WATER SUSTAINABILITY: MEASUREMENT, MANAGEMENT, ENGAGEMENT, AND DISCLOSURE OF SELECTED WATER-INTENSIVE COMPANIES ON THE JOHANNESBURG STOCK EXCHANGE

by

THERESA ASKHAM (50870130)

submitted in accordance with the requirements

for the degree of

MASTER OF PHILOSOPHY IN ACCOUNTING SCIENCES

in the subject

MANAGEMENT ACCOUNTING

at the

UNIVERSITY OF SOUTH AFRICA

SUPERVISOR: PROF. H.M. VAN DER POLL

JANUARY 2016

DECLARATION

Student nr: 50870130

I Theresa Askham, declare that:

Water Sustainability: Measurement, Management, Engagement, and Disclosure of Selected Water-Intensive Companies on the Johannesburg Stock Exchange

is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

_____ _____

Signed Date

ABSTRACT

Many parts of the world, but South Africa specifically, are facing a water crisis, not only because of the scarcity of water, but also the quality of the water that is available. Companies are the primary users of water and can therefore have the most significant impact on saving water. It is thus imperative to determine how companies are measuring, managing, engaging with their stakeholders and disclosing water-related risks in their businesses. This study was conducted on the premise that South African companies have not as yet grasped the seriousness of the water crisis. Thirty JSE-listed companies classified as being water intensive were selected for the study. Their sustainability/integrated/annual reports for 2011 and 2013 were downloaded from the internet and analysed to determine if and how they were mitigating their water-related risks. The Ceres Aqua Gauge™ was used as the framework for this study. It was established during the analysis of the selected companies' reports that, with the exception of food producers and food retailers, the companies had grasped the seriousness of the water crisis. One area of particular concern that was evident in all the companies was the lack of attention directed towards supply chain water management. Companies need to address water risks in their supply chain, and to also turn the water crisis from a threat into an opportunity. Investors need to engage with and put pressure on companies to improve their water management practices.

Key terms:

Water scarcity; Measurement; Management; Stakeholder engagement; Disclosure; Water-related risks; Ceres Aqua Gauge™

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS

AMD	:	Acid mine drainage
CDP	:	Carbon Disclosure Project
CIMA	:	Chartered Institute of Management Accountants
DWA	:	Department of Water Affairs (now the Department of Water and Sanitation)
GRI	:	Global Reporting Initiative
JSE	:	Johannesburg Stock Exchange
NGO	:	Non-governmental organisation
ISO	:	International Organisation for Standardisation
SAB	:	South African Breweries
WETT	:	Water Efficiency Target Tool
WWF	:	World Wide Fund for Nature

CHAPTER 1: SETTING THE SCENE

1.1 INTRODUCTION

King and Lessidrenska (2009) pointed out that water is quickly becoming one of the scarcest and most sought-after resources in the world. According to Black and King (2009), the amount of water never changes in the world, 2.5% is considered to be fresh water and more than two-thirds of this is not fit for human consumption. Black and King also stated that in 2001, world use of water by sector was 70% by agriculture, 20% by industry and 10% for domestic use. As published in the Water Footprint Network, cited in Hoekstra (2010:13), the water footprint of a kilogram of beef is 15,500 litres of water, one kilogram of chocolate has a water footprint of 24,000 litres of water, and one A4 sheet of paper's water footprint is 10 litres of water. It is therefore vital to evaluate if companies recognise the importance of water in their businesses and whether they are committed to making a difference when it comes to water scarcity.

In the following subsections, South African's own water issues and the responsibility of companies to help reduce the water crisis are discussed.

1.1.1 South African perspective

Two major water issues facing South Africa at the moment are hydraulic fracturing (fracking) and acid mine drainage (AMD). Fracking is currently a highly contentious issue. Some people are against this practice in the Karoo because they are concerned that it will be harmful to the environment, as fracking fluid contains toxic chemicals that can pollute ground and surface water (De Wit, 2011). De Wit also indicated that substantial amounts of water are required for all rock drilling operations. Between 10 and 20 million litres of water are estimated as the requirement for the drilling and hydraulic fracturing of shale gas wells, which is equal to approximately 150 domestic swimming pools. Also lifting, treating and disposing or recycling the production water is costly and the associated risks are significant. Hence there may be a need for companies to measure and monitor their environmental and social impacts on water sources more responsibly.

Orr, Cartwright and Tickner (2009) have catalogued four areas of risk linked to water which have been adapted by the Chartered Institute of Management Accountants

(CIMA) (2011). The following risk areas could be used to assess what business risks mining companies may face as a result of AMD:

- **Financial risks**: Companies could be expected to pay for the water treatment costs and the cost of continued pumping of unused mines.
- **Physical risks**: These include limited water availability, poor quality, supply chain impacts, flooding, wastewater discharges and groundwater contamination.
- **Reputational risks**: An example of this would be law suits by local communities for polluting their drinking water, thereby damaging the mining company's image.
- **Regulatory risks**: The government could impose new permitting standards or more stringent wastewater standards. It may therefore be necessary for companies to conduct risk assessments that identify and quantify water-related business risks.

Another issue that may need careful consideration is the cost of water in South Africa. As per SABMiller Plc. and the World Wide Fund for Nature (WWF) (2009), SAB Ltd (the South African subsidiary of SABMiller Plc.) paid around R0.61 for municipally supplied water per 100 litres of beer in 2007, while the comparable cost paid for irrigation water by farmers was only R0.014 per 100 litres of beer for the irrigation of their crops. It may become essential that water use in the agricultural sector is priced so that water is used more efficiently as the need to irrigate increases in South Africa because of climate change. It is notable that the principal user of water, namely the agriculture industry, is paying less for water than other industries.

