios also played an important role in the history of South Africa. Adam Kahane facilitated a process that became known as the Mont Fleur scenario project, which was launched in 1992. It explored the question of "*What will South Africa be like in the year 2002?*". These scenarios were arrived at collaboratively by a very broad group. All members of the team endorsed them, not as desired futures, but as valid mental models for how the future might unfold (Kahane, 1996, quoted in Galer, 2004). The Department of Arts, Culture, Science and Technology (DACST) also deployed scenarios and technology foresighting in the development of South Africa's National Research and Development Strategy, with Kahn initiating and leading the development of the South African National Research and Technology

Foresight Project (DACST, 1999). In that case, a Delphi approach was followed to derive macro-scenarios. Some of the recent scenario projects in the water sector include the World Business Council for Sustainable Development report on "*Business in the World of Water: WBCSD Water Scenarios to 2025*" (WBCSD, 2006), and the Global Research Alliance (GRA) report on "*Science and Technology-based Water Scenarios for sub-Saharan Africa*" (GRA, 2006). The Dinokeng team (2009) developed "3 Futures for South Africa", which characterised future scenarios based on the effectiveness of the state and the engagement of society.

From the above, it is clear that there is a range of dimensions, approaches and outcomes for scenarios. Some of the variables that characterise scenarios are related to temporal scale, spatial scale, level of multi-disciplinarity, level of engagement and level of quantification. Furthermore, a Delphi approach moves towards consensus on key issues and scenarios, whereas scenarios in the public interest deploy a diversity of inputs to characterise divergent (though plausible) futures. In this case, it is more about exposing different possibilities than agreeing on specific future realities.

The approach followed for the development of scenarios related to the water sector institutional landscape by 2025, was based on the framework suggested by Shell (2003), with specific steps drawing on international best practice and personal experience. The framework refers to five broad phases, being Preparation, Pioneering, Map-making, Navigation and Reconnaissance.

While this project was focussed on phases 1-4, the benefits of a scenario process are often realised in phase 5, where the scenarios are used by different actors in the sector. Schwartz (1991) suggests a 6-step process for developing scenarios (a-f). Listing these as steps under the 5 phases mentioned above, the suggested process is as follows:

- 1 Preparation
 - a. "*Identify focal issues or decisions*" – What impending decision keeps you awake at night?
 - b. "*Key forces in the local environment*" – What key factors will determine the success or failure of the critical issue?
 - c. "*Driving forces*" – What are some of the driving forces creating change in the wider world?
 - d. "*Rank by importance and uncertainty*" – The driving forces are ranked by importance and uncertainty: most important and most uncertain.
- 2 Pioneering
 - e. "*Select scenario logic*" – The scenario logics are selected and the scenario matrix is created
 - f. "*Fleshing out the scenarios*" – Referring to the key factors, suggest plausible events that might create that state.
- 3 Map-making – How does the decision look in each scenario?
- 4 Navigation – Find indicators or signposts that are heading toward one or another of these scenarios.

5 Reconnaissance – Interpret signals, share perspectives, recognise differences

In developing scenarios for Uganda (Society for International Development, 2005), Heinzen added a step called the "Picture of Now" to the above steps. This describes the present and how we got here. It is also important, as it helps create agreement in a fractious group and also helps them understand how the whole system works. It should also identify new forces that could change things we had previously taken for granted.

In a more recent application the 2030 Water Resources Group (2009) developed tools such as the cost curve and gap models, to provide critical insights for those engaged in transforming a national water agenda. They concluded that the first step in applying these tools is to construct a set of future scenarios that represent relevant choices facing the country. A scenario approach is chosen because it allows decision-makers to separate the problem of choosing an appropriate mix of economic activities, from ensuring that those economic activities are sustainable. Through this process, policymakers can construct scenarios to assess the impact of policy decisions on water demand. The 2030 Water Resources Group identified the scarcity of resources for development as a key issue for South Africa, in particular the competition across sectors. Their scenario process explicitly distinguished endogenous and exogenous factors. Endogenous factors are subject to the direct influence of decision-makers and stakeholders and may include future energy use, industrial growth, and agricultural production. The 2030 Water Resources Group concluded that exogenous assumptions are those that countries may not directly influence in the short term, for example, climate change. In shaping a trajectory towards sustainable water management, a country would focus primarily on the endogenous drivers, conducting a high-level dialogue on broader economic questions. The scenarios of what the water future of a basin or country may look like can then be used to facilitate a discussion around the trade-offs that countries face. The output of such discussions is a shared, quantified vision of how the country can best meet its development objectives in the context of limited water resources.

2.2 Project reflections on method

There are two broad approaches that can be followed for the development of scenarios. The approach described above was followed by the GRA, when they developed Science and Technology-based Water Scenarios for sub-Saharan Africa (2006). The benefit of this approach is that multiple drivers can be incorporated in different combinations to describe diverse, but plausible scenarios. The other approach is where drivers are simplified to two key drivers, which are presented as a 2x2 matrix, thus creating four scenarios. This approach results in scenarios that are easier to communicate, but may oversimplify future conditions.

3 Stakeholder Interaction

Traditionally scenario development and feedback has taken place by using methods such as central workshops, electronic communication and professional networks. The weakness of these methods, however, has been that they discriminate explicitly against equitable access to information and participation. In a country that is as richly diverse as South Africa, in terms of educational levels, access to communication technology, cultures, class and language, it is impossible to holistically represent such diverse groups of people using a limited suite of engagement methods. Given this situation, the project team committed itself to transcending these constraints by matching the country's diversity with diversity in methods of engagement.

To do this, the team had to understand the actors that they planned to engage with and had to choose methods of engagement that would make the respondent feel at ease. Some examples include informal discussions with rural community members, interactive sessions with school children or more structured interviews with water professionals. This approach assisted the project team in establishing a rapport with people, which made it easier for open communication to take place (Creswell 1994, Denzin & Lincoln, 1998). A process of co-learning (Backer et al., 2005) was made possible by engaging different groups of people with different methods tailored to their preferences. This enabled the project team to benefit from the feedback and the respondents to benefit from the process of imagining and sense-making.

4 Scenarios Development

In order to develop the scenarios for this project, the project team engaged a number of actors in different ways to elicit the drivers that would feed into the scenario development process.

4.1 Expert Interviews

4.1.1 Process

The project team identified different organisations as key institutional stakeholders representing the water sector (Table 1), who were expected to provide important insights into developments within the sector. Semi-structured interviews were held with at least one person per organisation. The aim of these interviews was to solicit information about drivers and uncertainties in the South African water sector that may impact on the water institutional landscape by 2025. The findings of the interviews (Appendix B) have been key inputs into the scenario development phase of the project. The water sector experts were also consulted about the proposed research approach.

In addition to the water sector experts, members of the project team discussed the project and ideas around it with Dr Barbara Heinzen, an independent scenarios expert from the United Kingdom. This interaction was

necessary and important, as Dr Heinzen was able to bring some regional African learning and considerable scenarios-related experience as input to the project. Dr Heinzen also provided advice on how to best choose participants for focus group discussions and conduct such discussions to get inputs from as wide a range of stakeholders as possible. Prof. Michael Kahn was consulted in the early stages of the project on the approach and methodology. Prof. Kahn supported the multiple driver approach and also recommended different engagement methods to get broad inputs to the scenario development process. Chantell Ilbury was involved in the final year of the project, when Professor Khan was no longer available to provide technical input to the project. Ms Ilbury facilitated two workshops, where the drivers were simplified to two key drivers and presented in a 2x2 matrix.

Table 1: Organisations that participated as key stakeholders

Sub-sector	Organisation
Government	Department of Water Affairs (DWA)
Non-government organization	EcoLink
Water board	Rand Water
Irrigation board	Hartbeestpoort Dam Irrigation Board; Sabie River Canal Association
Water research	Water Research Commission (WRC)
Water research	Council for Scientific and Industrial Research (CSIR)
Irrigation and research	Agricultural Research Council (ARC)
Mining	Chamber of Mines South Africa
Community members	Rindzeni High School, Pfathwa High School, Bushbuckridge area
Municipality	Mbombela Municipality, Bushbuckridge Municipality
Freshwater conservation	South African National Parks (SANParks)
Agriculture	Private commercial farmer
Environmental activism	Escarpment Environmental Protection Group, Federation for a Sustainable Environment (FSE), Mpumalanga Lakes Group

4.1.2 Results

The results of the project team's interaction with the key stakeholders can be divided into the following themes:

- Need for technical expertise, retaining staff and succession training

South Africa's water sector is characterised by considerable interdependence of its stakeholders. This means that dealing with the numerous issues that are present within the water sector requires a good technical base and capability

(for example in terms of the provision of good quality water and management of water resources). However, a person at a high level management position within the Department of Water Affairs (DWA) stated that it is a good thing that people who do not agree with the notion of transformation are leaving the department. This is problematic due to the urgent need for a sound technical base and the probability of the water sector being unstable in future without the existence of a sound technical base. The country's current skills shortage, lack of institutional memory and high staff turnover were identified as key problems. Many experienced and competent water professionals in South Africa are now at retirement age. While the will is there to make a difference, there is a lack of resources and know how. Government does not seem to be able to solve the problem of training and retaining quality staff and keeping skilled people in the country. In particular, there is a shortage of engineers, which is a problem when it comes to maintaining municipal water treatment works. This lack of maintenance in turn results in problems of water quality and human health (e.g. typhoid and cholera), especially in municipalities in rural areas.

- Need for awareness raising and wise water use

People in rural areas sometimes drink water directly from the rivers (because of lack of water supply) and also practice religious/cultural and recreational activities in polluted water resources (e.g. baptism and swimming). Such behaviour can have serious consequences for people's health. Stakeholders in South Africa (both rural and urban) need to be more aware of the importance and value of water in the country, and need to start using it more wisely. This is especially important due to the country's ever-increasing population and growing demand for water resources.

- Need to address maintenance of water supply infrastructure

The lack of maintenance is due to municipalities not receiving enough funding from government and not having the capacity to supply water to everyone who needs it. This trend may well worsen in future. A related issue is that DWA government officials are not willing to take local government to court, which results in municipal treatment works not being upgraded or kept up and local government not being taken to task for its neglect of the water quality situation. This is problematic because the Constitution states that if a local authority cannot fulfil a service, the next level of government is supposed to do so and/or disband the local authority. While the law is clear on what actions should be taken, this is not happening. There are however cases where DWA has been taken to court by members of the non-governmental organisation (NGO) sector; an instance is the NGO Save the Vaal Environment. Holding government accountable may need to happen more and more. Alternatively, there is also a need for a stronger partnership between the state and society in solving South Africa's water problems.

Another problem that was identified is that current technology (particularly water treatment technology) is not keeping pace with the growing population. This is particularly the case in growing urban areas where treatment plants

are not designed for treating larger volume, therefore they fail to cope with growing demand for water treatment. A related issue here is that large water volumes are lost through water leaks and informal water connections. Privatisation of water treatment works may be a possible solution to the problems that are currently being experienced in terms of the effective treatment of water. A change in attitude towards the necessity for water treatment is also essential. While outdated technology is a problem, irrigation systems are also no longer functioning optimally. A case in point is the Hartbeespoort Dam irrigation scheme which is more than 80 years old and running at an estimated 39% water loss. It would require approximately R 370 million and approximately 20 years to update the canal system. If the system were refurbished, this would mean massive savings on water, as well as more economic opportunities due to a greater availability of water, e.g. mining. The Hartbeespoort Dam irrigation scheme is not the only scheme under pressure at the moment. The Vaal Dam irrigation scheme is facing the same problem.

- Need to control illegal use of water and supply enough water for everyone

In terms of water supply, a key problem is the regulatory control of the illegal abstraction of water. This is a problem on the Lesotho Highlands Water Project (LHWP), as farmers often illegally abstract large quantities of water, especially during the dry season. Such illegal practices have a negative impact on the sustainability of the LHWP and its ability to meet its objectives. DWA does not seem to hold illegal water users accountable at the moment. Better administration of the licensing process and better policing of water use therefore has to take place. Another problem in terms of water supply is that the number of water users in South Africa is increasing sharply. This makes it very difficult to supply everyone with a sufficient volume of water. In order to address South Africa's situation of water scarcity, technologies such as desalination may be considered as an option. However, desalination is very costly and energy intensive which may make it difficult to implement. Other options are to charge a high cost per volume of water, or to change the way we use water. It is possible that if people paid more for water they would use it more efficiently. A possible way of doing this would be by charging anything over and above the first six kilolitres at a certain price. This would mean that the more one uses, the more one pays. It is also crucial that more be done to control the wastage of water. In Johannesburg alone, 25% of water is lost due to leakages, and 25% of water use does not contribute to the economy. This means that in total 50% of water is not billed by the City of Johannesburg. This is an issue which needs to be addressed.

- Need to manage mining effectively

In terms of mining activities, there is a problem because mining is unevenly distributed across the country, and especially affects water scarce areas negatively. In addition, the backlog in water use licensing is seen as a problem. This is particularly the case when it comes to controlling mining activities and their water use in the country. There are also problems in terms

of the legacies of abandoned mines, especially in terms of acid mine drainage (AMD). While it is possible for mining rights to be transferred to third parties, the Mineral and Petroleum Resources Development Act (Act 28 of 2002) does not make it compulsory to review whether this third party is competent and resourceful in terms of environmental management. While it is possible to treat mine water and to then resell it for municipal use, this is a costly exercise. Mining, in spite of the environmental damage it causes, is also a substantial creator of jobs, which makes it difficult to argue against its importance.

- Need to manage agriculture and climate change effectively

In terms of agriculture, water resources are often polluted as a result of pesticides that are used. This problem has been aggravated by the presence of endocrine disruptors (persistent organic pollutants). Water quality in South Africa is a big problem as the quality of the country's water resources is declining continuously. Climate change, of course, is another driver. This does not bode well for South Africa in terms of natural disasters (e.g. floods and droughts) and the availability of water. Questions thus arise regarding how to manage natural disasters and where to get more water from if less water is available overall. Due to these issues, shared rivers and the Lesotho Highlands Water Project might become increasingly political issues.

It is important to note here that what happens within DWA is of relevance to what happens within the water sector as a whole. If capacity within DWA decreases, this is likely to be repeated elsewhere in the water sector. DWA cannot function effectively unless there are highly skilled people within the department. "Business as usual" will not make a difference to the problems that are currently faced by the water sector, it is therefore imperative that things be turned around and that DWA once again becomes the employer of choice of highly skilled people.

- Potential positive developments in the water sector

On the positive side, stresses such as global change may bring about innovations to arrive at more water of better quality. Also, constantly changing legislation may lead to better enforcement and management of water. While government provision of water to previously disadvantaged farmers may lead to an increase in the percentage of irrigated land, this does not necessarily equate to an increase in water use. It would be necessary for other sectors to reduce their water use or for farmers to use water more effectively. There is also likely to be more of a focus on people especially at a grass roots level than on infrastructure and pipes (the technology of which will have become quite specialised and less time and effort intensive). More stringent controls will also be in place to control the use of water and make sure that water quality does not deteriorate too drastically. There is also likely to be increased interconnectedness between different actors within the water sector and capacity within the water sector will hopefully improve over the next 10 to 15 years. The situation in the water sector is likely to hit rock bottom before it

improves, but it will improve as people and institutions are forced to become more creative.

- Need to take into account important dilemmas, decisions and key points raised by stakeholders

From the point of view of the scenarios experts who were consulted, Dr Heinzen spoke of the importance of identifying important dilemmas and key points as brought across by the experts and stakeholders who have been interviewed as part of the project so far. Furthermore, she advised the researchers to make use of existing projects and contacts when it comes to interviewing groups of people from different social and economic strata in order to gauge their opinions and concerns regarding the water institutional landscape in South Africa by 2025. In terms of focus group discussions, it is important to identify the decisions that people are currently making at all levels of society regarding the future of water institutions and the water sector in general.

In terms of the selection of participants for focus group discussions, Dr Heinzen suggested that one considers the following possible categories/types of water use: households, industry, mining, industrial agriculture, small-holder/organic agriculture and “informal” rural and/or urban livelihoods. These groups of participants should be chosen by taking into consideration the following contexts: rainfall (frequency and amount), the river basin/catchment within which a group of people might be located, and an institutional analysis in terms of water/land tenure ownerships (tribal vs non tribal), access to resources and who decides and how they come to said decisions.

4.1.3 Reflections

The interaction with the experts and stakeholders proved to be important for the project as it provided the basis for the drivers which the project team initially identified. The interaction also resulted in some important insights into the question of potential future developments in the South African water institutional landscape. However, some of the respondents did not feel that the questions that were asked were structured or focused enough.

Many of the responses discussed in the previous section focused on operational issues that are prevalent in the water sector. Although the questions were formulated to solicit views on key drivers and uncertainties for the future, respondents focused on the problems at hand. While this may signify the significant challenges at hand, it also shows that people spend most of their time dealing with day-to-day problems and very little thinking about medium and long term issues takes place. It was also clear that relatively short engagements with people failed to get them out of the operational thinking mode, whereas a day or more of strategic and exploratory discussions may yield better results.

4.2 Social Attitudes Survey

4.2.1 Process

One of the objectives in defining key drivers is to get inputs from a wide spectrum of stakeholders. The South African Social Attitudes Survey (SASAS) has been conducted annually since 2003 by the Human Sciences Research Council (HSRC). The aim of the project is to conduct a longitudinal survey on the public's attitudes, beliefs, behaviour patterns and values on selected social issues. It is also the aim of the project to track changes on social issues among South Africans using time series and other relevant statistical methodologies. Due to various requests from government departments and other organisations, the HSRC has made a similar capacity available to external organisations in the form of a client survey. The client survey runs simultaneously with the HSRC's SASAS survey and is comparable in terms of methodology (HSRC, 2009).

The project team used this opportunity to get extensive input from people at the household level. The survey, which included questions related to key drivers, was conducted in 2008 and 2009. The survey reached 3292 people in 2008 and 3304 in 2009. Discussions with the HSRC resulted in 34 questions being agreed on, which would fit into the broader survey and also provide useful input to the scenario project (Appendix A). The following two open questions were included, which contributed directly to the identification of drivers for the scenarios:

[123] If water is poorly managed by the municipalities and misused by the people, what do you think will happen?

[124] How can the government make sure there is safe drinking water for all in the future?

4.2.2 Results

The results from the multiple choice questions provided useful contextual information. Questions 123 and 124 provided useful inputs to key drivers. The word clouds in Figure 1 and Figure 2 summarise the emphasis on issues and concepts that were derived from the survey results

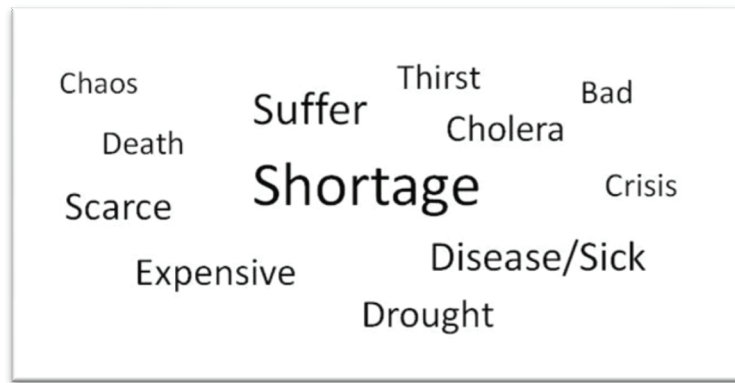


Figure 1: Word cloud derived from responses to the question: “If water is poorly managed by the municipalities and misused by the people, what do you think will happen?”