As mentioned in the Nestlé (2011) report, South Africa's rainfall levels are approximately 50% of the world average, 80% of the rainfall occurs within a span of five months, and the country's rivers have a high rate of evaporation as they are small and shallow compared to rivers in other countries. The latter gives a valid reason to conduct a study on South African companies, as the country may already be disadvantaged by its short rainfall season.

1.1.2 Company responsibility

According to Barton (2010), without water, most industries would cease to operate. However, few companies view water as an asset and water appears on few balance sheets. Barton also noted that the global water shortage is one risk that companies should give their full attention to and also a risk that investors need information on. Baird (2012) supported this by stating that investors are starting to ask for increased corporate water reporting as they begin to realise that water scarcity could threaten the profitability of their investments. Hence there could be a greater need for companies to provide water-related information in the public domain.

This is why the official launch of the Sustainability Accounting Standards Board™ (SASB) on 4 October 2012 was so important. SASB (2012) identified a current gap in corporate reporting which could be filled by measuring the value of non-financial corporate information. SASB explained that it would develop sustainability accounting standards specific to each industry. These sustainability accounting standards could provide guidelines to help companies with their corporate water reporting in the future.

CIMA (2011) added that successful business models could be threatened as water scarcity increases. The reason for this is that it will cause changes in the usage of raw materials, production methods, capacity levels and investor demands. It is therefore evident that companies should disclose material information on climate change issues, specifically material water risks.

Orr *et al.* (2009) have catalogued risks linked to water shortages according to four main areas which have a direct bearing on a company's success. These risks have been adapted by CIMA (Rapacioli & Malone, 2012:6-7) as follows:

- **Financial risk:** This entails increased water and energy prices, water treatment costs, increased insurance rates, higher raw material and other input prices.
- **Physical risk:** This relates to limited water availability, poor quality, supply chain impacts, flooding, wastewater discharges and groundwater contamination.
- **Reputational risk:** This refers to global recognition of access to clean water as a human right, lawsuits, local conflicts/tensions and advocacy opposition.

- **Regulatory risk:** This involves water allocations, caps on water use, new permitting standards and more stringent wastewater standards.

Wagner (2012) posited that companies do not ensure that shareholders are adequately informed about climate-related risks and opportunities, although the pressure group, Coalition for Environmentally Responsible Economies (Ceres) appears to have a clear idea of what it wants to see regarding climate change impacts in corporate reports. Their reports on disclosure can provide clear guidelines of what companies should aim for. The current study used the Ceres Aqua Gauge™ (Barton & Adrio, 2011) as a framework to evaluate the selected JSE listed companies on how they are assessing corporate water risk and the disclosure thereof.

While measurement, management, engagement and disclosure on water may be a new concept, there are a number of companies that seem to be taking water management seriously, as explained in the examples below:

- **Nestlé** (2011) reduced its water consumption at its Mossel Bay factory by almost 50% in 2010 versus its 2009 figures. This reduction was attributed to the recovery and use of condensate from the milk evaporation process. This project ran until 2015, the aim being to convert the factory into a zero water intake facility.
- **Puma** (2012) global sportswear brand issued an environmental profit and loss (P&L) account in early 2011, and it was the first major multinational to do so.
- **The Coca-Cola Company** (2012) set a target to reduce its water consumption by 20% in 2012 as part of its long-term goal to become water neutral in global operations. In 2007, it was using almost 300 billion litres of water to produce its drinks, but by 2008, it had reduced water usage per litre of product by 9%.

These examples may indicate that multinational companies are making significant progress regarding their water risks, and are changing the way they conduct their business activities. These policies and initiatives may be fed through to their branches/subsidiaries in other countries, for example, South Africa.

However, the purpose of this study was to evaluate what South African listed companies in high water risk sectors are doing to alleviate water risks for their

products, operations and supply chains. However, merely mentioning water and its risks by company disclosure may not be enough. This research investigated how these companies are measuring, managing, engaging with stakeholders and disclosing this scarce resource. Considerations such as whether the selected companies are incorporating water into their budgeting process, governance, policies and standards, and whether they are engaging all internal and external stakeholders are also reviewed.

This chapter sets the scene for this research study. In sections 1.3 and 1.4, the thesis statement and problem statement are discussed. The research objectives and research questions of this study are introduced and described in sections 1.5 and 1.6. In section 1.7, the delineations and limitations are identified, in section 1.8, the terms used in the study are defined and in section 1.9, the research methods that were applied are explained. The significance of this study is highlighted in section 1.10, and finally, a chapter overview of what will be discussed in each of the subsequent chapters is provided in section 1.11. Table 1.1 indicates the selected companies that were included in this study.

1.2 CHAPTER LAYOUT

An illustration of the chapter layout is provided in figure 1.1

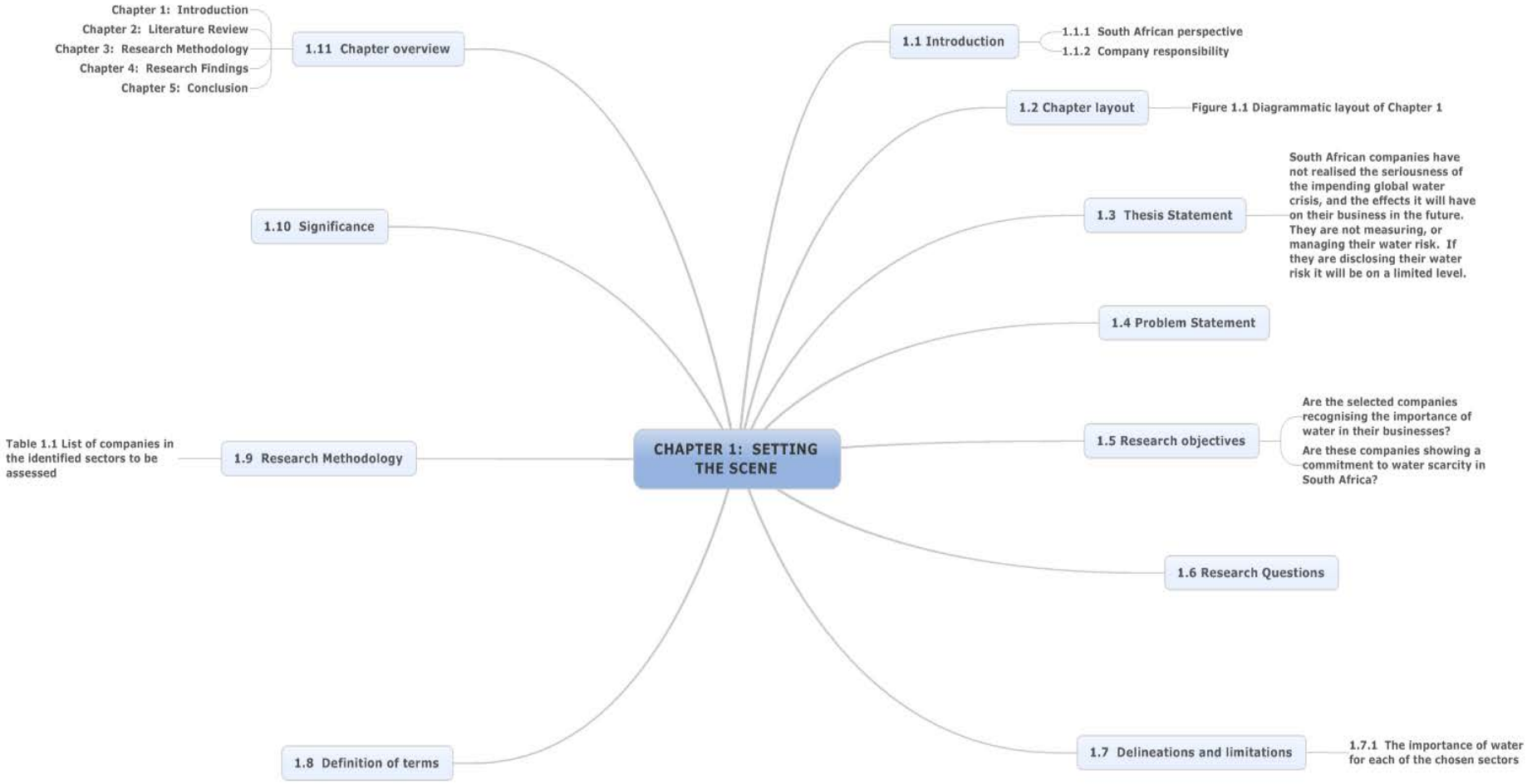

Figure 1.1: Diagrammatic layout of chapter 1

1.3 THESIS STATEMENT

South African companies have not realised the seriousness of the impending global water crisis, and the effects it will have on their business in the future. They are not measuring or managing water risk. If they are disclosing their water risk, disclosure is limited.

1.4 PROBLEM STATEMENT

A study was conducted to evaluate and rank the water disclosure practices of 100 of the largest publicly traded global companies, which were in eight key sectors exposed to water-related risks (hereafter referred to as the 2008 Global Study). The key finding of this study was that company disclosure of risk and corporate water performance is astonishingly weak (Barton, 2010).

Barton (2010) went on to argue that water scarcity affects a company's bottom line, and as a result, investors are demanding more significant and meaningful information on water risks and opportunities to be reported globally in companies' sustainability reports. Hence South African companies that are competing globally may be subjected to the same investor pressures and scrutiny. Added to this, Nestlé (2011) reported that South Africa has substantial water challenges.

For these reasons, this research study was conducted to assess the corporate water management practices of 30 JSE-listed high water-risk companies in South Africa.

King and Lessidrenska (2009) suggested that global companies are powerful representatives of change, sometimes even more powerful than governments. These authors (2009) contended that it is good business practice to act as a responsible corporate citizen and that this will most likely be shown through a company's sustainability reporting. Hence there may be a need for transparent and complete environmental, social and economic reporting by companies.

South Africa is considered a water stressed country and the majority of South African companies are not managing water risks in their organisations.

1.5 RESEARCH OBJECTIVES

The objective of this research was to assess whether the selected South African listed companies recognise the importance of water in their businesses and if they are showing a commitment to the issue of water scarcity in South Africa. The selected companies were compared with one another in their respective sectors.

The specific objectives of this study were as follows:

- To establish the latest developments in the measuring and disclosure of water risks
- To establish best practice disclosure requirements
- To determine whether companies are:
    - gathering data that measures water-related risks in the business, because businesses cannot manage what they do not measure (Barton & Adrio, 2011);
    - managing water-related risks – this would include governance, policies and standards, and business planning;
    - engaging with their internal and external stakeholders regarding water-related issues – for example, ascertaining whether companies engaging with their suppliers to help them improve water management; and
    - disclosing water-related information.

The main objectives of this research study were to identify if South African listed companies are recognising the importance of water to their businesses and if they are showing a commitment to combating the issue of water scarcity in South Africa.

1.6 RESEARCH QUESTIONS

The research questions formulated for this study were as follows:

- Are there recent developments in the measuring and disclosure of water risks?
- Are there best practice disclosure requirements?
- Do companies
    - gather data that measures water-related risks in the business?
    - manage water-related risks?