Figure 2: Word cloud derived from responses to the question: “How can the government make sure there is safe drinking water for all in the future?”

4.2.3 Reflections

The Social Attitude Surveys were a very good platform to solicit inputs from a large number of people. The surveys are particularly useful to collect data on aspects that can be framed to facilitate multiple choice, scalar or numeric responses. However, the inputs towards scenario development needed to be “open-ended” questions, where the respondents could identify new issues. This proved to be more challenging to achieve. The responses were often cryptic and it was difficult to ascertain the number of (precise) repetitions of answers given the variety of words and language people used to express themselves. This limited the value of the inputs.

4.3 Web-based Feedback

4.3.1 Process

Driving forces for change in the water sector institutional landscape in 2025 were identified through a literature review, personal interviews and the HSRC's social attitude survey of 2008 and 2009. These driving forces are essentially factors which are believed to be important influences on the water sector. Over and above the importance of driving forces, the degrees of uncertainty in terms of what their impact on the sector will be is also important for selecting key drivers for a scenario matrix.

A Web-based questionnaire on the drivers was developed to broaden the input base to the scenario development process. The survey allowed on-line feedback, with the results being emailed to the project team members. Each driver was accompanied by a brief description and an initial assessment of its uncertainty and importance on a scale of 1-5. The link to the questionnaire (www.watersector.macsette.com/) was sent out to researchers and stakeholders.

4.3.2 Results

While the approach allowed easy access for many potential respondents, the number of responses was relatively low. This response rate was in line with other similar surveys (Kaplowitz et al., 2004). Without exception, the respondents rated the suggested key drivers in terms of importance and uncertainty, but there were no suggestions for additional drivers.

4.3.3 Reflections

Web-based surveys are relatively easy to set up and administer and can reach a wide audience quickly. Respondents can provide inputs with relative ease at a time that is convenient to them. The disadvantages of web-based surveys are that the response rates are relatively low and that the respondents are anonymous (unless the survey is set up differently).

4.4 Communication

4.4.1 Process

Project information sheet

At the beginning stages of the project, a project information sheet was developed which gives background to the project and details the research process that would be followed. This document was widely distributed to interested parties at various national and international meetings.

African Water Congress (November 2008)

The project team used the African Water Congress as a platform to create broader awareness of the project and to solicit inputs. The material was

incorporated into a post-congress training session in support of capacity development in scenario development and application.

World Water Week (Stockholm September 2010)

A poster entitled “Developing scenarios for the water sector institutional landscape to develop effective responses to water quality challenges in a semi-arid region” was presented at the Stockholm World Water Week. The poster gave background to the research process that was followed (including stakeholder interactions), summarised the drivers that were identified, and gave a summary of the issues that were discussed during the strategic conversations that took place as part of the project.

Communication with the reference group

The reference group provided invaluable advice and inputs to the project. The engagements were through the reference groups meetings, individual interactions with members and through participation by the reference group members in the project workshops.

4.4.2 Results

The communication strategy and opportunities listed above created good awareness of the project at the national and international levels. Many people that were exposed to the project through the various products also provided valuable inputs to the development of the key drivers and scenarios.

4.4.3 Reflections

In terms of planning and executing a communication strategy, it may have been better to work this into the project proposal from the outset, rather than engaging in events only when the opportunity arose. A more structured approach may have enabled the project team and the research to benefit from more exposure. In addition, had time and budget allowed, it would have been beneficial to the project to have a communication phase at the end of the project to inform interested stakeholders of the project results and how these are applicable to them.

4.5 Identifying the Drivers

4.5.1 Process

The driving forces of the water sector institutional landscape were identified through individual interviews, social attitude surveys and a web-based survey. The drivers and associated descriptions were communicated through specific summary documents and conference and workshop opportunities. The 27 driving forces that were identified are believed to be important influences on the water sector towards 2025, whereas the degrees of uncertainty related to the drivers were also important. These driving forces were grouped into four categories, each of which was accompanied by a description:

- Strategic planning in South Africa
- Operational issues in the water sector
- Institutional capacity in the water sector
- Societal issues impacting on the water sector

Strategic planning means that government designs a long-term picture for how they would like to govern sectors (energy, water, agriculture, housing etc.) in South Africa. The value of strategic planning is that government takes account of the bigger picture. This means that the needs of all sectors are taken into consideration during strategic planning. This allows for the most important issues to be prioritised and dealt with first because there is a holistic picture of what the country needs. It also means that different sectors can work together better to contribute towards achieving national objectives.

Operational issues in the water sector have to do with the practical mechanisms for managing South Africa's water. There are two issues to consider here, namely privatisation and regulation. Privatisation is about asking the question: "Is South Africa's water managed by the government or by private companies?" This decision impacts on issues like the price of water, whether or not water is adequately accessible and affordable to the poor, and how socially and environmentally conscious actors are. Regulation is about ensuring that water users comply with legislation (such as the National Water Act). This can be done through the effective issuing of water licences for water use (e.g. to mining companies, farmers, industry etc.) and making sure that water users comply with the conditions of their water use and pay for the water they use or pollute.

Institutional capacity in the water sector is about having the capacity to do the right things and do things right in the water sector (e.g. DWA, local municipalities, CMAs, Water User Associations etc.). Such actions would include mitigation of the negative effects of staff turnover, such as retaining skilled and competent staff and having effective capacity development programmes. Furthermore, adequate financial resources and suitable infrastructure and technologies are required to support operations in the water sector.

Societal issues impacting on the water sector relate to the role that South Africans have to play in water governance. This is about people knowing about their water rights and the challenges facing the water sector in South Africa. It is also about whether people believe that they can make a difference and whether they care enough to do something about these challenges.

The project team compiled three scenarios, each of which had different combinations of driving forces, with either a positive or negative value being attributed to each driving force. Each scenario was also accompanied by a narrative which described the scenario more fully in terms of the combination of drivers, and would facilitate the writing of stories on the basis of the different scenarios.

Scenario 1:

“In your world government has a long-term strategic plan. This is helping different sectors of government to work together towards one bigger picture. Unfortunately the challenges facing the water sector are not being prioritised (due to publicity around South Africa’s energy shortage overshadowing water issues).

In your world the water sector is not privatised, but managed by the government. This is helping to keep water affordable to the poor. However, government is struggling to effectively provide water services to the country as the only actor who is responsible for water provision. Government believes in regulation and is expressing this by effectively managing water licences. Unfortunately, government is not effectively policing large-scale water users to ensure that they pay for cleaning the water they pollute.

In your world there are excellent technologies available to benefit the water sector. Unfortunately there are limited funds available to implement, maintain and upgrade these technologies. Whilst good systems have been put in place to support new staff and limit the negative effects of high staff turnover, there are very few skilled people to fill available positions in the water sector.

In your world communities in South Africa have a sense of ownership of water resources and associated infrastructure. However, they do not have the resources or support to participate in water governance and they don’t feel that participating will make a difference.”

Scenario 2:

“In your world, government doesn’t have a long-term strategic plan. This is limiting the cooperation between different sectors of government to work together because there is no bigger picture. Fortunately, recent publicity around the scarcity of water in South Africa has resulted in water issues becoming a priority area for government.

In your world the water sector is privatised, thus managed by private companies. This is helping to improve infrastructure associated with water and water service delivery. However, the price of water has increased. Despite outsourcing service delivery and water service provision to private actors, government still has the responsibility to regulate water use but is struggling to do so. Water use licences are not being effectively managed. However, there has been some improvement in terms of policing the pollution caused by large scale water users and ensuring that these users pay for the pollution they cause.

In your world there are sufficient funds available to maintain and upgrade existing technologies, even though access to new technologies is limited. Unfortunately there is high staff turnover, which is causing a lot of knowledge to be lost in the water sector. However, due to an availability of funds new and skilled employees are being brought into the water sector.

In your world communities in South Africa don't have a sense of ownership of water resources and associated infrastructure. However, they do have the resources or support to participate in water governance and they feel that participating will make a difference."

Scenario 3:

"In your world government has a long-term strategic plan. Whilst the strategic plan looks good on paper, in the real world different sectors of government are not yet working together towards the same bigger picture. Fortunately recent publicity around the scarcity of water in South Africa has resulted in water issues becoming a priority area for government.

In your world the water sector is not privatised, but managed by the government. This is helping to keep water very affordable to the poor. However, government is struggling to effectively provide water services to the country as it is the only actor who is responsible for water provision. Government has the responsibility to regulate water use but is struggling to do so. Water use licences are not being effectively managed. However, there has been some improvement in terms of policing the pollution caused by large scale water users and ensuring that these users pay for the pollution they cause.

In your world, there are enough skilled people in the water sector who, despite high staff turnover, pass on their skills to the people who fill their positions after they have left. Unfortunately, funding for water sector development is limited which makes existing technologies and services difficult to maintain and also negatively impacts on access to new technologies.

In your world, communities in South Africa don't have a sense of ownership of water resources and associated infrastructure. They also do not have the resources or support to participate in water governance and they don't feel that participating will make a difference."

4.5.2 Results

The scenario narratives were presented to high school learners during the schools interaction phase, who were asked to write stories about the different scenarios from the vantage point of 2025 (see Section 4.6). The project team members also wrote scenario stories from the perspective of a national government official in DWA, from the point of view of a school learner and from the point of view of industry – all looking back at the past from 2025 (see Section 4.7).

4.5.3 Reflections

The project team found it relatively easy to elicit, describe and test the drivers, but grouping them was quite a challenge and required some creative thinking and discussion. When putting together the scenarios, great care had to be

taken to ensure that the combination of drivers was feasible, especially as some were given positive values and others were given negative values. It was also quite a challenge to write the descriptive narratives accompanying each of the scenarios due to the different combinations of drivers that existed and their positive or negative values, which denoted a positive or negative impact on the water sector. This complexity, however, is also indicative of the complexity at play in any current or future water realities, and so in this regard, the process proved to be “real” in the way it had to grapple with complex issues and drivers. These scenarios were developed to serve as the content of the popular (“glossy”) project report, but were superseded by the outputs (scenarios) of the strategic conversation workshops conducted in 2010 (see section 4.8.2).

The process of eliciting drivers, grouping these into scenarios, writing narratives to explain the scenarios and stories based on the scenarios from different points of view proved to be very interesting and provided considerable learning to the project team and other participants. The WRC reference group felt that these scenarios were not sufficiently strategic and challenging. The water sector experts who were consulted only had a limited amount of time to identify possible drivers in an open-ended conversation with members of the project team, rather than being able to do so through a more creative process, such as a workshop. It was therefore decided that a scenarios expert would be appointed to take experts through such a process and enable them to come up with key drivers (see section 4.8).

4.6 Rural and Urban Schools Interaction

4.6.1 Process

- a) Establishing the importance of interaction with high school learners for the project

One of the explicitly laid out objectives in the inception report for this project, was to facilitate broad participation and empowerment in the scenario development process. The project aimed to represent the diversity of South Africa in its interactions and inputs to the project, particularly in terms of ascertaining driving forces for the scenario building process. This then implied that the team needed input from groups of people who are literate and illiterate, in urban, peri-urban and rural areas, who speak different languages, who have different cultures, who have different educational levels, who come from different constituencies, who have differing kinds of expertise and are of different age groups.

By interacting with school children the team was able to gain input from groups of younger South Africans who came from various parts of the country, spoke a variety of languages, had a variety of cultural backgrounds, and who had different qualities of educational exposure. With the exception of one primary school interaction (Skukuza Primary), the interaction was largely with high school learners ranging in ages from 12 to 20 years. The questions being

asked of the learners required them to reflect on their present context in relation to water as well as imagine a future picture in relation to the provision of their water needs. Given the complexity and depth of these reflections the team chose to interact with high school, and not primary children, who have more life exposure and language capacity to answer such questions.

A variety of methods were used to interact with school learners at different stages in the project. The project team recognised that conventional approaches to scenario development (central workshops, electronic communication, professional networks, etc.) discriminate against equitable access to information and participation. The team wanted to transcend these constraints by choosing the most appropriate and creative method of interaction for the specific group of people it was interacting with. Given the diversity of people that the team accessed, a diversity of interaction methods was employed. Using this variety of methods, learners provided input to the key drivers of the scenarios and gave input in the scenario writing phase.

b) The simulation game

- Explaining the choice of method

A simulation is the construction of a “pretend reality”. Individuals are asked to represent different actors or characters that exist in the “real world”. By creating a microcosm of the “real world”, it becomes possible to begin to talk about and understand some of the issues and complexities that are at play in reality.

The choice to run a simulation game as a way of getting feedback from school learners arose for a number of reasons. Firstly, simulation games are well established as being an effective method of interaction for promoting creative thinking and understanding amongst groups of people. Because school children are not necessarily consciously aware of, or taught about water issues, this unfamiliarity makes it difficult and awkward for them to answer questions about the state of the South African water sector. The simulation assisted with this challenge by encouraging learners to prepare for and think about their interaction in advance, thus increasing the quality of the feedback.

Secondly, by running a simulation game which involved running water-related workshops and guiding learners through a structured simulation preparation process, the team had the opportunity to build capacity at school level. This meant the research process was not only about gaining input for the project, but also had immediate educational benefits to the learners involved in the process. Such benefits also created an incentive for school leadership to allow the team to engage in this process with the learners (*See Appendix C1 & C2 for letters of invitation and an explanation of the simulation to the school and learners*).

- Running the simulation

Pretoria High School for Girls was the main participant in the simulation and Pretoria Boys High School sent a few participants to engage in the workshop. Both of these schools are government schools. Given a high educational reputation coupled with a fee structure that is significantly cheaper than private education, these schools attract a range of learners from a wide range of socio-economic groups and cultural backgrounds.

The simulation was run in two stages. First, an open-ended invitation was extended to the schools to attend a seminar where learners could learn about water issues pertinent to South Africa. This seminar gave learners some simple background information about water scarcity, water quality and water use issues facing South Africa. A brief introduction to the legislative and institutional framework that governs the water sector in South Africa was also introduced. Through this presentation and the resultant discussion, learners were equipped with the basic knowledge needed to analyse their own water context and develop opinions about where they believe the water sector is headed and what will drive this. The second step involved running the actual simulation game. Learners from the first workshop were invited to volunteer to participate in the simulation game. Volunteers were given the rules of the simulation as well as necessary information packs to prepare for the event, two weeks in advance.

During the simulations learners were asked to imagine what our country's water sector will be like in 16 years time, a point where the learners would be adults in the workplace. What will different actors' water demands be in this future? Will the population have grown? Will we have better technology to use water? Will there be more or less poverty? The different teams of participants had to imagine this future water landscape from the vantage point of a specific actor; either as a representative of the mining or agricultural sector, as urban residents or rural residents, as the energy industry, or as an environmentalist.

Each team was given information outlining their character's context, some questions to think about and some places to find out more about the actor. The teams then had to research the actor so as to represent the needs, wants and opinions of the character that they were assigned. In the first half of the presentation learners had to represent their character in "the here and now". In other words, who is the actor, what do they want in terms of water, why do they want this, and what are the challenges they face? The second part of the presentation had to jump to the vantage point of 2025. Given the passing of 16 years what has changed in the actor's life in relation to water issues? What would the actor's ideal 2025 picture look like?

Following these character introductions, a structured debate between teams and audience was facilitated, where the tension between current water needs and future water aspirations was explored from the vantage points of the characters represented in the simulation.

c) Written questionnaire responses

- Explaining the choice of method

Given the limited number of high school learners that was accessed during the simulation process, it was decided that more high school learner feedback was necessary from other parts of the country. The questionnaire method was chosen given that it is a flexible tool to use at schools where there are not established networks in place. It is not too time consuming and can be handed out to a large number of learners at once.

- Getting questionnaire respondents

During a field trip in Mpumalanga a number of schools were approached to give a written response to the following question:

“Do you think the people who provide us with freshwater will be able to keep doing this in the future (2025)? (“People” can possibly include: national government, regional government, local government, Catchment Management Agency, Municipalities). If not, why will they not be able to provide us with water in the future?” – See Appendix C1 for the questionnaire (Question 6 is relevant to this project)

The schools that were approached are detailed below.

School	Area	Other Information
Phatfwa High	Outside White River at the School	About 80 questionnaires answered Grade 10 and 11 learners 800 learners Language is mostly Swazi Learners come from the rural areas surrounding White River
Rindzeni High School	Bushbuckridge	About 140 questionnaires answered Grade 10 and 11 learners 600 learners at the school Language is mostly Swazi Children all come from Bushbuckridge
Skukuza Primary	Skukuza Staff Village	23 questionnaires answered Grade 7 learners
Lowveld High	Nelspruit	About 60 questionnaires answered Grade 10 and 11 learners 1190 learners in the school Language groups are English, Afrikaans, Seswati Children come from Nelspruit, Hazyview, White River, Skukuza, Numbi, Malelane

Whilst efforts were made to contact schools in advance the team had little success regarding response to their requests. Therefore, they approached this part of the interaction by going to schools directly and asking for their

permission to get feedback from learners. This face to face approach proved to be successful.

d) Essay responses

- Explaining the choice of method

One of the major aims of a scenario building process is to develop stories that all stakeholders who have given input can endorse as valid mental models for how the future might unfold. In order to achieve this endorsement, widespread stakeholder interaction is necessary, coupled with communication products that are accessible and meaningful to all participants.

It is with this in mind that the high school learners were approached to assist with writing the scenario stories. By allowing stakeholders to tell their own stories of the future, a sense of ownership of the stories is fostered. Insight was also gained as to how stakeholders themselves want the stories to be communicated or told.

- Getting the stories written

The participants from the scenarios simulation were invited to write stories for publication in this final report. Before the story writing started, the team undertook a process where they clustered key drivers together which then resulted in a set of generic ingredients that would be at play in a given scenario. Each participant was then assigned a story to write based on the key drivers/ ingredients guiding one of the emergent scenarios. The story had to be set in the year 2025 (*See Appendix C3 and C4 for instructions to the learners*).

4.6.2 Results

The school learner interaction produced a variety of results. The simulation game and questionnaire results fed into ascertaining the key drivers for the scenarios. The essay interaction fed into the story writing phase of the scenario process.

a) The simulation game

The conversation resulting from the seminar and simulation game produced a wide spread of thoughts and ideas. A number of key issues emerged from this conversation.

- Learners were concerned about the impact of mining on water quality. They were particularly worried about how this reduced water quality, as a result of mining, would impact on farmers, farmland and poorer communities. They felt that greater monitoring of mines and enforcement of legislation was important.
- Learners recognised a contradiction in the agricultural sector. On the one hand it is a high water using sector but on the other hand it is very

important sector as a source of food, jobs, and pride. They felt that better technology would need to be found in future to farm with less water and alternative “industries would need to be promoted”.

- Learners worried that water would run out with growing human, power, and economic needs. They felt that technological solutions like desalination may help in future.
- Learners felt that alternatives to municipally purified water may be necessary in rural areas that lack basic access to water (e.g. filtration and Jik purification)
- Learners worried about the lack of personal responsibility that South Africans take for water. They felt that household level conservation and water awareness would be increasingly important in future.



The winning team of the simulation game at Pretoria High School for Girls posing with some members of the project team

b) Written questionnaire results

A total of 303 school learners filled out questionnaires where they answered the question:

“Do you think the people who provide us with Freshwater will be able to keep doing this in the future (2025)? (“People” can possibly include: national government, regional government, local government, Catchment Management Agency, Municipalities). If not, why will they not be able to provide us with water in the future?”

A number of key ideas emerged. Approximately half the respondents believed that the “people who provide us with water in South Africa” will continue to do so by 2025. The reasons for this were multiple and included ideas like the fact that “government cares for its people”, government has a responsibility to provide for peoples’ needs, water is essential for life so a plan will always be made to provide citizens with water, that new technology will be developed in future to support the water provision and purification processes and that the

government is doing its best to use water wisely and provide for its citizens now and in future.

The other half of respondents were less positive about the prospects for effective water provision by 2025. Again, there was a variety of justifications for this perception. The most dominant justification was the idea that water is currently not being used wisely. Thus, because of current carelessness and over-exploitation of the resource there is unlikely to be adequate supply for the future. Other justifications raised concerns around issues such as climate change, global warming, weather change, pollution and drought and how this would limit water supply in future. Others worried about the pricing of water suggesting different few points around this debate. Another idea that arose was that if people wanted to be assured of water in future they needed to take responsibility for water themselves, rather than depending on government for its provision.

c) Story writing outputs

The driver clustering process resulted in a set of three preliminary generic scenarios. Six school learners wrote stories for the project resulting in 2 stories per scenario

Story 1

The past fifteen years have induced some change in how the average South African perceives the water situation. While the global water scarcity problems have been on the increase, the South African government has tried its best to combat these problems.

In order for a government to rule a country and its resources successfully, they must consider the long term effects and have concrete policies in place that will benefit the country as a whole and that can sustain these benefits. In trying to do this, the South African government has implemented various policies that help govern the water resources. This has included sidelining industries to a certain extent in order to provide for the people's needs. Seeing as the industries play a vital part in the South African economy, they haven't been ignored entirely. A big problem has been water quality, thus the industries which do not need water of the highest purity have been given water that hasn't been treated as much as the water that is used for consumption. A lot of attention has also been given to providing all the citizens in the country with clean drinking water. Even though this ideal hasn't been achieved, much progress has been made.

The government has remained in control of the water sector to ensure that the motives of the people in charge remain pure. There have been calls to privatize the water sector and to allow private companies to manage this precious resource, seeing as the government hasn't achieved their goals as quickly as they would have hoped. It was decided that it would be in the best interest of the public in general to leave the control of this resource in the

hands of the government. It was established that while private companies benefit more from being productive, they are also profit orientated. Seeing as there are still many impoverished people in South Africa, it would inevitably be required of the company in charge to provide these people with water for a very small cost or no cost at all. As no business would do this just to serve the public good, there was no choice but to leave the government in control of the sector, despite their shortcomings.

Seeing as this resource's control has remained with the government, it has one of their main objectives to manage it properly. In doing so, it has been insisted that the people who occupy positions of power must actually have experience in the field. The ministers will be appointed according to their expertise, as opposed to their political standings.

The system of controlling water usage has also been addressed. There is a new electronic way of ensuring that the correct readings of the water meters reach the admin sector of the department. In conjunction with this, a new computerized system has been implemented which process the data with little manual labour. This will ensure that there are fewer errors because of unskilled staff. Along with this, all employees will be trained how to use the system properly before they are put behind a desk.

A lot more awareness has been created about water scarcity. Due to the apathy of most people, scare tactics have been needed. In doing this, real emphasis was placed on how dire the water situation in the world is and what an injustice it is to the global community to abuse water sources. Due to this more drastic approach to water usages, many South Africans have become more conservative about their water usage.

While the situation as a whole has improved, a lot still needs to be done to ensure that all citizens have clean water for the foreseeable future.

Jolandi Swanepoel

Story 2

As a teenager, even a fairly well-informed teenager, I have never been overly concerned about water. Of course, I was well aware that water is becoming increasingly scarce (who could avoid it?) but it has never been an issue for me. My parents pay the bills and deal with any problems that come up.

The price of water has increased, however, and now features prominently in our household budgeting, where before it was a cost that we never thought much about (or, at least, one that I never thought much about). The price of water is becoming as much of a concern as electricity or petrol. We therefore do what everyone does when things are expensive: use less of it. We use far less water than we used to, even though service delivery has improved. We simply can't afford to use as much water as we did previously. My parents are both very conscious of the water they use, and we try to, too, although it is a bit difficult. You don't realise how much water you actually use everyday!

News is not all bad: apparently, pollution problems are slowly being fixed in some major rivers and dams, but I wouldn't know this if I didn't do projects about it at school. My family isn't big on rivers and lakes and nature. The river and lake where I live (in Centurion), however, are still very polluted and quite unpleasant.

We do live in a fairly well-off neighbourhood, though, so there haven't been very many problems as the existing infrastructure seems to function quite well. Service delivery when it comes to water is actually quite good. Currently, some of the infrastructure around our area is being worked on, and although it is a minor inconvenience, it seems to be managed fairly well. However, when there are problems it is difficult to get them sorted out. Different government actors issue different statements, and although the private companies have been effective in their roles, we are getting mixed messages. When we experience problems with our water, we are sent from the private institutions to various governmental representatives before we finally find somebody who can help us. There seems to be some confusion over what role the government/municipality actually has in these situation. The private companies insist that they are not at fault, but others say that they are responsible. Beyond this, when there is something wrong with the infrastructure in our neighbourhood, it takes ages before a technician is sent to sort it out, and they often turn out to be far from competent. It makes problem solving quite difficult.

Devi Pillay

Story 3

In the year 2025, the shortage of water is much more apparent and creates many social issues and awareness within society. There is still an unfair distribution of water (more specifically clean water) with more water being supplied to those who can afford it. As a high school student I have become more aware of the water problem due to the government taking steps in creating more awareness especially amongst school children. Water conservation has been made a bigger part of the school curriculum and learners are encouraged to find possible solutions to the problem.

At home the stresses of the water shortage are also felt due to higher water prices and stricter control of water usage. Constraints have been put in place by local municipalities regarding water usage which the entire community has to comply with. New technologies have been develop to extract safe drinking water from alternative sources yet these technologies are more expensive and have contributed to the increased water prices

All of the above issues have made me as a high school student in the year 2025, more aware of the issues surrounding us involving water and more importantly the availability of water and what can be done to solve the problem. Programmes have been started to make people more water conscious within the community.

Mashadi Mogase

Story 4

I am usually not a patient person when it comes to service delivery and although i understand that we are suffering from water scarcity, I still think that the government should be able to do something to provide for it's people. We like to cut down on our water useage at home, for example we shower for no more than 5 mins and we switch off the water in the shower whne not rinsing. I don't have a problem with Johannesburg water increasing the water bill, that's understandable, but i do have a problem with them not notifying us of water outages or clarifying the water properly. Fortunately enough we use the Brita filtration system on our taps but you fdont find that this is a common practice for many people which puts them at risk.

I have written letters to the Municipality to express my complaints but i often find that they only resond a few days later and by then its to late if there are water spills in the area.

I suggest that JW sets up a water household allowance system whereby each household gets a certain amount of kilolitres of water per month, determined by the number of people in the house, and if a family spends more water than that they are heavily taxed on it, outside of their monthly bill of course.

Zizi Ddlamini

Story 5

2025 – The ideal setting

Water now works on a pay-as-you-go system where 25 liters per family is supplied daily and then a household pays above this in advance for what they will consume. In this way, families can now monitor and control their water usage. Innovative urban planning has been instituted which has changed the way rainwater drains through cities so that most of it ends up unpolluted in drains ready to be filtered and used, as opposed to 2009 where much of the rainwater ended up wasted. Legislation that forces mines and factories to restore the ecosystems in which they work has been strictly enforced so that acid mine drainage and other industrial pollution has been eliminated. Mines have also planted indigenous trees to restore balance within the ecosytems. Eskom is making use of tidal power-electricity generated by the movements of the tides, and has invested in desalination technologies. Irrigation for agriculture has been refined so that minimum wastage occurs, and more people have been made aware of how to water their own gardens without wasting water. Every house has a water tank to collect water to water their veggie gardens and so on. Although climate change has made South Africa more water scarce, we have been able to cope thanks to the foresight of leaders back in 2009.

2025 – If nothing is changed

Not only is South Africa classified as water scarce due to climate change, but the water that we do receive is not usable because it is highly acidic acid rain. Ill-maintained sewer works have overflowed and contaminated nearby rivers

and streams. Acid mine drainage has caused many rivers and once-fertile lands to become unusable because any food that comes from these areas is inedible. Nothing has changed for people from the rural areas who still need to walk 5 km on average to fetch water, which is not even classified as clean. Water prices have sky-rocketed because demand comes from three main contenders: power utilities, agriculture and urban dwellers; this demand cannot be met and rolling blackouts are a daily occurrence.

Elise de Cock

4.6.3 Reflections

The strengths of the simulation process were twofold. Firstly, the depth of insight we received from learners was far greater given this facilitated interaction. This was evident as the project team was able to compare feedback received through the simulation process with feedback received from written questionnaires completed by learners of the same age group. The latter provided less insightful feedback than the former. Secondly, the simulation and seminar offered the opportunity for furthering understanding and insight about water issues amongst high school learners.

The weaknesses of the simulation process were firstly that running and organising the interaction was a highly time-consuming exercise for both the project team and the participants. Given this constraint it was not possible to run multiple simulations in different parts of the country. Secondly, the interaction was highly structured which may have limited the type of response that learners could have given.

In terms of the questionnaire process, the strengths were twofold. Firstly, a large number of learners' input was gained with this method. Secondly, schools from poorer communities that can only be contacted by "knocking on their door" were accessed thus providing greater diversity of learner feedback.

The weaknesses of this interaction were firstly that there was no prior conversation or context to prepare the learners for their answers. As a result, the answers tended to lack insight and awareness of the water issues in the country. Secondly, the learners were required to answer in English. Although all participants were literate, answering in English was a challenge for many learners which made it difficult to comprehend their written answers. Thirdly, there was no personal relationship between the team and the learners which seemed to affect the level of effort that was placed in answering the questions.

The story writing process was useful in that each writer, depending on who they are and what their context is, will see a different picture when faced with a specific set of variables. By building in a learner perspective of each scenario the imaginative process in the scenario story telling exercise was enriched.

A challenge in relation to this process was that the task of writing these stories was not an easy one for the learners who did not always have a detailed understanding of the driving forces they were telling stories about.

4.7 Project Team's Stories

4.7.1 Process

Based on the scenarios and accompanying narratives discussed under 4.5, the project team wrote three sets of stories based on the scenarios that were identified. The project team adopted the perspective of a national government official in DWA, a high school learner and a representative from industry. These scenarios stories were originally meant to be part of the popular report that is a main deliverable of this project. As mentioned earlier, the project process was adapted on the grounds of insufficient strategic inputs into the scenario development process. Chantal Illbury, a scenario specialist, was brought on board to conduct two strategic conversation workshops, which ultimately produced four scenarios that would form the outputs of the project in the form of the popular report. The project team ensured that none of the learning of the initial driver identification and scenario development would be lost by making sure that all of initial drivers were reflected in the final four scenarios.

4.7.2 Results

Industry: Indaba
E. Masekoameng

Scenario1

Strategic plans are in place: and this allows us to plan ahead in line with government visions.

Due to the shortage of skills in the sector we have to invest in skill development programmes. These are costly and lengthy processes. Fortunately, we are able to retain the skills hence there is no loss of institutional memory.

Water is not privatised and the users and polluters are not required to cover the full cost of water use: We as industry can still afford the water and that makes our business lucrative.

Responsible agencies are able to issue water use licences and this allows for the development of new industries to support socioeconomic growth. This occurs at minimal expense to the environment because the current regulation ensures the culture of compliance.

However, water is not a priority: there is no pressure on the provision of infrastructure, skills and technology at political level. Hence, water provision is

still unreliable. This causes serious industrial downtimes which result in inconsistent production and the subsequent inability to meet client requirements on time.

No intersectoral interdependencies: the energy sector is also failing to provide us with services within the necessary time frames. We are now faced with both inadequate water allocation plus inadequate electricity supply, which impair our production rate and ability to deliver to our clients. Let alone the capability to compete with international competitors.

Technology access: Technology can be accessed internationally to address some of these short comings, however attempts to tap from that always fail there is no funding. This makes it difficult to implement projects that could improve the efficiency of water management and/or water management techniques.

Scenario 2

We are seeing disproportionate allocation of water resources – some industries are enjoying over allocation of water while others are under allocated. This is all because of the lack of planning that incorporates changes in water demand for different industrial sectors in a long term. We are also aware of the opportunities for new water based industries however, in the absence of planning, we still have to wait before we can realise and experience such opportunities.

Opportunities for new water based industries and expansion of existing ones is even more difficult because of the delays in the issuing of water licences. This is a step back in terms of economic development and associated job creation opportunities.

Water is given high priority at political level and this exerts pressure on responsible agencies to allocate infrastructure, skills and technology.

Although appropriate skills are available, it is difficult to retain such skills – knowledgeable people are leaving the country for more attractive overseas opportunities. Because of this, existing projects that seeks to improve water management in the country are disjointed and sometimes not effectively/efficiently completed.

A lot of money is not only spent on recruiting new staff but also on accessing water itself. Water is now privatised and we are paying for the full cost of water including externalities. This results in high budget allocation for water use and/or water pollution, which result in subsequent increase in the prices of our products.

As industry, we would like to work towards treating our effluent, as this will reduce the cost of water pollution to be incurred. However, it is difficult for us to do so because the technologies to deal with specialised industrial discharged are not available and it is difficult to source them internationally.

There is no culture of compliance, downstream industries such as tourism/recreation fishing, suffers from water quality problems caused by non-compliant upstream users. This causes unstable relations between various industrial water users in different economic sectors.

Scenario 3

Strategic plans are in place and this allows industries to plan ahead in line with government visions and future objectives.

Water is given high priority at political level and this puts pressure on responsible agencies to allocate infrastructure, skills and technology.

The supply of services from other sectors (such as electricity and transportation) is unreliable, which result in inconsistent production to meet the client requirements.

Our relations in the market are worsened by high cost of our products which includes in itself the true cost of water.

Many of the new water based industrial projects takes time to take off because of the delays in obtaining water use licences. Meanwhile those who cannot wait, continues to illegally operate without appropriate licences.

Some non-polluting industries are suffering the consequences of non-compliant polluters because the regulation does not ensure a culture of compliance and cooperative management with regard to water issues.

As industry, we would like to work towards treating our effluent, as this will reduce the cost of water pollution to be incurred. However, it is difficult for us to do so because the technologies to deal with specialised industrial discharged are not available and it is difficult to source them internationally.

There is no pressure from the public as they feel no sense of ownership and they don't participate in water governance.

National Government Officer Perspective

C. Chikozho

Scenario 1

- *The strategic plan for the water sector looks very good on paper. Fortunately, different sectors of government are using it to work together towards one bigger picture. Its important for us to further strengthen the coordination between sectors in order to realize the objectives of the strategic plan.*

- *Failure to prioritize the water sector negatively affects resource allocation to the sector. The Minister of Water and other key players should find ways of bringing water firmly onto the national development agenda so that it can compete for resources favourably with other sectors.*
- *Our relations with other sectors who provide supplies of goods and services are thriving very well. We need to continue strengthening them.*
- *Water users and polluters are not responsible for the negative consequences of their actions. The Government should seriously consider introducing the user-pays and polluter-pays principles.*
- *The privatization of water resource management and services is usually very controversial. Our government should deal with the issue cautiously and consult stakeholders widely before making a decision on whether or not to privatize. Without stakeholder buy-in, a careless decision on this sensitive matter might back-fire to use in the long-run.*
- *Regulation and licensing are very useful in the water sector as they ensure compliance and cooperation of stakeholders. But like privatization, there is need for us to consult widely in order to reach a decision that is binding to all stakeholders. Otherwise we run the risk of alienating some users and facing resistance from them when we try to implement the decision made.*
- *We need to address the skills shortages and high staff turnover in the sector and build our capacity to deliver. We should institute a multi-pronged approach that includes internships, introduction of water management-related degree programmes at the tertiary level, and raise remuneration levels in the sector so that we retain qualified staff.*
- *Government should mobilize and increase funding for monitoring, evaluation and maintenance. We should broaden our funding base in order to have sufficient resources for all our operations.*
- *We should continue upgrading our IT resources in line with international best-practice.*
- *We need stakeholders to participate in the management of water resources meaningfully. We need to institute a systematic programme to accommodate all stakeholders and build neutral dialogue platforms for the process to be effective. This is going to require a lot of time and resources.*
- *Our communities have a sense of ownership of water resources and associated infrastructure. This enhances their willingness to use the resources wisely. We need to build on that understanding and encourage them further along that continuum.*

Scenario 2

- *The lack of a strategic plan for the water sector remains a serious constraint to our operations. We need to engage in a strategic planning exercise as soon as possible in order to facilitate better resource use and management.*
- *Water has been placed firmly onto the national development agenda. What remains is for the governments to initiate specific programmes and projects that enhance use and management of the resource.*
- *The lack of inter-sectoral coordination hinders smooth functioning of the water sector. We need to develop better inter-sectoral alliances and partnerships so that other sectors such as electricity, manufacturing and*

transportation can be able to provide reliable supplies of goods and services to the water sector.