- engage with their internal and external stakeholders regarding water-related issues?
- disclose water-related information?

1.7 DELINEATIONS AND LIMITATIONS

Companies from eight sectors with a high water risk profile were selected for this study, because they can make the most impact by managing their water risks. The sectors were identified from a list by the WWF and Deutsche Investitions und Entwicklungsgesellschaft (DEG, 2012) (the German investment corporation). The list categorises sectors into high, medium and low priority, based on their water risk profile (Barton & Adrio, 2011).

Companies with a secondary listing on the Johannesburg Stock Exchange (JSE) were excluded from this study. The researcher chose to exclude these companies in order to focus only on companies incorporated in South Africa with a primary listing on the JSE.

1.7.1 The importance of water for each of the chosen sectors

Beverage sector: According to Barton (2010), the most important and key ingredient for the beverage sector is fresh water, which makes these companies particularly vulnerable to climate-related risks which can affect water availability and quality. Furthermore, the production of key raw materials used in the beverage sector, for example, sugar, wheat, hops, barley, grapes and so on, is also water-intensive.

Chemical sector: A significant amount of water is used in production processes in this sector. Another concern is the major impacts this industry has on water quality through wastewater discharges and possible chemical spills associated with the manufacture, transport and storage of chemicals.

Another concern is that the actual chemical products that are sold and used downstream in the supply chain affect water resources the most. Vast numbers of chemical compounds pose a substantial risk of contaminating surface and/or groundwater, which cause harm to animals and humans. However, the chemical industry also develops and supplies products that can sterilise, purify and desalinate water for domestic and industrial use, thereby playing a significant role in the global

water industry. Chemical companies are also developing drought-resistant seeds, thereby reducing the vast amount of water needed in the agricultural sector (Barton, 2010).

Food sector: Barton (2010) pointed out that water plays a critical role in the food industry. The agricultural industry uses around 70% of water worldwide, with even as much as 90% being used in developing countries. Furthermore, farming can have substantial effects on downstream water quality, owing to run-offs of pesticides, herbicides and fertilisers contaminating surface and groundwater quality (Orr *et al.*, 2009).

Forestry sector: According to Morrison, Morikawa, Murphy and Schulte (2009), forestry products, particularly pulp and paper manufacturing, are high water and energy intensive. Pulp and paper manufacturing also produces a substantial amount of wastewater. Planting, harvesting and logging operations have major impacts on local water resources, which can lead to conflicts with local communities.

Mining sector: Barton (2010) mentioned that water plays a vital role in the mining sector as it serves as an industrial input when mining for metals and minerals. Therefore, water can cause a great deal of conflict between mining companies and local communities. For open-pit mining methods, which are used in the majority of large-scale mining operations today, water is used as a cooling and lubrication agent for cutting and drilling machines, the transporting and processing of ore, managing waste tailings and suppressing dust.

Acid runoff, coal sludge spills or cyanide can severely affect freshwater resources. Closed mines must be pumped and treated indefinitely to prevent contamination of surface and ground water, which can cause major long-term environmental liabilities for mining companies.

Oil and gas sector: Oil and water do not mix, but for oil and gas companies, water risk management is definitely a factor in their businesses. Oil refinery uses large amounts of water, one- to two-and-a-half litres of water for every litre of product. Water contamination is also a major risk in this sector. The pumping of oil and gas out of the ground can create large amounts of low-quality water known as “produced water”. As oil fields age, so too does water production increase. This sector’s operations can also adversely affect freshwater quality, through uncontrolled spills or

wastewater discharge. Alternative forms of natural gas extraction, for example, coal-bed methane, tight sands and shale gas all use drilling technologies which have the potential to contaminate drinking water (Barton, 2010).

A recent and apt example of how oil companies have contaminated water is the BP oil disaster of 2010. According to the National Wildlife Federation, the BP 2010 oil disaster in which an estimated 600 million litres of oil flooded the Gulf of Mexico, more than 8,000 birds, sea turtles and marine mammals were found injured or dead in the six months after the spill. In addition to the oil, eight million litres of chemical dispersants were used to try to clean up the oil spill.

According to the National Wildlife Federation, even though the oil may no longer be visible on the water surface, it has not disappeared, and scientists have found substantial amounts of oil on the Gulf floor. According to the *Wall Street Journal*, the total cost to date that BP has had to pay for the oil disaster amounts to USD 54 billion.

Pharmaceutical and biotechnology sector: Donnelly, Dorau, Koslow and Lorenz (2008) mentioned that large quantities of high-quality water are required in a number of different pharmaceutical manufacturing processes. Certain biological processes need water that must be sterile and free of minerals and bacteria. In order to treat water to this level of purity, large quantities of water are needed to go through several cleaning phases. Existing water purification technologies result in huge volumes of water being rejected which cannot always be used again.

Morrison *et al*. (2009) also postulated that there is a high concentration of chemicals in the manufacturing wastewater of pharmaceutical companies that run the risk of leaking into surrounding water sources. Another risk is that of these chemicals being discharged into the environment through product disposal or human and animal waste.

All of the above examples show how vital water is in each of the sectors chosen for this study.

The beverages section on the JSE has the following four listed companies:

- **Awethu Breweries:** This company does not have a website to obtain information from. According to the ethical clearance obtained, all information

was required to be in the public domain. It is a small company with a market capitalisation of R5.9 million – hence the exclusion of this company from this research.

- **Capevin Holdings Ltd:** This is an investment holding company that holds as its sole asset an indirect investment in Distell Group Ltd (CapeVin, 2012). This company was excluded as Distell was included.
- **Distell Holdings Ltd:** This company was included in this research because its primary listing is on the JSE.
- **SAB Ltd:** This company has been the leading beverage company in South Africa for over 100 years. It moved its primary listing to the London Stock Exchange in 1999 (SAB, 2012).

  Distell would have been the only company reviewed in the beverages sector, but in order to make this study comparable and worthwhile, SAB Ltd was also included, as the purpose of this research was to review and benchmark companies against their peers in the various sectors.

A limitation of this research was that all information gathered was from the public domain, and this creates a challenge if not all information on water sustainability has been publicly disclosed.

1.8 DEFINITION OF TERMS

2030 Water Resource Group: This is a neutral platform that offers a partnership to assist government water officials and other water sector specialists to fast-track transformations that will guarantee sustainable water resource management for the long-term advancement and economic growth of their countries (2030 Water Resources Group [WRG], 2013).

Acid mine drainage (AMD): This is highly acidic water, usually containing high concentrations of metals, sulphides and salts resulting from mining activity. Drainage from abandoned underground mine shafts into water systems (decant) may occur as the mine shafts fill with water (Manders, Godfrey & Hobbs, 2009).

Alliance for Water Stewardship (AWS): This is an alliance between some of the world's leading players in sustainable water resource management who are dedicated to driving shared responses to water risk through a stakeholder-endorsed

International Water Stewardship Standard (Alliance for Water Stewardship [AWS], 2013).

Carbon Disclosure Project (CDP): This is an international, not-for-profit organisation providing the only global system for companies and cities to measure, disclose, manage and share vital environmental information (Carbon Disclosure Project [CDP], 2013).

Ceres: This is an international coalition of investors, environmental groups and other public interest organisations working with companies to address sustainability challenges such as water scarcity and climate change. Ceres is a group of more than 80 institutional investors and financial firms from Europe and the USA that manage over $8 trillion in assets (Barton, 2010).

Ceres Aqua Gauge™: This is a framework and scorecard used to assess corporate water management practices. It is an Excel-based tool that allows investors to scorecard a company's water management activities against detailed definitions of leading practice. It helps investors, but also benefits companies by giving them the whole picture of leading practices in water management (Barton & Adrio, 2011).

Corporate water disclosure: This entails the process of collecting data on the current state of a company's water management, assessing the implications of this information for the business, developing a strategic response and ultimately reporting this information to stakeholders (investors, NGOs, consumers, communities**,** suppliers, employees and others) (Pacific Institute, Price Waterhouse Coopers, Carbon Disclosure Project & World Resources Institute, 2012).

Global Reporting Initiative (GRI): This is a prominent organisation in the field of sustainability. GRI encourages the use of sustainability reporting. GRI was founded in Boston in 1997. Its origins lay in the US non-profit organisations the Coalition for Environmentally Responsible Economies (CERES) and the Tellus Institute. GRI has initiated and established an all-inclusive sustainability reporting framework that is used extensively around the world (Global Reporting Initiative [GRI], 2013).

International Organisation for Standardisation (ISO): This is the world's largest developer of voluntary international standards. Developed through global consensus, it helps to break down barriers to international trade (International Organisation for Standardisation [ISO], 2013).

ISO 14001: This sets out a framework that a company can follow to establish an effective environmental management system (International Organisation for Standardisation [ISO], 2015).

Market capitalisation: This is calculated by taking a company's current market price of one share, multiplied by the company's outstanding shares. It is one way to value a company (Fridson & Alvarez, 2002).

Silviculture: This is the practice of controlling the establishment, growth, health and quality of forests (British Columbia Ministry of Forests, 2015).

Sustainable Agricultural Initiative (SAI): Nestlé, Unilever, and Danone formed the Sustainable Agriculture Initiative (SAI) platform in 2002. It is a non-profit organisation to enable sharing, at the precompetitive level, of knowledge and initiatives to support the development and implementation of sustainable agriculture practices involving the different stakeholders of the food chain (Sustainable Agricultural Initiative [SAI], 2013).

Sustainable Apparel Coalition (SAC): This is a group of over 100 leading clothing and footwear brands, retailers, suppliers and NGOs working to reduce the global environmental and social impacts of clothing and footwear products. The focus of SAC is the Higg Index, which measures the performance of products on the environment (Sustainable Apparel Coalition [SAC], 2013).

UN Global Compact CEO Water Mandate: This is a unique public-private initiative launched in July 2007 by the UN Secretary-General. It is designed to help companies in the development, implementation and disclosure of water sustainability policies and practices (United Nations Global Compact CEO Water Mandate, 2013).

Wastewater: This is water containing waste from residential, commercial and industrial processes (The San Francisco Bay Regional Water Quality Control Board, 2015).

Water discharge: This is water or wastewater that runs out of a reservoir or treatment plant (Barton & Adrio, 2011).

Water footprint: This is the volume of freshwater used to produce a product measured over the whole supply chain (Hoekstra, Chapagain, Aldaya & Mekonnen, 2011:2).

Water footprint accounting: This quantifies and locates the water footprint of a process, product, producer or consumer, or quantifies, in space and time, the water footprint in a specified geographic area (Hoekstra, 2012).

Water Footprint Network: The Water Footprint Network was established in October 2008 by a number of major global players from business, civil society, multilateral organisations and academia. The Water Footprint Network and its partners strive to develop and apply the Water Footprint to support the transition to sustainable and equitable water use and management globally (Water Footprint Network, 2013).

Water neutral: This does not mean that water use is brought down to zero, but rather that the negative economic, social and environmental externalities are reduced as much as possible and that the remaining impacts are fully compensated for (Hoekstra, 2008).