- The water sector needs to implement and enforce user-pays and polluter-pays principles in order to make the sector self-sustaining. The big challenge is how to ensure this enforcement. We may have to consider working and consulting closely with stakeholders (including the users themselves).*
- The privatization of water resources management and services is a very bold step that we have taken. We now need to ensure that the equity and social goals of water are not lost in the process. We therefore, need to come up with pricing formulae that ensure that water is not priced beyond the reach of our citizens. We also need to closely regulate the operations of water service providers in the private sector in order to ensure that they do not exploit the citizens.*
- Regulating the water sector is difficult. We should improve our enforcement and monitoring mechanisms in order to ensure that regulations are adhered to.*
- We have to explore ways of capacitating agencies responsible for issuing water licences. More resources may have to be allocated for transport, staff development, training and increasing the staff complement for licensing.*
- We currently have skilled people manning the water sector but high staff turnover prevents the water sector from being effective. We must continue training people for the sector and address the high staff turnover through remuneration and other benefits that act as incentives for staff retention.*
- The current funding levels for monitoring, evaluation and maintenance of delivery services are adequate. It is essential for the government to maintain the momentum gathered in this regard and make regular adjustments to the funding levels in order to suit new development needs identifies in the sector.*
- Lack of appropriate technology is a serious barrier to efficiency and effectiveness in the sector. We should acquire and introduce technologies relevant to the water sector, whether or not they are sourced locally. This requires considerable resource commitments from government.*
- Both process and outcomes are essential in participatory processes. We need to ensure that an enabling environment for meaningful participation is created and maintained if positive outputs are to be realized.*
- Communities should have a sense of ownership of water resources and associated infrastructure. The government will have to institute an awareness raising process to obtain the support and ownership of communities. This should include the involvement of the communities in planning and implementing water programmes and projects.*

Scenario 3

- The strategic plan for the water sector looks very good on paper. How do we operationalize it in order to realize its objectives on the ground? We need a plan for bringing together different players and government departments to work together in a coordinated way in order to realize the set objectives.*

- *I am happy that funds and resources have been made available to implement programmes and projects in the water sector. The government and other players should continue providing the funds and resources.*
- *We must improve our lines of communication and build partnerships with other sectors so that we get their support particularly in terms of the supplies of goods and services that they provide to the water sector. Otherwise we will continue to face serious limitations in terms of these supplies.*
- *The user-pays and polluter-pays principles have been introduced at the right time. We will need strong enforcement mechanisms to make sure that these principles actually work on the ground. We cannot afford to leave anything to chance.*
- *The government has decided to treat water as both an economic and social commodity that must be used in an environmentally sustainable way. Whilst the quest for environmental sustainability is well understood, balancing the requirements for social equity and economic viability in the water sector is going to be very challenging. We need to start searching for practical ways of striking that delicate balance.*
- *Issues of regulation have always been difficult to deal with and are likely to continue challenging the water sector professionals. Perhaps we need to start thinking about participatory ways of involving the communities and water users so that they can assist us in enforcing compliance with the regulations in place.*
- *Water use licences help us to track and monitor water use in the country more easily. But implementing this is going to require enormous amounts of resources if we are going to register every water user. The responsible agencies are unlikely to have all the resources and competencies required for this exercise and therefore, are most unlikely to be able to issue water use licences to all water users. We may have to re-think the issue of licensing carefully in order to come up with more practical solutions. In any case, clear guidelines are going to be essential in determining who should and who should not be licensed.*
- *We need to continue training and retaining professionals in the water sector. Otherwise capacity constraints will continue to be a hindrance to our operations.*
- *The levels of staff turnover are too high for us and this negatively affects our operations. I think that government should increase the remuneration for water sector professionals in line with world standards or else consider commercializing the sector so that we raise more revenue and augment the salaries of employees in the water sector.*
- *The prioritisation of the water sector at the political level is very encouraging. But this must be translated into reality through financial commitments that will enable the sector to function effectively. Perhaps the Minister of Water should lobby strongly for more resources to be allocated to the sector.*
- *We really need to ensure that the water sector has good access to relevant technologies that improve efficiency in the sector. It does not matter whether the technologies are sourced locally or internationally as long as they function efficiently and effectively.*
- *The level of civil society participation in water resources management is very low. We should institute a more systematic process of awareness-raising*

among the water users and other stakeholders so that they also participate. We have to think about how to level the playing field so that all stakeholders participate meaningfully. We also need to ensure that they realize tangible benefits in both the short-term and the long-term.

- *Even though stakeholder participation is time consuming and costly, it is high time we started involving communities in the planning and implementation of water resources and associated infrastructure. In this way, we will empower them to own the water resources and use them in more sustainable ways.*

High school learner (16 years old, PHSG)

N. Funke

Scenario 1

This morning when my family and I wanted to get ready for school and work, there was no water – again! Great! I had to use swimming pool water to wash my hair. Now it smells like chlorine. Just hope it doesn't go green. ☹️ Dad says it's the municipality that keeps having to fix water pipes because they leak all the time. I don't know why they don't just upgrade them. They showed the mayor of Melbourne on the news the other day. He came to Pretoria to investigate our water piping system and said that we're welcome to use Australian technology and that they'd help us install it too. I guess there's just not enough money to maintain and upgrade everything then.

Anyway, getting back to the municipality, Dad that one of the reasons why the Hartbeespoort Dam is looking as bad as it is is because sewerage treatment plants aren't working the way they should. We went sailing last weekend and you could hardly breathe it smelled so bad. All of Dad's friends are moving their yachts to other dams – there's just no point in having them there anymore if you can't enjoy sailing because of the bad smell! The sewerage treatment plants aren't working the way they should and way too much sewerage gets into the rivers that flow into the dam. Yuck! Green, slimy, gooey – looks like pea soup! This problem's apparently gotten really bad over the past ten years or so. People are selling their weekend homes and everything and the zoo next to the dam has also had to close down! Apparently government's got some plan in place to fix up water quality and other problems, but we'll have to wait and see how well that's going to work!

The dam is not the only problem though. The water quality of many of our rivers is incredibly bad, Dad says, so bad that it's costing millions to treat the water before we can drink it! Another cause of pollution is big industries like paper mills – they pollute and pollute and no one actually enforces the law and makes them pay. They're destroying our rivers and no-one's doing anything to stop this! Dad says it's because a lot of skilled people have left the country or are just working for private companies now instead of working for government. So government is just trying to fight fires and not actually managing to manage things the way it needs to.

Water really is a big issue these days – much bigger than when Dad and Mom got married they tell us. They used to have long showers and baths and water the garden for hours. But they wised up quite a bit after the big 2012 and 2016 droughts – the worst droughts since the 1980s apparently – people were only allowed to shower every second day and use very little water for cooking and drinking! Apparently all of mom's roses died because she wasn't allowed to water them. She was devastated, but she got over it eventually! Now we have an indigenous garden. Dad says people are more careful about using water now because they've realised how bad things can get if we don't have enough of it. My friends and I talk about water and a lot and about how we think we can make a difference and how we could help government manage things better. But I don't know. The way things are going it seems that government has too many other problems to worry about – not sure if we can actually help. Quite depressing! Strange – you'd think that water would be its biggest priority seeing as we can't survive without

Scenario 2

As a teenager, even a fairly well-informed teenager, I had never been overly concerned about water until last year. Of course, I was well aware that water is becoming increasingly scarce (who could not be with it being in the news every single day) but it never really was much of an issue for me. My parents paid the bills and dealt with any problems that came up.

Then suddenly, a decision was taken by government last year to privatise South Africa's water supply (apparently to increase efficiency) and things have changed considerably since then! The price of water has increased a lot and now features prominently in our household budgeting, where before it was a cost that we never thought much about (or, at least, one that I never thought much about). The price of water is becoming as much of a concern as electricity or petrol. We therefore do what everyone does when things are expensive: use less of it. We use far less water than we used to, even though service delivery has improved. We simply can't afford to use as much water as we did previously! My parents are both very conscious of the water they use, and we try to, too, although it is a bit difficult. You don't realise how much water you actually use everyday!

News is not all bad, thank goodness: apparently, pollution problems are slowly being fixed in some major rivers and dams, but I wouldn't know this if I didn't do projects about it at school. My family isn't big on rivers and lakes and nature. The river and lake where I live (in Centurion), however, are still very polluted and quite unpleasant.

We do live in a fairly well-off neighbourhood, though, so there haven't been very many problems as the existing infrastructure seems to function quite well. Service delivery when it comes to water is actually quite good. Currently, some of the infrastructure around our area is being worked on, and although it is a minor inconvenience, it seems to be managed fairly well. However, when there are problems it is difficult to get them sorted out. Different government actors issue different statements, and although the private companies have

been effective in their roles, we are getting mixed messages. When we experience problems with our water, we are sent from the private institutions to various governmental representatives before we finally find somebody who can help us. There seems to be some confusion over what role the government/municipality actually has in these situation. The private companies insist that they are not at fault, but others say that they are responsible. Beyond this, when there is something wrong with the infrastructure in our neighbourhood, it takes ages before a technician is sent to sort it out, and they often turn out to be far from competent. It makes problem solving quite difficult.

My parents and some of our neighbours have now taken it upon themselves to attend meetings at the municipality to try and sort out these problems. They seem to feel that community participation can make a difference. Mom and Dad told me that apparently the Department of Water Affairs is busy with a big recruitment drive to get new skilled staff on board. We just hope that they manage to keep these people in their new positions for a long time (apparently this is a big problem at the moment) and we hope that this will go some way to resolving existing problems...

Scenario 3

There were quite a number of girls absent from our school and other Pretoria schools this morning! It was all over the news! Apparently, they all got very ill from drinking contaminated water which hadn't been cleaned properly before making it into people's houses. Luckily my family was ok because we have a filtration system on our taps but lots of girls at schools weren't as lucky. Some are even in hospital! And what about poor people? How are they supposed to afford filtration systems?

I am usually not a patient person when it comes to service delivery and although I understand that we are suffering from water scarcity, I still think that the government should be able to do something to provide for its people. Apparently they appointed lots of new skilled people a couple of years ago as part of their new strategic plan. So surely they should be able to sort things out! And that means providing us with clean water and looking after their technologies – even if money is tight! I mean, everyone's gotten a lot better about water usage now that water is such a priority. We like to cut down on our water usage at home, for example we shower for no more than 5 minutes and we switch off the water in the shower when not rinsing. So government should really do something for us too! And that includes notifying us of water outages and not just switching it off when they feel like it!

We had a big discussion about this at school today because of all the girls that were absent. It seems that nobody thinks that having a demonstration about this or attending meetings at the municipality will actually make a difference. I think we're all a bit disillusioned. Our rivers are so dirty anyway – it's probably all beyond repair so we just don't care anymore. I saw on the news the other day that in some cases government has managed to regulate

pollution a bit more and is making big industries pay. But it's probably a case of too little too late!

4.7.3 Reflections

Writing the stories proved to be quite a creative and fun part of the project as the project team members were able to put themselves in the shoes of the persona whose perspective they were writing from and were able to apply the scenarios in a more practical way.

As mentioned earlier, the process of eliciting drivers, grouping these into scenarios, writing narratives to explain the scenarios and stories based on the scenarios from different points of view proved to be very interesting and provided considerable learning to the project team. However, due to the strategic input into the scenario development process having been insufficient, it was decided that a scenarios expert would be appointed to take experts through a driver identification process during the course of two strategic conversation workshops. These drivers would then be converted into four scenarios which would make up the final project output.

4.8 Strategic Conversation Workshops

4.8.1 Process

The first of two strategic conversations was held on 14 July 2010. The purpose of the first strategic conversation was to identify the context, players, certainties (rules of the game), key uncertainties and scenario outline or game board that constitute the water sector institutional landscape by 2025.

A second strategic conversation was held on 31 August 2010, entitled, "Building Scenarios for the Water Sector Institutional Landscape by 2025". The purpose of this strategic conversation was to populate the scenarios around the drivers and uncertainties related to the water institutional landscape by 2025, as identified during the first strategic conversation. The ultimate aim of this exercise was to provide practitioners, stakeholders and policy-makers with valuable insights to support decision-making and counter undesirable trajectories of change.

4.8.2 Results

Using the two *pivotal* uncertainties as axes, a scenario game board was developed for the water sector.

The higher-level uncertainties were clustered, and two pivotal key uncertainties were defined as follows:

- Decision-making paradigm, and the ability to deal with complexity¹ (values will be a driver)' i.e. requisite decision-making paradigm dealing with complexity versus failing to deal with complexity; i.e. milling around in circles; and,
- Sustainability (balancing the 3 elements of sustainability*; i.e. keenly sensitive to sustainability issues versus exploitation regardless of sustainability).

Complexity and sustainability were defined as follows:

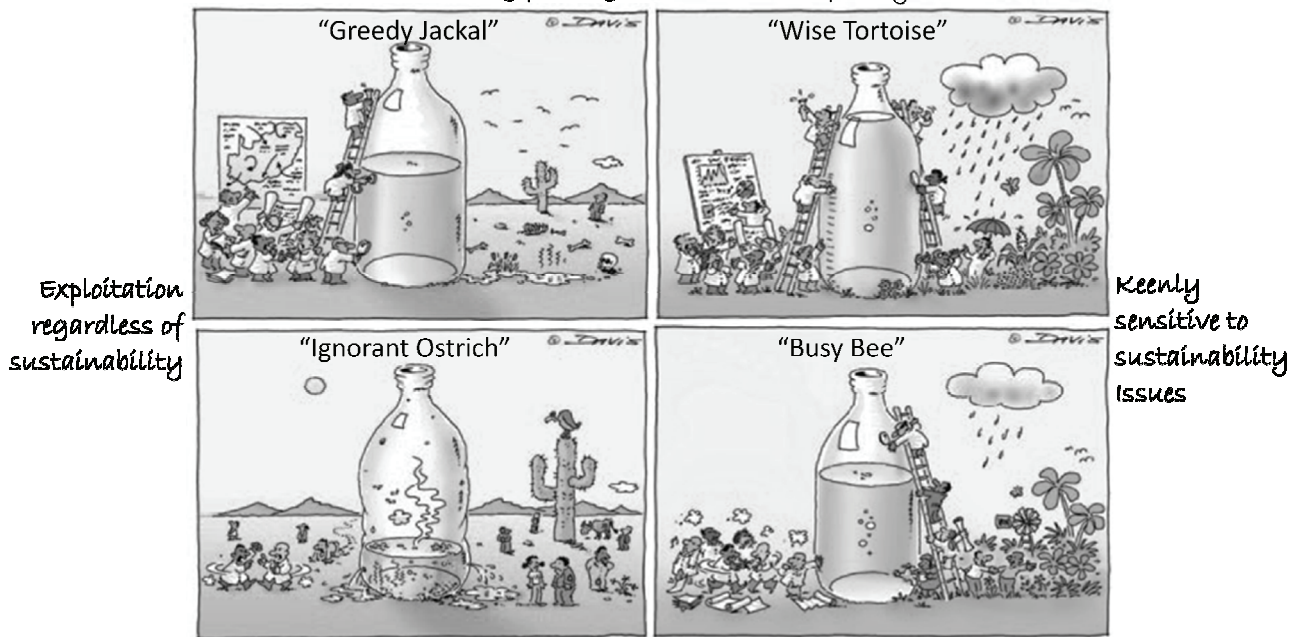
Complexity – this is determined by the number of factors, the rate of change of those factors, and the ease of identification of the factors in a situation.

Sustainability – this requires the reconciliation of environmental, social and economic demands – the “three pillars” of sustainability (2005 World Summit). “Sustainable development” is defined as meeting the needs of the present without compromising the ability of future generations to meet their own needs.

The pivotal issues resulted in the development of four scenarios. In the “Wise Tortoise” scenario, the decision-making paradigm deals with complexity, and is keenly sensitive to deal with sustainability issues. In the “Busy Bee” scenario there is a keen sensitivity to deal with sustainability issues but the decision-making paradigm fails to deal with complexity. In the “Ignorant Ostrich” scenario, there is exploitation regardless of sustainability and the decision-making paradigm fails to deal with complexity. The “Greedy Jackal” scenario represents a landscape where the decision-making paradigm deals with complexity but exploitation continues regardless of sustainability. The scenario game board and stories of the four scenarios are as follows:

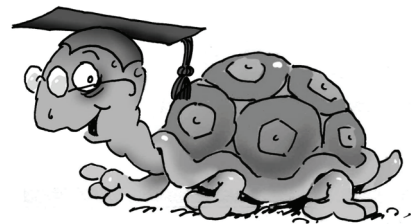
¹. It is important to distinguish between complicated and complex. By example, a clock is complicated, but it is predictable. A complex system is inherently unpredictable. The behaviour of a complex system emerges in a bottom-up manner as the system “self-organises”. It is this unpredictability and self-organisation that have fundamental implications for management. (Murray, personal communication, 26 May 2011)

Decision-making paradigm deals with complexity



Decision-making paradigm fails to deal with complexity

Wise Tortoise ²



"A paradigm shift has occurred. There is no isolated and singular 'Water Sector'. Instead, it is a multi-layered and diversified composite of different sectors all actively engaged in respecting and ensuring the focus of water being a resource of strategic importance. As a result the supervision of this resource enjoys the benefits of proactive engagement rather than a discordant stream of ongoing crisis management."

This has been achieved through the increased harmonisation of other, associated, legislation and their implementation with water policy and legislations. Governance is not siloed into separate rule-based priorities. Instead it is guided by a shared, principle-based vision. This means a reduced transaction cost, and more tools are used other than just command and control."

There is now a state of institutional maturity and stability, one that recognises legal plurality and alignment with a confidence to embrace flexibility; it is, in essence, an enabling environment that allows informal governance to work. Moreover it harnesses indigenous knowledge, values and decision-making"

² The tortoise is a very resilient creature as it manages to thrive in the harsh conditions of the Karoo and can even live to 100 years. While the tortoise moves very slowly, it is good at protecting itself from danger by withdrawing into its hard protective shell. The tortoise is also seen as being very wise. An example of this wisdom is the famous tale of the Tortoise and the Hare where the Tortoise outsmarts the much faster Hare and ends up winning the race.

processes. Strong decentralised systems allow for local regulation, and for local impacts to be addressed.

As people become more empowered to make choices and decisions based on their consumption of water, a strong citizens' voice starts to emerge. As such citizens embrace their integral buy-in into the responsible management of this resource. Combined with successful incentives, this has encouraged accountability by all stakeholders, from individuals through corporations and up to Government.

One of the main characteristics of this scenario is the successful implementation of improved technology and the requisite establishing of environments to develop expertise and a knowledge resource base. Changes in narrow social and political ideals have untethered restrictions on research, making it attractive for experts across all disciplines in the field of water management. More importantly these experts are encouraged to share their knowledge; and the resultant technological solutions are designed to address the issues of complexity and sustainability. These solutions are linked to conjunctive use, re-use and recycling as well as to empowerment.

Another defining feature of this scenario surrounds the ministerial institutional instruments that are in place. The relevant ministries jointly develop a national water resources strategy; the mandate is clear, and there is role clarity. There is inclusive implementation of the National Water Act, Water Services Act and other water related legislation. Moreover, adequate funding, regulation, monitoring and support are in place.

A tortoise will prosper when it has a complete understanding of its environment, and allocates the correct resources timeously, with great thought, and with conviction. In this scenario, a common understanding and awareness by all stakeholders has led to the appreciation of the true value of water to self and to others. It is recognised as both a social and an economic resource, but more importantly a finite one, which should therefore be protected and carefully managed. The environment flourishes, providing a sustainable resource of clean and re-usable water.

The outcome of this scenario is a happy and prosperous people."

Busy Bee ³

"This scenario is characterised by noble intentions but a failure to correctly execute requisite actions. Part of the reason for this is a distorted perception of the state of affairs.



³ The bee is synonymous with being industrious and works together with its swarm to maintain the bee hive, support the queen bee and produce honey. The bee is not good at coping with complex situations, however. When it perceives itself to be in danger, it will sting its enemy and will die as a result.

The country has enough water – or so it seems – and there is a genuine zeal on the part of the Government to ensure that it remains so, and that the supply, and management, of water is sustainable. The right words are used: suggestions are enthusiastically embraced and there is clear evidence that sustainability is considered a priority. In fact there is almost an obsession towards developing and displaying a sensitivity towards sustainability at all costs.

Unfortunately, the picture is not so rosy. Although water resources seem well managed the impression is out of touch with the dictates of reality. There is little economic growth, and social development is slow. The demand for water is growing quickly and so problems are hiding just around the corner.

The Government is seen as solely responsible for the distribution and management of water, and as such, the country's citizens, although they are aware of the importance of water, don't see themselves as being part of the system and therefore partly responsible in ensuring its sustainability. In brief, they see themselves as consumers and not stakeholders.