Woolworths Farming for the Future: This is a new approach whereby Woolworths, together with its farmers, grows food in a sustainable way, in order that South African farms will be able to provide sufficient food for future generations, without compromising on quality or adding costs (Woolworths Holdings Limited, 2015).

1.9 RESEARCH METHODOLOGY

This research was qualitative as it analysed text and documents and therefore took the form of a literature review. Among other sources, Google Scholar, company websites and the Unisa Library were used for information.

The sampling method used in this research was purposive or judgemental sampling, meaning it was based on the judgement of the researcher (Bless, 1995). The qualitative data analysis software, Atlas.ti was used to analyse the water-related information collected from the selected company's reports.

This study took 30 publicly-traded South African companies from eight high water-risk sectors. Specifically, water-intensive companies that have a primary listing (except for SAB Ltd in the beverage sector which is London-listed) on the Johannesburg Stock Exchange (JSE, 2012), were selected and investigated for how they measure and manage water risk and engage with their stakeholders and disclose water risks in their operations, supply chains and products. The collection method involved gathering data via company websites and corporate documents.

The study researched the years 2011 and 2013 in order to determine if there were improvements from 2011 to 2013 in the Ceres Aqua Gauge™ (hereafter referred to as the Gauge™) activities. Companies were benchmarked against their peers in each sector, as each sector has different water needs and uses. The Gauge™ was used as the framework to assess each company (see appendix A). The list of companies evaluated in this research is provided in table 1.1.

Table 1.1: List of companies in the identified sectors to be assessed

Sector	Company
Beverage	Distell
	SAB
Chemical	AECI
	Afrox
	Omnia
Food producer	AVI
	Illovo Sugar
	Oceana
	Pioneer Foods
	Tiger Brands
	Tongaat Hulett
Food retailer	Pick n Pay
	Shoprite
	Spar
	Woolworths
Forestry and paper	Mondi
	Sappi
Mining	African Rainbow Minerals
	Amplats
	Anglo Gold Ashanti
	Assore
	Exxaro
	Gold Fields
	Implats
	Kumba
	Northam Platinum

Sector	Company
Oil and gas	SacOil
	Sasol
Pharmaceuticals and biotechnology	Adcock Ingram
	Aspen

Source: *Adapted from the Star (2012)*

1.10 SIGNIFICANCE

This study sought to identify gaps in company disclosure relating to water risk, highlight best practices and make recommendations to companies and investors for improving corporate water reporting in South African listed companies.

The researcher made recommendations that companies could use to improve their water risks and the disclosure thereof. Recommendations were also made to help investors better drive water-related disclosure.

1.11 CHAPTER OVERVIEW

Chapter 1: Setting the scene

This chapter contains the background and introduction to the research study, the problem statement, the research objective and the thesis statement. The delineations and limitations of the study, definition of terms, research methodology, and lastly, the significance of the study are discussed.

Chapter 2: Literature review on company water risks and disclosure

This chapter identifies and reviews related and existing literature on company water risks and disclosure. The following topics are dealt with:

- **A historical overview:** This covers water risks and water disclosure, laying the foundation for this research.
- **Water risks:** The risks faced by organisations in general in South Africa and also by each of the eight high-risk sectors are explained. Since each country and sector may face different water-related risks, reviewing this helps to identify risks that are inherent only in South Africa or in a specific sector.
- **Financial, physical, reputational and regulatory risks:** These risks are discussed in order to clarify the different risk types and how to construct ways in which companies can manage them.

- **The main drivers of water risks in South Africa:** Since this study was based on South African companies, it was deemed important to know what water risks are specific to the country.
- **Best practice disclosure requirements:** These are explained in order to provide a benchmark against which to measure the selected companies. This also helps to demonstrate objectivity in the study.
- **The latest developments in measuring and disclosure of water risks:** These are highlighted in order to gain insight into these advances and therefore to be able to verify whether the selected companies are keeping up with the latest developments. This also indicates future goals that companies could set for themselves and highlights opportunities to gain a competitive advantage.
- **Similar research conducted in South Africa and at a global level:** This is discussed in order to establish reliability and validity for this study, and also to have research to compare with and differentiate against.
- **Pioneers in in the field:** A review is provided of various companies that are considered pioneers in the field and what are they doing to mitigate their water risk and their disclosure thereof: The aim of this is to identify best practices to help formulate recommendations for businesses and investors.
- **Water scarcity:** This is highly topical, and new developments and research are ongoing. To ensure that this study was up to date and current, the literature review covers all of the above aspects.
- **How water scarcity will change business models:** It was deemed necessary to include this topic in order to assess how water-related issues can change and impact the way companies conduct their business operations.
- **Water footprint and life cycle assessment:** This topic was included in order to assess what water footprinting entails, explain its method of calculation and define water life cycle assessment.
- **The management accountant's role, financial impacts, changes in decision making and sustainability reporting:** These topics were included to establish what the finance function can do to drive and navigate a business

in the right direction with regard to climate change, specifically water-related aspects.

- **Governments role:** It is ultimately the role of government to manage water and ensure delivery of this resource to its citizens. This topic was included to ascertain what government is doing about water scarcity in South Africa and the water-related risks that it faces.

This literature review is important because when water scarcity has a financial impact on a business, senior managers and directors will take notice. It will then become the finance function's responsibility to provide the correct information, identify and mitigate the business risks caused by the water shortage, and identify potential business opportunities for the company.

Chapter 3: Research methodology

This chapter provides a detailed explanation of how the data was collected, the method of analysis, and the design and completion of the Gauge™ framework.

Chapter 4: Research findings

Key and detailed findings are presented and discussed by sector, and then by company in each sector, which is illustrated in the form of discussions. Tables are used in order to compare companies in the same sector or against best practice. This is done via the Gauge™ framework, under the following subheadings of the Gauge™ key areas:

- measurement;
- management;
- stakeholder engagement; and
- disclosure.