This is part of a bigger problem: a failure to recognise the complexity of water as a resource and of its management. This has major implications, the chief being that solutions to the developing problems are multi-faceted, requiring ongoing input from many different stakeholders, robust discussions across all spheres, passionate research and innovation, and considerate but decisive decision-making.

As a result there is little consultation with other stakeholders, including citizens. Any discussion is meaningful but lacks depth. There is therefore no complete picture of the water system and where the other stakeholders within business, society and the environment fit in. Projects are embarked upon and implemented with good intentions, but they are often not aligned or integrated with other sectors. They often miss the mark, and are manifested in simplistic solutions, poor spatial planning and unsustainable infrastructure systems.

Without any systems thinking in place in management, the levels of dealing with the inherent complexity are low and the consequences of actions are not clearly understood. There is an increasing inability to deal with the unknown, and people within the management system operate in silos with little co-operation or sharing of knowledge.

Similarly, any research that is encouraged is poorly directed, without any clear focus. The passion is there, but it is dispersed and diluted in effect. The resultant knowledge is not internalised, no time is left to reflect on decisions, and there is little in the way of innovation; i.e. no new ideas to address pressing problems.

The sustainable management of water as a critical resource requires a clear, focused head and a complete picture of the complexity of the system. Priorities need to be put in place, focus ensured, and discipline and guidance needed to stay on course. It also demands some brave and tough decisions and nobility of purpose. But such nobility alone, even supported by a nose-down, shoulder-to-the-wheel commitment to work will not succeed. All it will

ensure is a steady toil in a direction away from the complexity of the job – the path of choice of the bee.”

Ignorant Ostrich ⁴

“The driving feature of this scenario is the Government’s incapacity to prioritise water as central to development and the rush to implement short-term and imbalanced solutions to the ever-growing challenges of a developing nation.



In this scenario the forces entrusted with the management of water (the Government) have a poor understanding of the concept of sustainability. To them sustainability is an illusory ideal and not demanding of immediate meaningful debate. They have ‘more important issues’ on their plate. There is frustration around general delivery.

Around water, people want taps, and they want them quickly. Little concern is afforded to the security, maintenance, quality, and longevity of the supply. As a result the Government has been forced to make quick, and often rash, decisions surrounding water issues, hoping to secure quick results. The concept of sustainability is lost in the rush.

If there is any positive side to this, it is that the Government has created the impression it has adopted a ‘just do it’ mindset. Their argument is that it is better to be doing something rather than debating around an ideal and not doing anything. Whereas this is true; it is such only if the decisions taken have been correctly thought through – ‘correctly’ in this context meaning ‘with a robust view on the future’.

Unfortunately this is not the case. There is little, if any, use of a systems thinking approach, in fact there is little attempt to even understand the complexity of the system; and so decisions are made without proper concern for their impact on the system as a whole. There are significant consequences to these decisions, which are found out only after the decisions have been implemented. Learning by doing can have unfortunate repercussions.

If there is a key phrase in this scenario it is ‘short-term’. Political and social imperatives for job creation and social and economic growth take precedence, with a view on ‘improving the quality of life’; and decisions are made designed to secure as much as possible as quickly as possible. Water is not seen as critical resource for sustainable management, it is rather something that comes out of a tap and which everyone wants in their home, and quickly. Any innovations in water management are therefore focused on delivery and not sustainability. Big business, such as mining, which is such an imperative to

⁴ The ostrich is known in many stories to hide away from its problems by sticking its head in the sand. This behaviour makes it impossible for the ostrich to confront danger or survive it, which makes its behaviour both self-destructive and completely unsustainable.

economic growth, is calling the shots. The Government is unable to establish and enforce a clear institutional system, as it has to continually satisfy the demands of big business. Any negotiations with respect to water supply are therefore power-based, with little or no input bargaining opportunities afforded to environmental agencies or to the poor. Position-based bargaining overtakes the interests of interest-based bargaining. If there are any interests in the bargaining process they could well be political.

With no clear institutional system in place, unclear roles and responsibilities in the water sector and a constantly shifting operating environment, the transaction costs between stakeholders are high. Work is fragmented with gaps forming in some areas and overlapping in others, and where there should be complimentary roles between Government and service providers there is confusion, and a stalling of provision.

There are other forces at play: international players such as China are offering generous buy-in in the form of 'investment', but demanding substantial benefits in return, such as the ownership of resources. Attractive as these offers may seem, they are unquestionably short-term, and could open the door to unscrupulous deals and the further eroding of any possible sustainable water management.

In an attempt to accelerate delivery, work is going to the private sector (often via costly tender processes), which in turn increases complexity in the system and, subsequently leads to higher transaction costs.

Where little in the way of financial resources or attention seems to be allocated, is in the development of knowledge and expertise. In fact it is devalued, even considered 'expendable'; and there are limited career paths and development opportunities for some players. Research becomes secondary in importance to provision, and in a sector that should be bristling with bright young minds considering a myriad of exciting challenges in sustainable water management, there is only a smattering of capacity experience and knowledge of existing systems and issues, leading to poor institutional memory.

As a result, funds are directed at infrastructural investment without due consideration and expertise contribution around operations and maintenance. Furthermore, a lack of integrated planning leads to insufficient linkages between water supply and treatment capacities. The result is insufficient and irregular supply, large-scale water loss, and a rapid degradation of water quality. The water bubbles, but not in a nice way. Bad decisions have had unfortunate consequences, and the vultures have come home to roost.

The combination of a weak understanding of intergenerational equity and a lack of common vision, combined with an unyielding quest for short-term benefit has placed a stranglehold around any considerations of sustainability for the water sector; and as what water is left in the system bleeds out, the ostrich that doesn't see the danger signs, takes its last breath."

Greedy Jackal ⁵

"In this scenario water is scarce. Resources are running dry in a country that is still in the process of development and addressing backlogs. As such the Government is chiefly concerned with pandering to the social and economic demands placed upon it, and, as a result, represses any pressures for environmental responsibility.



A term that quite correctly describes the water sector is 'stressed'. Water basins, water supply infrastructure, water sanitation processes and water management structures are all under stress. Demand is exceeding supply, and in the rush to allocate the depleting resources, scant regard is given to any long-term sustainability. Water bleeds away in the face of an encroaching future wasteland.

However, the prevailing mindset is anything but fatalistic. Something must be done, and a multidisciplinary approach is agreed upon. The problem is a complex one, as are any possible solutions, and through the combination of a team approach and a burgeoning understanding of the complexity, adaptive management has become a forced reality. Projection planning is abandoned in favour of scenario planning, which is characterised by shorter decision-making and response times. Learning is not through testing, but by doing. This is evident in increasing discourse around trade-offs, such as the sharing of resources, efficiencies and co-operations.

Ongoing research agrees on the severity of the problem, and there is acknowledgement within the Government of the complexity of the problem; as such new solutions have to be integrated and take into consideration the dimensions of economic, agricultural as well as social development. This is an ideal under unfavourable conditions, and is therefore not easy. Conflict increases between competing users, and the ideal has to be abandoned at times to satisfy specific interests, be they economic, social, agricultural or even political.

There is little agreement amongst stakeholders, and any decision-making is fragmented further by the vocal interference of lobby groups who seize the opportunity to pressurise malleable components of the decision-making process towards satisfying specific interests.

As a result, one of two things happens: either the system starts to work to favour an elite (economically powerful) few rather than the whole population, or a massive socially driven redistribution process is embarked upon, at the expense of any measurable economic gain or benefit to environmental sustainability. The harsh reality is that something has to give.

⁵ The jackal is seen as a sly creature in many stories that often makes clever plans to outwit other animals and benefit at their expense. These short-sighted and exploitative plans often backfire however, and so the jackal ends up worse than before.

Are there any solutions? If so, their hand has been forced by the global economic slow down and the resultant limited financial resources. Established, long-term, large-scale solutions are put on hold. Immediacy and cost restraints make it clear: innovation is key. It's time to think out of the box.

There is another pressure: the stress and scarcity of water has a very visible face – the harrowing image of a sick and distressed populace. There are outbreaks of water-borne diseases amongst the poor; and in the more affluent suburbs continual water shortages and forced cuts to supply have sewn anger and frustration. Where water is in supply, costs have skyrocketed.

South African citizens are confronted with tough decisions and are forced to rethink their former cavalier attitude towards water. This is indeed a bitter way to learn about the limited nature of this critical resource.

In frustration they turn to the Government, whom they see as the ultimate authority in the management of water. The Government in turn centralises control and, in frustration and unable to implement preferred measures, suspends the Water Act.”

The detailed account of the strategic conversations is provided in Annexure F.

4.8.3 Reflections

The strategic conversations can be deemed successful because the result was a scenario game board with four possible scenarios for the South African water institutional landscape. The game board represents two drivers that are sufficiently challenging to define scenarios that can stretch our imagination regarding possible futures. Each of these four scenarios was subsequently described in the form of a story, which forms one of the main deliverables of the project and is presented in a separate “glossy” WRC report. The strategic conversations did cause a significant delay in finalising the scenario report. There was also substantial rework, since the scenarios presented earlier in this report were already developed at the time of initiating the strategic conversations.

5 Reflections and Learning

The Water Institutional Landscape by 2025 project was challenged by the unavailability of scenario experts. The initial plan to involve Prof. Michael Kahn from the HSRC failed due to Prof. Kahn's retirement. The HSRC did not have staff with similar expertise and had to withdraw from the scenario development process. Dr Barbara Heinzen's participation was tailored around strategic advice and the logistics of her involvement from her London base negated efforts to upscale her role. The first round of scenario development conducted through the methods described in sections 4.1 – 4.7 did not deliver strategic inputs. It became clear that it was important to take people out of their current reality. In short, engagement with people that were immersed in operational activities did not provide the thinking space for strategic engagement. The suggestion of strategic conversation workshops was based

on the need to get people out of their operational environment for at least two days and to structure discussions around key issues.

The first scenario development process was an important learning process for the project team and participants. It proved to be quite tricky to describe and get to grips with the different combinations of multiple drivers and make sure that each of the scenarios is internally coherent. The multiple-driver approach was demonstrated to be a complex approach of structuring scenarios. While it takes considerable effort to work through the complex scenario space, it was rewarding once it was internalised, because this approach captures many nuances that other approaches to scenario development may not capture.

The project was certainly conducted in the spirit of adaptive management, with lessons learned about scenario development processes being adapted to an alternative approach that was more likely to yield a strategic framework that would add value to the water sector. Due to the relatively long time frame of the scenarios project and the requirement for contributions from seasoned experts, the continued availability of research partners and sub-consultants was a challenge to project continuity.

The project provided valuable opportunities for capacity development for the project team and participants alike. The learners that participated in the scenario development process certainly learnt a lot about the water sector institutional landscape and the process of scenario development. The project participants provided valuable inputs to the project, but also developed a better understanding of the scenario process and the application of scenarios. Ms. Millicent Kekana's MSc (University of Limpopo) was supported through the project and she will also be able to participate in future scenario processes. Lastly, the project team developed significant capacity in scenario development through exposure to different methods and approaches and a better understanding of the strengths and weaknesses of different approaches.

6 Recommendations and Way Forward

This report compliments the “glossy” scenario report on the Water Sector Institutional Landscape by 2015. While the “glossy” report was envisaged as the main product from the research project, it became clear that the learning that was gained through the project should be recorded for the benefit of future scenario practitioners and users. This report can thus be used as a baseline document for other scenario development processes. The drivers and scenarios described in the report can also provide useful perspectives on the water sector institutional landscape in 2025.

6.1 Navigation

One of the objectives of scenario development is to identify preferred future outcomes and to navigate towards such outcomes through explicit decisions

and actions. Signposts or indicators can be used to assess the current position and trajectory in the scenario game board (Figure 3). The path towards the preferred option (Wise Tortoise) requires the most significant interventions, while inadequate action will migrate the sector to the worst case scenario (Ignorant Ostrich). A push towards short term, but inequitable development will take us to the “Greedy Jackal” future scenario.

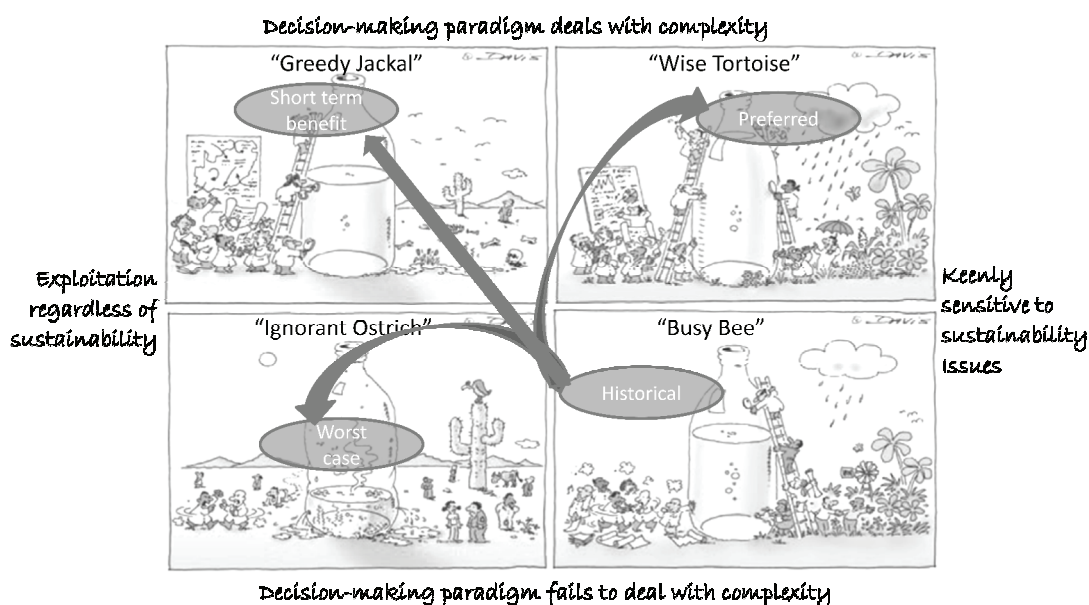


Figure 3: Scenario game board indicating trajectories of change.

Indicators that suggest progression to the “Wise Tortoise” future can be expressed as the degree to which:

- Water is prominent in integrated planning through national strategies, with particular reference to water security
- A systems approach and complexity thinking support a shared, principle-based vision and proactive management approach
- The national water resources strategy is updated and implemented, through mature and stable institutions and stakeholders are empowered and accountable
- Ministerial institutional instruments are in place
- Legislation is harmonised to give effect to equitable and sustainable water resource-based social and economic development
- There is effective informal governance and a strong citizens voice
- There is good support for research, knowledge is shared across disciplines and solutions which address complexity and sustainability are implemented
- People have universal access to domestic water

The “Busy Bee” scenario is characterised by the degree to which:

- Government is enthusiastic with noble intentions but fail to take effective action.

- Social and economic growth is low and citizens don't see themselves as stakeholders
- There is no complete picture of the water system, poor spatial planning and an inability to deal with the unknown
- People have misguided views, are not in touch with reality and solutions are simplistic
- Research is poorly directed and while there are good intentions with projects they are not aligned

The "Ignorant Ostrich" path is defined by the degree to which:

- Water is not central to development and there is a poor understanding of sustainability
- There is little concern to security, maintenance, quality and longevity of supply. Water comes out of a tap and everyone wants access, but the water supply is irregular, insufficient and degraded
- The approach is short term ("just do it"), with limited systems thinking which leads to imbalanced solutions and a weak understanding of intergenerational equity
- There are no clear institutional system in place, which results in poor institutional memory. International players are 'investing' for the wrong reasons and big business is calling the shots
- There is increasing complexity and costs, and knowledge and expertise is devalued

The traits of the "Greedy Jackal" scenario are the degree to which:

- Government is blamed and the Water Act is "suspended" with adaptive management becoming a forced reality in a context of water bleeding away and the wasteland encroaching
- Multidisciplinary approach is agreed upon, but there is an increasing discourse around trade-offs, with the country still developing and addressing backlogs
- New solutions need to be integrated, but there is shorter decision-making and response times, which means that innovation is key
- Water is scarce and the water sector is stressed, so citizens are forced to rethink their attitude towards water with water shortages escalating costs
- With an increase in conflict between competing users and outbreaks of water-borne diseases, something has to give

These traits are suggestions of some of the indicators that indicate a presence of, or move towards a certain future scenario. In order to effectively detect these indicators and use them as warning signs or indicators of success, actors involved in steering water governance in South Africa need to be aware of these indicators, personalise them to their individual working contexts and needs, and add to these indicators where necessary.

6.2 Communication and Implementation

The need for an explicit and comprehensive communication and implementation process became clear towards the end of the project. The research project did not make provision for such a process beyond the development of the scenario documentation. If these scenarios are to be used for strategy development, planning and management in the water sector, a broad and extensive communication process is a key requirement. This engagement, ideally, needs to take place at many levels of scale and amongst a diverse spectrum of actors.

Firstly, official government actors need to be aware of these products and how they can use them. In particular, there appears to be a need to capacitate DWA officials to make use of the scenarios and to apply them in strategic decision-making processes within the department. There is also scope to include the scenarios in the revised National Water Resources Strategy, as they provide a useful way of mapping out possible futures for the water institutional landscape. Given the learning derived from this project about how difficult it is to get experts and government officials to adopt an imaginative, creative and future thinking stance given the real, present and daily challenges of their work, careful consideration should be given to the contexts in which the scenarios are used and introduced. Using people with skills and understanding of scenario building as facilitators for strategic planning sessions may be helpful. Also, attempting to hold strategic planning and thinking sessions in spaces away from the office often helps to jolt people away from their immediate pressures to being able to think in a more creative forward thinking way.

Secondly, consideration needs to be given to how non-government actors can be exposed to and made aware of these scenarios. There is naturally an enormous diversity of actors in this category. Researchers can be made aware of these products in workshops, through mass email reminders, conferences, workshops, blogs etc. Having researchers aware of future scenarios and possible indicators that indicate which scenarios we are moving towards is important as researchers will help to sound the warning bells and generate awareness if they detect a move in a certain direction. Similarly, civil society (NGOs, schools, communities and so on) has “on the ground” experience and awareness of what is happening in terms of water availability, quality and so on. If many actors have a picture of potentially good and potentially bad water futures, and some indication of what they will experience in any one of these possible “futures”, civil society will have an added tool to support its articulation of current and future needs in relation to water.

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Appendix A: Social Attitude Survey questions

Questions by project team incorporated into Human Sciences Research Council
Social Attitudes Survey 2008 and 2009

WATER AND SANITATION

90. Which of the following is most important to you?

Sufficient safe drinking water	1
Steady electricity supply	2
Enough food	3
Improved toilet	4
Refuse removal	5
(Do not know)	8

91. How sufficient is the safe drinking water that your family is receiving?

Completely sufficient	1
Somewhat sufficient	2
Neither sufficient not insufficient	3
Somewhat insufficient	4
Completely insufficient	5
(Do not know)	8

92. Water is important to me for...

Religious reasons	1
Cultural activities such as weddings	2
The home: washing, cooking and cleaning	3
Growing food	4
Keeping my garden	5
Keeping my business going	6
To sustain life (drinking)	7
(Do not know)	8

Is the water you use currently?

	Yes	No
93 Safe to drink?	1	2
94 Clear?	1	2
95 Good in taste?	1	2
96 Free from odours?	1	2

Do you expect that the water will remain in the future?

	Yes	No
97 Safe to drink?	1	2
98 Clear?	1	2
99 Good in taste?	1	2
100 Free from odours?	1	2

Do you feel you received adequate education on the wise use of water (water conservation)?

		Yes	No
101	At school	1	2
102	In the community	1	2

103. Has this education on the wise use of water (water conservation) been improving for your children?

Improving	1
Stayed the same	2
Worsened	3
(Do not know)	8

Did you receive adequate education on hand-washing and safe sanitation (health and hygiene)?

		Yes	No
104	At school	1	2
105	In the community	1	2

106. Has this education on hand-washing and safe sanitation been improving for your children?

Improving	1
Stayed the same	2
Worsened	3
(Do not know)	8

**To what extent do you agree or disagree with the following statements?
[Showcard 1]**

	Strongly agree	Agree	Neither nor	Disagree	Strongly disagree	(Do not know)
107. My municipality provides enough information on water and sanitation services	1	2	3	4	5	8
108. My municipality can provide <u>sufficient water</u> for all	1	2	3	4	5	8
109. My municipality can provide <u>improved sanitation</u> for all	1	2	3	4	5	8
110. My municipality has the capacity to respond and fix problems related to water supply	1	2	3	4	5	8
111. My municipality has the capacity to respond and fix problems related to sanitation	1	2	3	4	5	8
112. There will be enough water for me and my family in 10 years time	1	2	3	4	5	8

113. What is your preferred level of service in water?

Piped tap water in dwelling	1
Piped tap water on site/yard	2
Public/communal tap	3
Water carrier/tanker	4
Borehole	5
Rainwater tank	6
Other, specify	7
(Do not know)	8

114. What is your preferred level of service in sanitation?

Flush toilet connected to a municipal sewage system	1
Flush toilet connected to a septic tank	2
Chemical toilet	3
Pit latrine with ventilation pipe (long drop)	4
Pit latrine without ventilation pipe (long drop)	5
Other, specify	6
(Do not know)	8

115. In the past year, how often did you experience interruptions of longer than one day to your water service?

Never	1
Once or twice a year	2
Monthly	3
More often than monthly	4

116. In the past 12 months, what was the longest interruption you experienced to your water service?

Never	1
Few hours or less	2
Few hours to 1 day	3
1 day to 2 days	4
3 to 6 days	5
1 week (7 days)	6
More than one week	7
(Cannot remember)	8

117. Has your water service gotten better, worse, or has it remained the same over the last year?

Gotten better	1
Stayed the same	2
Worsened	3
(Do not know)	8

118. Which of the following groups of people may not have enough water in the future?

a	City dwellers	1
b	Rural people	2
c	People living in informal settlements	3
d	Mining companies	4
e	Farms	5
f	Small businesses	6
g	People like me	7
h	(Do not know)	8

119. Which of the following groups of people will be most affected if there are water quality problems in the future?

a	City dwellers	1
b	Rural people	2
c	People living in informal settlements	3
d	Mining companies	4
e	Farms	5
f	Small businesses	6
g	People like me	7
h	(Do not know)	8

To what extent do you agree or disagree with the following statements? [*Showcard 1*]

	Strongly agree	Agree	Neither nor	Disagree	Strongly disagree	(Do not know)
120. South Africa is a water scarce society in which people have to be careful to save water	1	2	3	4	5	8
121. I am prepared to accept my municipality providing me with water which has been disinfected (thoroughly cleaned) after being used	1	2	3	4	5	8

122. To what extent do you agree or disagree that people like you consulted in decisions on water services / issues? [*Showcard 1*]

Strongly agree	1
Agree	2
Neither agree nor disagree	3
Disagree	4
Strongly disagree	5
(Do not know)	8

123. If water is poorly managed by the municipalities and misused by the people, what do you think will happen?

(Refused to answer)		97
(Don't know, inadequately described)		98

124. How can the government make sure there is safe drinking water for all in the future?

(Refused to answer)		97
(Don't know, inadequately described)		98

Appendix B: Notes of meetings with water sector and scenario experts

Date: 17 July 2008

Time 09:30 am

Name: Dr Phillip Kempster (DWAF)

Place: DWAF RQS, Pretoria

1. Water quality and sanitation

Skilled labour

The current crisis in the county is shortage of skills and high turnover. Whereas this is a country-wide problem, it is more so in the government sector. Particularly in the government water sector, there has been a great loss and shortage of engineers responsible for water treatment works. This is a contributing factor to inadequate water quality and sanitation – the lack of skills mean poor treatment of waste water, river contamination and subsequent health effects (Cholera and typhoid).

Population growth Vs technological advancement

The current technology (particularly water treatment technology) is not keeping in pace with the growing population. Particularly in growing towns (urbanisation), most treatment plants are not designed for large volumes of inflows, hence they fail to cope with growing demand for water treatment.

Funding

Most of the maintenance and treatment efficiency problems experienced in the wastewater sections are often attributed to lack of, or insufficient funds. Often times the municipalities are not allocated enough funds required for the upgrading and continuous maintenance of their sewer systems. In Delmas for example, lack of funds for water treatment led to the contamination of river water and underground aquifers. People using the underground water resource were eventually affected.

Privatisation of water treatment services.

When asked about privatisation of water treatment services, Dr Kempster agrees that the private treatment works are more efficient both in retaining the staff, maintaining the equipment and in terms of overall treatment efficiency.

Energy supply

The current energy supply regime in South Africa is characterised by frequent power outages that affect the treatment works and their efficiency.

2. Water supply

Regulatory control

Illegal abstraction of water: The Lesotho Highlands project is a classic example. The project involves **diversion** of water from Lesotho to Gauteng. Currently there are farmers who illegally abstract water for irrigation purposes at a very large scale, especially during the dry seasons. These have implications in terms of the lifespan of the project and its ability to sustainably supply water as required. For further information on this contact Fred Van Zyl at 012 336 7500 (DWAF planning division)

Technology

There are prospects with regard to the desalination of sea water to overcome water shortage problems especially in the coastal areas. However, inland users may not benefit from such initiatives because it would require a lot of energy and money, making it inefficient to transport water from the coast to inlanders.

Date: 24 July 2008

Time : 12h00

Name: Mr Nikisi Lesufi (Chamber of Mines SA)

Place: CSIR Pretoria

Water supply

Uneven distribution of mining activities across uneven water distribution – water scarce and water

Licensing in water rich areas

The department have not been effective in issuing, declining and putting conditions for water users. This results in uncontrolled utilisation of the resource. People don't impose regulations because they don't have licences. People had licences in terms of the old act. New licences are required and the department has to determine receiving water quality objectives, reserves and to classify the water resource. Operation without the licence results in bad practice.

Water quality

Facts

Mining continues to render water unusable

Where there are several mines in the same water shed, it is difficult to link pollution to its source

Check: Loskop Dam . Klipspruit (Riana DWAF)

Legacies

Former mine dams and water pollution are not appropriately located. Knowledge gap – what was appropriate then is not now (e.g. placement of slime dams in drain free areas was ok then but new knowledge informs that this results in groundwater contamination). What about in 2020.

Derelict mines: These result in acid mine drainage and responsibility lies with the state

Legislation: There is no legislation that deal with legacy issues

Transformation in the mining

EMPA opened for the transfer of mining rights to a third party. However the act does not make it mandatory for analysis of the competency and resourcefulness of the third party in environmental management and interest

Water economics

Waste discharge levies drove the initiatives: Initiatives have started where mining companies in a particular catchments set up a regional treatment facility. The water coming out will be of a better quality – in certain instances the water will be reused by other industries including mines including mines in water scarce areas. The example is the Emalahleni Water treatment project – pilot. Water from these plants is returned

to the river, sold to the community at a nominal price, and the sludge can be still be explored for minerals (value chain).

The challenges

- when Action precede legislation.
- treating water to portable standards is costly. Where industrial grade water passes through areas whose people do not have access to clean water, people tend to interfere with the system (breaking the pipes to access water).

Policy: Economics Vs environment

Elisrus Lephalale area (water scarce), is a biodiversity hotspot. Which means mining is limited yet it is the sole hope for socioeconomic development in the area. the Olifants River Water Resource Development project is faced with a challenge of serving the people or potential mining activities . mining is not a priority water user.

The use of economic instruments.

Biodiversity offsets

Ecosystem services???

Date: 24 July 2008

Time : 14h00

Name: Dr Pete Ashton

Place: CSIR Pretoria

With Business as usual we are heading to the low road. BAU means

- upto 40% of water being lost through informal connections and leaks
- **illegal connection:** most of the water tapped from Lesotho-Vaal never reach the Vaal because of illegal connections consortium of people making it difficult for water provision mandate. This will require strong implementation of policy.
- **Local govt:** authorities have no capacity for reticulation (plans); no metering systems, no tariff structures in place. Loss of technical capacity vs transformation.
- Skills in terms of availability, variability and risk
- Loss of institutional memory
- The will is there but no know how's and resources.
- This is worse in rural municipalities who are somewhat disconnected.
- The result of poorly operated municipalities is a urbanisation (including that of skilled people): not only for jobs , but for better services

Attitudes and lack of feeling of ownership

In rural areas where tap water is allocated on in every 5 m or so, local people lacks a sense of ownership (they even break the property); considered "government water". It is difficult to reach an agreement /common interest

Institutional structure at community level – male dominated (changing).

Treatment facilities: old equipment with insufficient capacity to cater for growing population. The result; over 85% of WWTW suffer from incomplete treatment.

Attitudes: people have to do things differently. Change attitudes

Inequalities

Poor people pay more for water and waste less and visa-versa

3ways

- high cost per unit volume
- find new sources of water
- change the way we use water

Benefit sharing paradigm, > export technology> import water (virtual water)

- The nature of SA dams – most of them are wide and this increase the surface area for evaporation. Most of them are big and require plenty of water to fill up, and this make the concept of ecological reserves less practicable.

As standard of living increases, population increases, demand for the resource increases.

Climate change is yet another driver.

Date: 25 July 2008

Time : 14h00

Name: Dr Heidi Snyman

Place: WRC offices, Pretoria

- Incubation for Innovation: A lot of stresses brought by things like global warming will encourage innovation for better quality and quantity of water.
- Constantly changing legislation: may lead to better enforcement
- Skills; uncertain. If people can't immigrate because of violence, we can't keep SA skills and we can't pay them well, then we will have a problem. Privatisation and keeping politics out will be a better option and the government can be an overseer.
- Technology: Advancement in treatment technology and more re-use of water. E.g dry sewer systems. This may not be proactive though.
- Financial constraints: might get worse with the current political direction
- Methodology: this is the worst year for the study: high inflation, high food and fuel prices, violence, political uncertainty etc
- Pollution in rivers and dams: The government should impose laws that drinking water should be purchased otherwise protect the water resource better. There are people who die from pollution but it is difficult to quantify that because of compounding factors.
- Transboundary water issues: water might unite or divide us.
- Recommendations: "numbers and needs" by Alloyson Lawless. www.civils.org.za

Date: 31 July 2008

Time : 14h00

Name: Felix Reinders

Place: ARC offices, Silverton, Pretoria

Background

- SA receives 450 mm of rain compared to 870 mm in the world
- Of the 110 x10⁹; 70 x10⁹ evaporate
- Of the 70 x10⁹ ; 40x10⁹ flows to the sea, ground water and into the soil profile

- Only 12871 x10Exp6 is available for Agric, domestic, mining and industrial use
- 62% is used in Agric alone for food and fibre
- 1.5 x106 hactres of land is irrigated and 18 x106 is dry land
- Area of irrigated land: government plans for making irrigation resources available to previously disadvantaged farmers (and upgrading of irrigation schemes in former homelands) may lead to an increase in the percentage of irrigated land. This may not necessarily mean an increase in water use if other sectors reduce their use or other farmers use their water more effectively. Research is done in the agric research sector to optimise water usage.
- Population growth: there is uncertainty in terms of direction of population size. Impact of HIV/Aids
- The cost of water diversion/ building dams make it difficult to divert water

Date: 24 July 2008

Time : 14h00

Name: Nick Fourie (Haartebeertspoort Dam IB)

Place: Telephonic conversation

Drivers

- Type of crop that is dominant. The type of crop affect the amount of water used. And this trend will be affected also by the price of maize
- Irrigation schemes' systems conditions: the hartebeespoort dame irrigation scheme is now more than 80 years old. The system is old, with cracks and estimated 39% water loss. The system is also built on clay soils which are subject to movement. It will require approximately 370m to replace the canal system. Given the current situation (14m budget with only 4 million Rands profit), it will take 20 years to fully refurbish the system. Massive water savings can be made if the system is refurbished.
- This is not the only scheme facing these problems. The same can be said for Vaal
- The scheme supply raw water to industry (mines), and farms. Huge economic impacts can be incurred if nothing is done to circumvent this. There are currently some potential mining opportunities that are forfeited because there is no water. If the 39% that is lost is retained instead, then some mines can start establishing themselves.

Date: 6 August 2008

Time 09:00 am

Name: Dr Jaqui Goldin (Ecolink)

1. People and infrastructure

There is likely to be more of a focus on people especially at a grass roots level than on infrastructure and pipes (the technology of which will have become quite specialised and less time- and effort intensive). More stringent controls will also be in place to control the use of water and make sure that water quality does not

deteriorate too drastically. There is also likely to be increased interconnectedness between different actors within the water sector and capacity within the water sector will hopefully improve over the next 10 to 15 years. The situation in the water sector is likely to hit rock bottom before it improves, but it will improve as people and institutions become more creative.

Skilled labour

The current crisis in the county is shortage of skills and high turnover. Whereas this is a country-wide problem, it is more so in the government sector. Particularly in the government water sector (a case in point is local government), there has been a great loss and shortage of engineers responsible for water treatment works. This is a contributing factor to inadequate water quality and sanitation – the lack of skills means poor treatment of waste water, river contamination and subsequent health effects (Cholera and typhoid). Government does not seem to be able to solve the problem of training and retaining quality staff and keeping skilled people in the country.

Population growth Vs technological advancement

The current technology (particularly water treatment technology) is not keeping in pace with the growing population. Particularly in growing towns (urbanisation), most treatment plants are not designed for large volumes of inflows, hence they fail to cope with growing demand for water treatment.

People's behaviour

People in rural areas drink water directly from the rivers and also practice religious/cultural and recreational activities in polluted water resources (e.g. baptism and swimming). Such behaviour can have extremely serious consequences for people's health. A case in point is the Klerksdorp cholera epidemic.

Pollution of water as a result of agriculture

Water resources are often polluted as a result of pesticides that are used for agriculture and that pollute some of the rivers that run through irrigation areas. This problem has been aggravated by the presence of endocrine disruptors (persistent organic pollutants).

Funding

Most of the maintenance and treatment efficiency problems experienced in the wastewater sections are often attributed to lack of, or insufficient funds. Often times the municipalities are not allocated enough funds required for the upgrading and continuous maintenance of their sewer systems. In Delmas for example, lack of funds for water treatment led to the contamination of river water and underground aquifers. People using the underground water resource were eventually affected.

Privatisation of water treatment services.

When asked about privatisation of water treatment services, Dr Kempster agrees that the private treatment works are more efficient both in retaining the staff, maintaining the equipment and in terms of overall treatment efficiency.

Energy supply

The current energy supply regime in South Africa is characterised by frequent power outages that affect the treatment works and their efficiency.

2. Water supply

Regulatory control

Illegal abstraction of water: The Lesotho Highlands project is a classic example. The project involves **diversion** of water from Lesotho to Gauteng. Currently there are farmers who illegally abstract water for irrigation purposes at a very large scale, especially during the dry seasons. These actions have implications in terms of the lifespan of the project and its ability to sustainably supply water as required. Efforts are currently being made to tighten restrictions and to introduce severe punitive measures for those who abstract water illegally. For further information on this contact Fred Van Zyl at 012 336 7500 (DWAF planning division)

Technology

There are prospects with regard to the desalination of sea water to overcome water shortage problems especially in the coastal areas. However, inland users may not benefit from such initiatives because it would require a lot of energy and money to transport water to the interior of the country.

Date: 24 July 2008

Time 09:00 am

Name: Dr Kevin Murray (Insight Modelling)

1. Approach

Global and local realities and uncertainties shape the future of the water sector and are water sector specific. It is possible to look at drivers and uncertainties that are specific to the water sector (i.e. located within it), specific to South Africa as a country (local context) and specific to the world (external/global context). The water sector for the purposes of this project can be defined as everyone who affects or is affected by water. This includes water providers, conservation authorities, water users etc.

2. Interdependence and controversy surrounding the need for a sound technical base

South Africa's water sector is characterised by a massive interdependence of its stakeholders. This means that dealing with the numerous issues that are present within the water sector requires a good technical base and capability (for example in terms of the provision of good quality water and management of water resources). On the other hand, however, a person at a high level management position within DWAF has stated it is a good thing that people who do not agree with the notion of transformation are leaving the department. This is problematic due to the urgent need for a sound technical base and the probability of the water sector being unstable in future without the existence of a sound technical base.

3. DWAF's future

It is important to note here that what happens within DWAF is of relevance to what happens within the water sector as a whole. If capacity within DWAF decreases, this is likely to be repeated elsewhere in the water sector. DWAF cannot function effectively unless there are highly skilled people within the department. Business as usual will not make a difference to the problems that are currently faced by the water

sector, it is therefore imperative that things be turned around and that DWAF once again becomes the employer of choice of highly skilled people.

4. Lack of water resources and need for job creation

There is a lack of water in South Africa, and at the same time levels of unemployment are unacceptable high and need to be lowered. This causes tension within government circles and the water sector because job creation in effect places greater pressure on available water resources. Lack of water is therefore a massive issue.

Date: 23 July 2008

Time 10:00 am

Name: Mr François van Wyk (Rand Water)

1. Water quality and sanitation

Deterioration of water quality

There seems to be a deterioration of water quality in South Africa's rivers and dams and the situation is not improving. Government departments are understaffed and the situation needs to be addressed. Another problem is that government officials are not willing to take someone (e.g. local government) to court, which results in municipal treatment works not being upgraded or kept up and local government not being taken to task for its neglect of the water quality situation. This is problematic because the Constitution states that if a local authority cannot fulfil a service, the next level of government is supposed to do so and/or disband the local authority. While the law is clear on what actions should be taken, this is not happening. There are however cases where DWAF has been taken to court by members of the NGO sector; an instance is the NGO Save the Vaal Environment.

Skills shortage

There is a shortage of skills and there is the possibility of retired water sector professionals training employees who are actively working in the water sector. A related problem is that many professionals of the same age are now at a point where they are retiring.

2. Water supply

Climate change

This is not boding well for South Africa in terms of natural disasters (floods and droughts) and the availability of water – questions thus arise regarding how to manage natural disasters and where to get more water from if less is available. Due to these issues, shared rivers and the Lesotho Highlands Water Project might become increasingly political issues.