Chapter 5: Conclusion

This chapter provides a summary of the findings and answers the problem statement of how water-intensive companies in South Africa are measuring, managing, engaging with their stakeholders, and disclosing water risks in their operations, supply chains and products. It highlights recommendations that companies could use to improve the management of their water risks and the disclosure thereof. It

also highlights recommendations that investors could use to drive better water disclosure. Lastly, it introduces possible future research studies.

The next chapter provides a literature review of the existing research on water scarcity and the underlying concepts.

CHAPTER 2: LITERATURE REVIEW: COMPANY WATER RISKS AND DISCLOSURE

2.1 INTRODUCTION

In the previous chapter, the issue of water scarcity, together with South Africa's own water issues and company responsibility with regard to water scarcity, was introduced. The thesis statement, problem statement, research objectives and research questions were then discussed. The delineations and limitations were identified, and the definition of terms that would be used in this study was explained. Research methods along with the significance of the study were disclosed. The previous chapter concluded with an overview of what would be discussed in the subsequent chapters of this research study. In table 1.1, the selected companies to be evaluated were introduced.

This chapter provides a discussion on existing literature concerning global water scarcity. There appears to be a wealth of literature on water scarcity as this problem seems to be extremely topical at the moment. However, this review covers aspects that deal with water scarcity in businesses.

Section 2.3 provides a historical overview of environmental issues, and the involvement of concerned organisations is dealt with to establish whether environmental issues are new to business, and whether business may be slow off the mark to do something about this particular threat to its profitability and sustainability.

Following this, in section 2.4, a review of water risks that affect business, namely financial, physical, regulatory and reputational risks, is presented, as these are viewed as having the most significant impact on business. In section 2.5, the main drivers of water risks in South Africa are evaluated. The best methods to respond to water risks are reviewed in section 2.6.

In sections 2.7 and, 2.8 and 2.11, best practice disclosure requirements, the latest developments in the measuring and disclosure of water risks, and a review of companies that are deemed to be pioneers in the field of how to deal with water scarcity in their business operations are covered. It was deemed appropriate to review these topics to establish standards in order to set benchmarks for this research.

Sections 2.9 and 2.10 cover similar research conducted in South Africa, and at a global level, to verify any gaps or lessons learnt. How water scarcity changes business models is discussed in section 2.12. In section 2.13, the water life cycle assessment and water footprint analysis are discussed as two important methodologies to measure water in the business and supply chain.

Section 2.14 focuses on the role of the management accountant with respect to managing water scarcity in business, and in section 2.15, the government's role and shared partnerships between government and private business to tackle the problem of water scarcity in South Africa are discussed. Section 2.16 provides a brief summary of the chapter.

2.2 CHAPTER LAYOUT

An illustration of the chapter layout is provided in figure 2.1.