Water pricing

Water in South Africa is very cheap – especially compared to other countries. It is possible that if people paid more for water they would use it more effectively. A

possible way of doing so would be by charging anything over and above the first 6 kilolitres at a certain price. This would mean that the more one uses, the more one pays. It is also crucial that more be done to control the wastage of water. In Johannesburg alone, 25% of water is lost due to leakages, and 25% of water use does not contribute to the economy. This means that in total 50% of water is not billed by the City of Johannesburg – an issue which needs to be addressed. What is also required is a shift in mindset on behalf of Randwater and local municipalities. Both want to sell water and will therefore have an in principle with urging people to conserve it/use less of it.

Sanitation

A further problem is that not enough sewerage works are being built, possibly because sewerage works do not provide politicians with votes. Again this is a difficult problem to solve.

Lawlessness

It is important that those people who do not pay for the water services they use be penalised accordingly, something which is not happening at the moment. As a result people simply break the law and end up getting away with their actions. As regards industry, some large companies like SASOL have seen the light and are engaging in good actions to prevent pollution, while smaller organisations find it financially difficult/unviable to do so. The Catchment Management Agencies will not have any additional powers that DWAF has at the moment – the question then arises of whether they will be able to make a difference to holding water users and/or abusers accountable.

Discussion with Dr Barbara Heinzen – Independent scenarios expert

Marius Claassen and Nikki Funke discussed the project and ideas surrounding it with Barbara Heinzen, an independent scenarios expert from the United Kingdom. Dr Heinzen spoke of the importance of identifying important dilemmas and key points as brought across by the experts and stakeholders who have been interviewed as part of the project so far. Furthermore, she advised the researchers to make use of existing projects and contacts when it comes to interviewing groups of people from different social and economic strata in order to gauge their opinions and concerns regarding the water institutional landscape in South Africa by 2025. In terms of focus group discussions, it is important to identify the decisions that people are currently making at all levels of society regarding the future of water institutions and the water sector in general.

In terms of choosing who to have focus group discussions with, Dr Heinzen suggested that one consider the following possible categories/types of water use: households, industry, mining, industrial agriculture, small-holder/organic agriculture and “informal” rural and/or urban livelihoods. These groups of participants should be chosen by taking into consideration the following contexts: rainfall (frequency and amount), the river basin/catchment within which a group of people might be located, and an institutional analysis in terms of water/land tenure ownerships (tribal vs non tribal), access to resources and who decides and how they come to said decisions.

Appendix C: Rural and urban schools interaction

C.1 Letter to Pretoria High School for Girls explaining the suggested interaction with learners

To whom it may concern,

We work in the Water Governance Group at the Council for Scientific and Industrial Research (CSIR) and are currently involved in a research project that looks at the water institutional landscape in South Africa by 2025.

As part of the project, we would like to determine the views and opinions of high school learners (ideally in Grades 10 to 12) around what they think the possible future(s) of the South African water sector might look like. We would like to interact with learners in two stages: First, we would like to give an introductory presentation about the state of water in South Africa and the institutional structures that govern it. Secondly, based on any interest expressed at this presentation, we would like to invite the learners to take part in a simulation exercise that would be held a few weeks after the initial presentation. In this exercise, the learners, with some guidance from us in the form of an information starter pack and after having done some research, would be asked to “step into the shoes” of different characters who make use of water. These characters would represent the following: agriculture, industry, mining, urban life, rural life, national government and environmental activism. We would either have one learner or a team of two learners per category. The learners, each representing a character, would then be asked to hold a discussion, each of them tabling their interests and needs around water for the future. At the end of the discussion, we would sketch the future according to what the learners discussed and would try to elicit from them what might need to change if the future of the water institutional landscape in South Africa is to be a favourable one.

Who would benefit from participation in this event?

- Any staff or learners who are interested or concerned about the state of fresh water resources and how they are governed in South Africa, would find this seminar interesting.
- Grade 11 Geography learners who are looking for an interesting topic for their Grade 12 research project may be interested in participating to get some interesting ideas for their research.
- This information might be of interest to learners who take part in debating.
- Learners who are possibly interested in pursuing a career in environmental/water affairs would gain interesting exposure from this exercise.

All of the learners who take part in the simulation exercise would receive a hamper with CSIR branded give-aways. A prize (probably in the form of a gift voucher) would be awarded to the learner who best represents the interests and needs of their particular character.

Please let us know what you think about this idea. If possible, we would like to put up some posters in the schools on 21 July. We propose the afternoon of 24 July as a possible date for the introductory presentation. The simulation exercise could take place on either 7, 21 or 28 August.

We look forward to hearing from you!

Regards,
Nikki Funke and Shanna Nienaber

C.2 Rules of simulation game

WATER INSTITUTIONAL LANDSCAPE OF 2025 -SIMULATION EXERCISE-

August : 14h00 – 15h30

Room __ - PHSG

In order to help us to construct our picture of the future of the South African water sector we ask you to participate in a Simulation game.

What is a simulation game?

A simulation is the construction of a 'pretend reality'. Individuals are asked to represent different actors or characters that exist in the real world. By creating a microcosm (a small reality or picture) of the real world it becomes possible to begin to talk about and understand some of the issues that are real and serious and worrying in the actual world. The great thing about the simulation is, however, that it's not actually the real world, so no one has to get too stressed if we don't get the answers right the first time around!

The pretend reality that we will be creating or simulating is the South African water sector in 2025. In other words, we are asking you to imagine what our country will be like in 16 years time when you are in the working place. What will different actors' water demands be in the future? Will the population have grown? Will we have better technology to use water? Will there be more or less poverty?

How does the simulation work?

Step 1: Commit to participating in the simulation by signing up with your designated teacher.

Step 2: You will be assigned a character from the water sector. You will either represent mining, agriculture, urban residents, rural residents, the energy industry, or an environmentalist. You will be given a card outlining who you are, giving you some background about your context, some questions to think about and some places to find out more about your character. You then need to go and research your character so that in the simulation, to the best of your ability, you can represent the needs, wants and opinions of the character that you are assigned (Remember you will always be doing a bit of guess work about the future).

Step 3: At the simulation on Friday 4 August there will be 2 sessions taking place. In the first session you will each be given a maximum of 4 minutes to present your character, what you want in terms of water now and in the future, and why you want it. When everyone has done this, we will essentially have created a picture of the water sector and what everyone wants from it. In the second session we will have a round table discussion between stakeholders about what can realistically be achieved given the competing sets of demands that are at play in the water sector

Step 4: Prizes for participation and best presentations will be awarded.

Please feel free to contact us if you have any questions or concerns.

Nikki Funke

or

Shanna Nienaber:

We look forward to seeing you on ____.

Regards
Shanna and Nikki

C.3 Email communication regarding story writing for Pretoria High School for Girls and three sets of instructions on how to write the stories

Good morning.

I write to you in connection with the conversation we had in relation to the possibility of some of the students, who participated in the Water Simulation Game, becoming involved in the next stage of our Water 2025 Project. This next stage involves writing different possible water stories for the future of South Africa.

Whilst it would add great value to our research to have young students' 'voices' in our final product, we also feel that this is an exciting opportunity for students to get their work published in our final product.

We meet today to draft the characteristics of the stories that we will need written. We estimate that we will have between 3 and 4 possible stories emerging from our analysis. Thus, we would need at least 4 students to volunteer to write these stories. If more students are interested in participating, they could work in groups to produce the 3-4 stories that we need.

The girls would be required to produce a short story that is between 1/2 a page to a page of typing. We will provide them with the 'core keywords' or 'ingredients' that they need to be built into the story. We will have this sorted out and sent to you by Monday 21 September at the latest. This will then give the girls the holidays to play with their stories.

We would be very grateful if you could let any interested students know about what is happening. We will then be in contact with you regarding specific details in the next week.

Regards,
Shanna Nienaber



Water Institutional Landscape of 2025



-A chance to contribute your story to our final publication-

Having participated in the “State of South Africa’s Water Sector: A Simulation Game” you will by now be well aware that Water Governance Group at the CSIR is busy with a project where we are trying to construct possible scenarios or stories about what our South African Water Sector may look like in 2025.

Over the past year we have been gathering inputs from a broad spectrum of South Africans (Girls High girls amongst them). Out of this research three possible stories for the future have emerged. However, for these stories to mean anything important to different groups in society we need to have different voices ‘tell the stories’. This is where you come in. We would like you to tell one of the three stories through your eyes as a high school pupil. We want to know what the scenario we give you means for your personal, daily life.

By submitting this story to us we will be able to offer a more real and honest reflection of what the impact of these scenarios will be on the lives of different South Africans. You on the other hand gain the opportunity to offer an input in our final publication and also get your name published in a scientific publication. This sort of thing looks super on varsity applications, CVs and so on.

Right so what do you have to do?

- You need to write a story that is between ½ a page to 1 page in length. This story needs to be typed in size 12 Arial font with Size 1 spacing.
- This story needs to be submitted to Mrs Cyrus by Friday, 16 October. We will collect the stories from her on this day. This gives you the holiday and a week or two of term to work on this.
- Please put your name, surname, age, grade and contact details on your story. Also mention to us that you are working on scenario 1 (admin matters!!!)

What story do you need to write?

- You need to write a story about how water and the institutions that govern water are impacting on your daily life. When you write this story you must write from a personal perspective. In other words, don't pretend to be anyone else Just be yourself as you are right now. The only twist is that you are who you are right now in the year 2025.
- In order to write your story you need to carefully read the information below. This information gives you specific details about the challenges facing you in the world you live in, in 2025 (i.e. the characteristics of the scenario you live in).
- You need to write a story about how the characteristics of the scenario we describe below are likely to affect you in your life on a daily, weekly or monthly basis.

Some tips to make your task a little easier:

- Think of three water institutions that impact on your life and think how they could be affected by the issues described below. Then write about how these water institutions (affected by the issues described below) impact on your life and water needs and wants.
- You can think of these institutions by asking questions like:
 - Who do I pay my water bill to?
 - Who do I phone when the water stops coming out of my taps?
 - Who do I phone when there's a river running down my street from a burst pipe?
 - What do I do if I run a glass of water and it smells and looks dirty?
- Chat to family or friends for advice and ideas.
- Give Shanna a call or email if anything is unclear or if you want to bounce some ideas around (don't be shy!!)
 - Shanna: 012 841 4475
- Make it simple for yourself. Pick an idea that you understand and relate to and run with it. After all, you only have 1 page (not 100 pages!!)
- Have fun!!

C.4 Interaction with rural schools in Bushbuckridge as part of an existing questionnaire

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 D: Communication on driving forces

The Water Sector Institutional Landscape by 2025

Driving Forces

Potential driving forces of the Water Sector Institutional Landscape by 2025 have been identified through a literature review, personal interviews and the HSRC's social attitude survey of 2008. These driving forces are essentially factors which are believed to be important influences on the water sector but have varying degrees of uncertainty related to them in terms of what their actual impact on the sector will be. Each driver is presented with a brief description and an initial assessment of its uncertainty and importance on a scale of 1-5.⁶

1. Strategic planning

The degree to which long term plans (5, 10 and 50 years) are in place to achieve objectives for the future. Strategic planning refers to objectives in the water sector the Department of Water and Environmental Affairs wants to achieve. These could include objectives related to managing water quality, and developing and protecting water resources.

Importance: 4

Uncertainty: 3

2. Prioritisation

The degree to which the water sector is prioritised at the political level, particularly regarding resource allocation for infrastructure, skills and technology development. Water and the needs of the water sector have to be high up on the political agenda to receive the political attention and resources they need.

Importance: 4

Uncertainty: 3

3. Inter-sectoral coordination

The degree to which other sectors (such as electricity, manufacturing and transportation) are able to provide reliable supplies of goods and services to the water sector. This links to Driver #9, where the dependency of other sectors on the water sector is highlighted.

Importance: 3

Uncertainty: 4

4. Economics of water

The degree to which water users and polluters are required to cover the real cost of their use, including externalities. Cost of water, which is based solely on production cost (treatment and pumping) and some cross subsidization schemes to meet socio-political objectives is insufficient. Externalities such as sustainability and conservation features like scarcity, social and environmental values need to be accounted for.

Importance: 3

Uncertainty: 2

⁶ Uncertainty:- 1: Very low; 2: Low; 3: Moderate; 4: High; 5: Very high
Importance:- 1: Little impact; 2: Noticeable; 3: Significant; 4: High; 5: Dominant

5. Privatisation

The degree to which water resource management and water services are privatised. This implies considering issues of the price of water, whether or not water is adequately accessible and affordable to the poor, how socially and environmentally conscious water controlling private actors are, and other issues.

Importance: 3

Uncertainty: 2

6. Regulation

The degree to which regulation ensures a culture of compliance and cooperative management in the water sector. It is important for users of water, either on a private or commercial scale, to comply with water regulations regarding, for instance, the payment of water or treatment of effluent. It is also important for these regulations to be enforced by the Department of Water and Environmental Affairs and other relevant government departments.

Importance: 3

Uncertainty: 2

7. Water use licensing

The degree to which responsible agencies are able to issue water use licences to support sustainable social and economic development. This refers to the ability to make decisions to issue licences that are based on reasonable scientific assessments and the use of credible techniques. Both the quality of the decisions and the time it takes to make such decisions will affect the speed and sustainability of water-based development activities for social benefit.

Importance: 3

Uncertainty: 2

8. Skills

The degree to which a shortage of skills prevents the water sector from being effective. Skills are characterised by appropriate competence (quality) and the capacity related to such competencies (quantity).

Importance: 5

Uncertainty: 2

9. Staff turnover

The degree to which high staff turnover prevents the water sector from being effective. This reflects limited experience of staff to perform specific functions, as well as the transaction costs related to vacancies, recruitment and in-service training.

Importance: 4

Uncertainty: 4

10. Funding for operations

The degree to which funding for monitoring, evaluation and maintenance is available and deployed to ensure continued and sustainable delivery of services. Availability of funds requires a coordinated approach to different funding streams, whereas effective deployment requires planning and operational capacity within the sector.

Importance: 5

Uncertainty: 4

11. Globalisation (in terms of access to technology)

The degree to which technology and technology-related services are global depends on the appropriateness of global technology, effective supply chains and the local demand for global services. This affects local competition for

Importance: 3

Uncertainty: 1

technological goods and services and the availability context-specific solutions.

12. Technology development

The degree to which the development of new technologies keeps pace with the challenges in the sector and the degree to which available technologies are being deployed in the sector. The former requires good communication by the sector about the needs in the sector and effective mechanisms to develop and supply such technologies. The latter requires good communication to the sector about the available technologies, as well as the capacity in the sector to adopt and implement the technologies.

Importance: 5
Uncertainty: 3

13. Civil society

The degree to which civil society participates in water governance. Participation depends on two main factors: being empowered to participate and taking action. Empowerment includes the capacity to participate and the availability of enabling processes. A decision to act depends on the belief that participation will have a positive influence on water governance and benefit participants.

Importance: 4
Uncertainty: 3

14. Equitable participation

The degree to which water user groups feel that they have fair and equitable access to water governance processes. This implies asking a number of questions. Have I consulted with the public before arbitrarily making a policy choice? Who have I spoken to: Have I only represented powerful private sector actors or have I made provision for the voice of civil society and river communities? These questions of fair participation go to the heart of creating a democratic culture within water management.

Importance: 2
Uncertainty: 4

15. Ownership

The degree to which communities have a sense of ownership of water resources and associated infrastructure. Sometimes a sense of ownership towards a resource brings about a sense of responsibility towards the resource. On the other hand, ownership of resources by communities (so called common property resources) often subjects the resource to overexploitation and misuse.

Importance: 3
Uncertainty: 4

Strategic Challenges

Strategic challenges are issues which are identified as actual and potential obstacles or hurdles facing the water sector. Their importance to the state of the water sector is, however, somewhat uncertain.

16. Global change

The degree to which the water sector is able to respond to global change. This implies considering global and regional trends. Can the water sector manage the pressure that is created by a rapidly opening economy following the trend and pressure that globalization creates? Is the water sector able to adapt to changing international norms, trends and laws relating to water? Is the water sector able to respond to the demands of neighbouring countries with growing water needs?

Importance: 4
Uncertainty: 4

17. Political stability

The degree to which national and regional political stability create an environment which is conducive to the effective functioning of water institutions. This requires a consideration of a number of things. Is the water bureaucracy in South Africa strong enough to weather political change and dispute? Is the government focused on supporting the development of the water sector or is it tied up with more immediate concerns (e.g. violence, poverty, unrest?)

Importance: 3
Uncertainty: 2

18. Decentralisation

The degree to which the public water sector is decentralised and decisions are devolved to a local level. This is about considering how much water is controlled by the executive and highest organs of state and how much water is controlled by provinces or local districts. This is about considering whether CMA's are 'up and running' or if their responsibilities are continually being delegated back to national government departments. This is about asking if local people are being drawn into taking responsibility for the water they utilize.

Importance: 5
Uncertainty: 3

19. Local government

The degree to which local government is able to meet the demands of the water sector. The responsibilities of local government with respect to water are stipulated in various pieces of legislation; including the Municipal Systems Act and the Water Act. These responsibilities include supplying people with clean, good quality water and sanitation, and also treating sewerage before it is released into river systems and dams. The ability of local government to meet its obligations and mandates as per legislation and policies does have an impact on the water sector.

Importance: 5
Uncertainty: 4

20. Rights to water

The degree to which the rights to water are translated into action. This requires a clear understanding of the rights of people enshrined in the constitution, bill of rights, national water act and water services act as well as an overt commitment to effective implementation of these rights.

Importance: 4

Uncertainty: 2

21. Land restitution

The degree to which land restitution and transformation in land ownership lead to more effective water use. Do land owners who have gained land based on land restitution policies use water effectively? Are they advised and helped to do so by the government or are they left to their own devices after they have acquired their new land?

Importance: 3

Uncertainty: 4

22. Balance development and protection

The degree to which implementation of water sector policies and regulation achieves an equitable balance between providing services, utilising the resource and achieving sustainability. This is determined by the understanding of equal opportunities that both water-based development and water protection can offer. Such an understanding can be achieved if the opportunity cost of water conservation is understood by decision makers in the sector.

Importance: 3

Uncertainty: 4

23. Biophysical constraints

The degree to which water governance takes account of the physical, chemical and biological complexity and constraints of the resource. This requires consideration of issues pertaining to protection of ecosystems, basin closure, keeping appropriate levels of green water in the ecosystem and so on.

Importance: 5

Uncertainty: 4

24. Water quality

The degree to which poor water quality affects users and impacts on real social and economic development. Poor water quality especially affects people who are directly dependent on water resources such as rivers. It can be detrimental and even fatal to people who are immuno-compromised and can aggravate the spread of water borne diseases such as cholera. Poor water quality also means that crops irrigated with such water are less likely to be of good quality, which impacts on economic development.

Importance: 4

Uncertainty: 4

25. Social and economic growth

The degree to which the water sector is recognised as a critical driver for social and economic growth. This should be demonstrated by water sector-related issues being included in strategic planning options and development decisions.

Importance: 3

Uncertainty: 2

26. Regional development

The degree to which a regional approach is taken in water-related social and economic development. When the Department of Water and Environmental Affairs makes decisions regarding social and economic development that impact on transboundary water resources, it has to take into account how this will impact on the neighbouring countries who share these resources with South Africa.

Importance: 4
Uncertainty: 3

27. Disease

The degree to which disease, such as HIV/AIDS, diarrhoea, and cholera changes demands for water resources and services. People who are ill may need more water and better water services in order to be cared for and retain a sense of dignity once they have fallen ill. These people should also be cared for in hygienic conditions so as to help prolong their lives and reduce infection of caregivers or people who come into contact with them (for example, in the case of cholera).

Importance: 3
Uncertainty: 3

Participation sheet

Please assign importance and uncertainty scores to existing driving forces, strategic challenges (key on page 2) and suggest additional driving forces.

Key drivers

1. Strategic planning	Importance: Uncertainty:
2. Prioritisation	Importance: Uncertainty:
3. Inter-sectoral coordination	Importance: Uncertainty:
4. Economics of water	Importance: Uncertainty:
5. Privatisation	Importance: Uncertainty:
6. Regulation	Importance: Uncertainty:
7. Water use licensing	Importance: Uncertainty:
8. Skills	Importance: Uncertainty:
9. Staff turnover	Importance: Uncertainty:
10. Funding for operations	Importance: Uncertainty:
11. Globalisation	Importance: Uncertainty:
12. Technology development	Importance: Uncertainty:
13. Civil society	Importance: Uncertainty:
14. Equitable participation	Importance: Uncertainty:
15. Ownership	Importance: Uncertainty:

Strategic Challenges

16. Global change	Importance:
17. Political stability	Importance:
18. Decentralisation	Importance:
19. Local government	Importance:
20. Rights to water	Importance:
21. Land restitution	Importance:
22. Balance development and protection	Importance:
23. Biophysical constraints	Importance:
24. Water quality	Importance:
25. Social and economic growth	Importance:
26. Regional development	Importance:
27. Disease	Importance:

Additional Driving Forces or Strategic Challenges

1.		Importance: Uncertainty:
2.		Importance: Uncertainty:
3.		Importance: Uncertainty:
4.		Importance: Uncertainty:
5.		Importance: Uncertainty:
6.		Importance: Uncertainty:
7.		Importance: Uncertainty:
8.		Importance: Uncertainty:

Please return completed forms to Ms Elizabeth Masekoameng

Appendix E: Different scenarios as initially identified by the project team

Scenario 1

Strategic

- Strategic planning+

Long term plans (5, 10 and 50 years) are in place to achieve objectives for the future.

- Prioritization-

The water sector is not prioritised at the political level, particularly regarding resource allocation for infrastructure, skills and technology development.

- Inter-sectoral dependencies (should be changed to inter-sectoral co-ordination)+

Other sectors (such as electricity, manufacturing and transportation) are able to provide reliable supplies of goods and services to the water sector.

Operational

- Economics of water-

Water users and polluters are not required to cover the real cost of their use, including externalities.

- Privatization-

Water resource management and water services are not privatised. This implies considering issues of the price of water, whether or not water is adequately accessible and affordable to the poor, how socially and environmentally conscious water controlling private actors are, and so on.

- Regulation+

Regulation does ensure a culture of compliance and cooperative management in the water sector

- Water use licensing+

Responsible agencies are able to issue water use licences to support sustainable social and economic development

Institutional

- Skills-

A shortage of skills prevents the water sector from being effective. Skills are characterised by appropriate competence (quality) and the capacity related to such competencies (quantity).

- Staff turnover+

High staff turnover does not prevent the water sector from being effective.

- Funding for operations-

Funding for monitoring, evaluation and maintenance are not available and deployed to ensure continued and sustainable delivery of services. Availability of funds requires a coordinated approach to different funding streams, whereas effective deployment requires planning and operational capacity within the sector.

- Globalization(should be changes to access to technology)/ technology development+

Technologies and services are available and sourced internationally.

Societal

- Civil society/ equitable participation-

Civil society does not participate in water governance. Participation depends on two main factors: being empowered to participate and taking action. Empowerment includes the capacity to participate and the availability of enabling processes. A decision to act depends on the belief that participation will have a positive influence on water governance and benefit participants.

- Ownership+

Communities have a sense of ownership of water resources and associated infrastructure.

Scenario 2

Strategic

- Strategic planning -

Long term plans (5, 10 and 50 years) are not in place to achieve objectives for the future.

- Prioritization +

The water sector is prioritised at the political level, particularly regarding resource allocation for infrastructure, skills and technology development.

- Inter-sectoral dependencies (should be changed to inter-sectoral co-ordination)-

Other sectors (such as electricity, manufacturing and transportation) are not able to provide reliable supplies of goods and services to the water sector.

Operational

- Economics of water+

Water users and polluters are required to cover the real cost of their use, including externalities.

- Privatization+

Water resource management and water services are privatised. This implies considering issues of the price of water, whether or not water is adequately

accessible and affordable to the poor, how socially and environmentally conscious water controlling private actors are, and so on.

- Regulation-

Regulation does not ensure a culture of compliance and cooperative management in the water sector

- Water use licensing-

Responsible agencies are not able to issue water use licences to support sustainable social and economic development

Institutional

- Skills+

A shortage of skills does not prevent the water sector from being effective. Skills are characterised by appropriate competence (quality) and the capacity related to such competencies (quantity).

- Staff turnover-

High staff turnover does prevent the water sector from being effective.

- Funding for operations+

Funding for monitoring, evaluation and maintenance are available and deployed to ensure continued and sustainable delivery of services. Availability of funds requires a coordinated approach to different funding streams, whereas effective deployment requires planning and operational capacity within the sector.

- Globalization(should be changes to access to technology)/ technology development-

Technologies and services are not available and sourced internationally.

Societal

- Civil society/ equitable participation+

Civil society participates in water governance. Participation depends on two main factors: being empowered to participate and taking action.

Empowerment includes the capacity to participate and the availability of enabling processes. A decision to act depends on the belief that participation will have a positive influence on water governance and benefit participants.

- Ownership-

Communities do not have a sense of ownership of water resources and associated infrastructure

Scenario 3

Strategic

- Strategic planning +

Long term plans (5, 10 and 50 years) are in place to achieve objectives for the future.

- Prioritization +

The water sector is prioritised at the political level, particularly regarding resource allocation for infrastructure, skills and technology development.

- Inter-sectoral dependencies (should be changed to inter-sectoral co-ordination)-

Other sectors (such as electricity, manufacturing and transportation) are not able to provide reliable supplies of goods and services to the water sector.

Operational

- Economics of water+

Water users and polluters are required to cover the real cost of their use, including externalities.

- Privatization-

Water resource management and water services are not privatised. This implies considering issues of the price of water, whether or not water is adequately accessible and affordable to the poor, how socially and environmentally conscious water controlling private actors are, and so on.

- Regulation-

Regulation does not ensure a culture of compliance and cooperative management in the water sector

- Water use licensing-

Responsible agencies are not able to issue water use licences to support sustainable social and economic development

Institutional

- Skills+

A shortage of skills does not prevent the water sector from being effective. Skills are characterised by appropriate competence (quality) and the capacity related to such competencies (quantity).

- Staff turnover+

High staff turnover does prevent the water sector from being effective.

- Funding for operations-

Funding for monitoring, evaluation and maintenance are not available and deployed to ensure continued and sustainable delivery of services. Availability of funds requires a coordinated approach to different funding streams,

whereas effective deployment requires planning and operational capacity within the sector.

- Globalization(should be changes to access to technology)/ technology development-

Technologies and services are not available and sourced internationally.

Societal

- Civil society/ equitable participation-

Civil society does not participate in water governance. Participation depends on two main factors: being empowered to participate and taking action.

Empowerment includes the capacity to participate and the availability of enabling processes. A decision to act depends on the belief that participation will have a positive influence on water governance and benefit participants.

- Ownership-

Communities do not have a sense of ownership of water resources and associated infrastructure

Appendix F: Strategic Conversations (Facilitated by Chantal Ilbury)

Project: The Water Sector Institutional Landscape by 2025

One day strategic conversation

Date: 14 July 2010

Venue : CSIR

INTRODUCTION

The interpretation of the project was explored. The project will take the biophysical environment into account, but the aim of the project is to explore, through a set of scenarios, what the institutional landscape would possibly look like in 15 years time. 'Institutional' means considering the types of rules and arrangements that would be in place, and the laws that would be required to support various arrangements and would allow effective responses to be developed to deal with the challenges and opportunities in the future.

A time span to 2025 was decided upon, as 15 years into the future still allows a logical understanding of what the scenarios could look like. However, an extrapolation and some thinking were considered to 2050. This was to enable the correct thinking and decision-making to take place to 2025, with a view to defining their consequences to 2050.

The critical element of this project is to develop a landscape with the requisite institutional structure to deal effectively with the complexity of the water sector. This could optimise South Africa's future in this sector, as water is a strategic imperative for the country.

METHODOLOGY

The strategic conversation followed the methodology as set out below:

1. Context – understanding how the water sector, both globally and in South Africa, has changed. Trends defining the future of water were also explored.
2. Players – an understanding was explored of the key players in this sector. This is critical to understand, as the future of the sector will be influenced and defined by the interactions, relationships and decision-making by these key players.
3. Rules of the Game (certainties) – the certainties for the next 15 years were considered, as they will play out under all scenarios, and will in part define the game in the water sector going forward.
4. Key uncertainties – the key uncertainties that could influence or impact the institutional landscape were considered and then grouped and prioritised.
5. Scenarios – the two *pivotal* uncertainties were developed through a process of clustering and redefining the uncertainties. These two uncertainties form the axes in order to develop the scenarios.

FEEDBACK

CONTEXT – understanding changes in the water sector, both globally and in South Africa; and defining future trends.

- There are increasing demands on water; and,
- An increasing deterioration of the quality of water.
- There is an increasing complexity in the management of water.
- However, there is also a declining technical capacity in Government. South Africa does have this capacity, but the resource is not being optimised or utilized correctly. Institutional memory has been lost, but there is an increasing availability of knowledge in the sector. Decision makers do not know what they are missing, as the level of complexity is not understood; and therefore strategy that is in place cannot be implemented.
- The appreciation of the value/scarcity of water has been eroded, or is lacking in general.
- There is also the lack of appreciation of the increasing knowledge within, and of, the water sector.
- There have been decades of underinvestment in O and M.
- Climate change has introduced huge uncertainty.
- Linked to this is an increased focus on biodiversity (and the impact of climate change), which will impact on the water sector (in terms of decision-making and the consideration of the ecological reserve).
- Awareness of water has increased due to increased environmental awareness.
- The need to get water to communities is high on the political agenda. However, the political will for water security is not. Delivery seems to be a key focus area. (NOTE: 'political will' should be further defined as 'whom the players are being considered as influencing political will').
- South Africa is in the phase/stage of understanding/focusing on individual water security. This has not, however, moved to considering the country's future water security (we are currently in a 'messy' phase).
- Two different languages are spoken around water. One language is the many different messages that are conveyed, and the other is around costs.
- There is no co-ordinated understanding of water. This is due to two different hierarchies in play:
 - A hierarchy of perceptions amongst players;
 - A hierarchy of resources, i.e. the understanding of the resource is different at each level of play.
- South Africa has a current mindset trap around water; i.e.
 - Capacity;
 - Paranoia of omission (this is a fundamental block in the sector). This mindset will have to change in order to optimise the institutional landscape going forward.
- The Water Act is very good and, in reality, the blueprint for 2025 is already in place. However this is not being implemented due to:
 - The fragmentation of players;
 - Procedures are extremely complex;
 - There is a loss of efficient use of resources (i.e. people).
- There is a beginning to understanding that South Africa has a very inequitable base to start with.

- This is leading to the emergence of a multi-stakeholder approach. This means there is a potential common focus forming (the exception is reallocation).
- Planning, monitoring and accountability are beginning to emerge in Government.
- Globally, water has been identified as a corporate risk. (This is leading to both positive and negative consequences).
- The valuation of water is incorrect. Innovation is required, and this is starting to happen.
- The current industrial policy does not capture any innovations/opportunities for water. There is opportunity in the 'green economy' strategy, as well as in other global 'green' drivers. The immediate MDGs are 'non-green', and the energy policy is unfavourable for water. This plays back to the fact there is a lack of awareness of water across Government. DWAF may have a lack of leadership, and should have a stronger voice across Government about water. (It is a strategic imperative for the country. NOTE: it must be considered why this voice in Government is not heard, and the blocks must be identified).
- There is a lack of trust in the water sector and this could be due to a lack of dialogue across the sector.
- No dialogue occurs between food, water and energy (and these three sectors are integrated; hence understanding complexity is a critical skill).
- The political focus versus the technical focus is a key tension. Performance measures are skewed. The technical component as mentioned is declining/missing and the political component cannot implement. Hence nothing happens. It is a sector 'in waiting'!
- The technological driver will continue to surprise, even though the water sector is currently a very conservative sector.
- The regulator has an identity crisis.
- South Africa has a mismatch in power (empowerment) between Government and society. Government does not empower society, and society has no will to do anything. (The question of what does Government currently influence and how much does it influence should be considered).
- SADC is considering regional integration. This could be an opportunity. It could lead to a more integrated approach (food, water and energy) as well as a shared water course and transboundary view and virtual water concept.

NOTE:

Some key questions were raised and parked for further consideration during the process of the project, namely:

1. **Is water becoming scarce?**
2. **Can water be made?**
3. **What was the 1960s perception of water? Why and what institutional structures were managed in order to deliver solutions?**
4. **Is the sector approach the correct approach?**

PLAYERS – Who are the key players in this sector?

Player	Comments
1. Poor people (urban/rural)	• Have no voice. This leads to inadequate responses. • Government is focused on: ➢ Equitable distribution ➢ Service delivery ➢ Dealing with a dissatisfied group of citizens ➢ Departments working in silos
2. Water users: a. Domestic b. Industry c. Power d. Mining e. Agriculture f. Recreation g. Tourism	• Have very different influences • Some have significant influence • Use versus voice is not related
3. Environmental sector	• Voice is increasing • Variable impact
4. Government a. National b. Provincial c. Local	• Some exploit resources • This leads to conflict which has not openly come to the surface in Government • Do not all speak the same language (regarding water) • Decentralised versus centralised debate is emerging. This is leading to increasing tensions. Operations being decentralised is already in the law. No implementation is taking place though due to these tensions. The question going forward is what should be decentralised versus centralised; and with respect to operations or governance? • This is a critical debate and a differentiated approach has been approved. • Some service is not dependent on institutional capacity. • There is interference between political/management roles and capacity. The political drive is currently stronger. There are no clearly defined roles in Government.
5. Civil society	
6. Regional players	
7. International players	
8. Technical community	

9. Research community	
10. Media	
11. Politicians	
12. Educators	
13. Funders	
14. National Planning Commission	
15. Parastatals	
16. Water management Institutions	
17. WSLG	
18. Advisory Committee to Minister	
19. Nedlac	
20. Traditional leaders	

NOTE:

1. The water sector is made up of a cluster of networks.
2. There are, however, key gaps in this cluster of networks. These should be identified.
3. There is fragmented dialogue between players.
4. This leads to no co-ordinated discourse for a common rationality.
5. There is a crisis of leadership at all levels.
6. There is also too much internal focus at all levels.
7. Players and their future roles, responsibilities, outcomes and agendas will be critical to understanding the future of the water sector institutional landscape.

CERTAINTIES (Rules Of The Game) – What are the certainties for the next 15 years that will play out under all scenarios, and will, in part, define the water sector going forward?

1. The demand for water will increase.
2. Overall, within the next 15 years the health of the resource will be below acceptable levels (some sectors will therefore grow in order to respond to this).
3. Climate change will impact on resources.
4. Inequality between people will remain.
5. There will continue to be a high proportion of people living in poverty.
6. Rapid urbanisation will continue.
7. The cost of water will increase significantly (price will remain an uncertainty).
8. Water will continue to be increasingly politicised, both locally and regionally.
9. Technological advances will enable the more efficient use of water.

10. Development pressure will drive some quick wins irrespective of the environmental and water concerns.
11. There will be increased international market pressure on the efficient use of water.
12. Social grants will continue.
13. Governance in South Africa will remain complex.
14. There will be a continual drive towards the provision of basic water and sanitation.

Certainties (Rules) to Win

1. The appropriate distribution of technical and management expertise is essential.
2. A shared mental model and purpose must be developed (shared frame of reference).
3. Approaches to capacity must be aligned.
4. A starting point must be defined and can be built up from that point.
5. “Just do it”, i.e. implementation, is critical.
6. Learning comes from doing.
7. Role clarity and accountability (there will always be some role overlap, but complexity and resilience must be built in).

The above certainties (rules) to win are non-negotiable, and must be met for the institutional landscape (i.e. water sector) to be successful in 2025.

KEY UNCERTAINTIES – What are the key uncertainties that could influence or impact the institutional landscape?

Uncertainty	High level uncertainty
1. Society lowers its standards to acceptable resource quality (value driver)	• Sustainability/mindset
2. The degree to which relevant (appropriate) technical and research outputs are taken up	• Decision-maker paradigm
3. Does decision-making operationalise complexity in a pragmatic way (i.e. learning by doing, adaptive practice, embracing uncertainty)	• Decision-maker paradigm
4. Power sharing between the centre and the periphery	• Decentralised versus centralised
5. The degree to which the current legislation will change fundamentally (acts, regulation, interpretation; i.e. procedures)	• Linked to 1, 3 and 4, and is an outcome of these uncertainties.
6. Capacity development	• Pipeline and reticulation (skills)
7. Appropriately deployed capacity	• Pipeline and reticulation (skills)
8. Moving from ‘they’ to ‘we’	• Should be a rule to win and not an uncertainty • Joint ownership
9. Whether the economic pathway is resource efficient	• Sustainability • Linked to 1

10. The impact of climate change (water scarcity or abundance)	• Water more/less available
11. Technological innovation	• Water more/less available
12. Technological innovation in another sector impacting on water	• Water more/less available
13. The balance between technocratic and people-centred processes	• Technocratic retreat/ • Deepening of democracy
14. Ability of society to feel empowered to act	• Decision-maker paradigm • Deepening of democracy • Spontaneous participation
15. The availability of funding in order to implement in different situations (global and SA economic scenarios)	• Financial sustainability • (May be a rule of the game/certainty to win that needs to be flexible within funding paradigm)

SCENARIOS – Using the two pivotal uncertainties as axes, a scenario gameboard was developed for the water sector.

5.1 The pivotal key uncertainties

The higher-level uncertainties were clustered, and two pivotal key uncertainties were defined as follows:

1. Decision-making paradigm, and the ability to deal with complexity* (values will be a driver); i.e. requisite decision-making paradigm dealing with complexity versus failing to deal with complexity; i.e. milling around in circles; and,
2. Sustainability (balancing the 3 elements of sustainability*; i.e. keenly sensitive to sustainability issues versus exploitation regardless of sustainability).

5.2 Defining/interpreting complexity and sustainability

- Complexity – this is determined by the number of factors, the rate of change of those factors, and the ease of identification of the factors in a situation
- Sustainability – this requires the reconciliation of environmental, social and economic demands – the ‘three pillars’ of sustainability (2005 World Summit). ‘Sustainable development’ is defined as meeting the needs of the present without compromising the ability of future generations to meet their own needs.

5.3 The water sector scenario game board