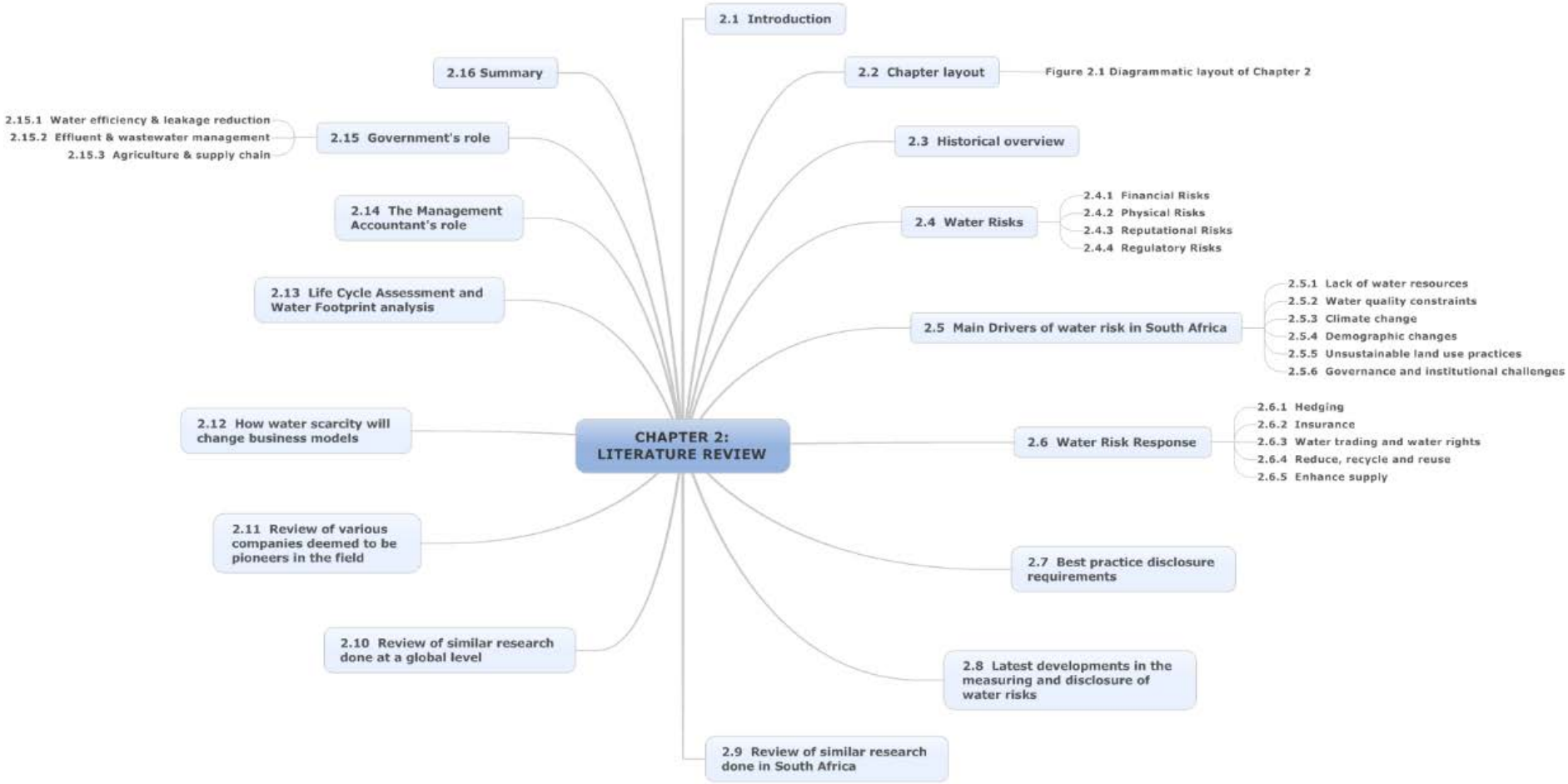

Figure 2.1: Diagrammatic layout of chapter 2

2.3 HISTORICAL OVERVIEW

According to Meadows, Meadows, Randers and Behrens (1974:190), as far back as 1970, unprecedented levels in demographic and economic growth had been reached, and humanity would be forced to take into account the limited dimensions of the planet. They also mentioned the fact that demographic pressure in the world had already reached unsustainable levels, and further were so unequally distributed, that this alone would force humanity to pursue a state of balance on the planet.

As early as the 1970s, overpopulation and scarce resources were mentioned in a publication by Meadows *et al*. (1974:192), who postulated that with the world population doubling in a little more than 30 years, society would be hard put to meet the needs and expectations of so many more people. These needs and demands would likely be satisfied by overexploiting the natural environment and further damaging the life-supporting capacity of the earth.

According to Ceres (2013), the Exxon Valdez oil spill in 1989 was a major environmental disaster which rocked public confidence in corporate America. One of the world's most untouched habitats was devastated when almost 42 million litres of oil poured into Alaska's Prince William Sound. Suddenly, it became patently clear that companies were not doing enough to account for the social and environmental impacts of their operations. Six months after the spill, Ceres (a non-profit organisation) was launched by a group of investors to tackle the problem.

The United Nations (UN) organised the first Earth summit in Rio in 1992. In 2012, 20 years later, under the leadership of the UN, the world came together again in Rio. This time, the presence of business and the private sector were significantly more visible (Bakker, 2013). Bakker criticised the fact that these issues had been talked about for over 40 years, without making many improvements. He added that 1.8 billion people do not have access to clean drinking water and sanitation.

Lusher (2012) reported that in 1982 the Corporate Social Responsibility (CSR) index was established by the UK Business in the Community (BITC) organisation. The index comprises the following:

- corporate strategy for identifying and addressing risks and opportunities;
- integration of corporate responsibility throughout the company;

- management of the risks and opportunities in the areas of community, environment, marketplace and workplace; and
- reporting on the performance in these areas.

According to Lusher (2012), the World Commission on Environment and Development, known as the Brundtland Commission, developed the sustainability concept in 1987, which changed the world's attitude towards social, environmental and economic issues. Sustainable development is defined by the Brundtland report as development which meets the needs of existing generations without compromising the capability of coming generations to meet their own needs.

Lusher (2012) noted that the accounting profession began to realise the need to account for social and environmental issues in the 1980s when organisations started including environmental issues in their annual reports. In the mid-1990s, John Elkington introduced the triple bottom line (TBL), which comprises three elements of performance, namely financial, social and environmental – that is, profit, people and planet.

Until recently, only a few standards existed for reporting on sustainability issues. In January 2005, the International Auditing and Assurance Standards Board (IAASB) approved international standards for corporate sustainability reporting, and in 1997 the Global Reporting Initiative (GRI) was established (Lusher, 2012).

From the above, it can be deduced that the global water shortage may not be a new problem and that a number of organisations have introduced or initiated tools to help businesses manage water risks in their operations. The GRI includes three standard guidelines for reporting on water which are discussed later in this study, this inclusion may show the importance of water reporting for companies. The question on how the selected companies are currently performing and what their future strategies are with regard to water scarcity were investigated in this research.

2.4 WATER RISKS

A considerable amount of South Africa's key economic activity occurs in areas where water availability is limited. Declining water quality, including that from acid mine drainage, is also a concern. Poor municipal management and deteriorating infrastructure place an ever-increasing risk of unreliable water supply and inadequate quality. These challenges have potential supply and financial impacts on

business (CDP Water Programme, 2012). Accordingly, companies may need to be aware of external risks that could affect their current and future operations.

According to the CDP Water Programme (2012), South Africa is one of the driest countries in the world. Furthermore, South Africa will be facing an estimated gap between water supply and demand of 17% by 2030. Even though this gap is significant, it is likely to be an underestimate as it excludes uncertain impacts of climate change and the declining water quality in this country. Because of this estimated gap, business will need to anticipate disruptions in water supply, and face higher water bills and more water regulations (CDP Water Programme, 2012). The latter, points to the need for companies to mitigate water risks in their operations, supply chains and the communities in which they operate.

2.4.1 Financial risks

According to Orr *et al*. (2009), water scarcity translates into higher energy prices, higher insurance and credit costs, and reduced investor confidence, all of which challenge business profitability. Furthermore, the growing water demand and threats posed by pollution are likely to increase the cost of gaining access to water, both in terms of quantity and quality for businesses, therefore resulting in higher manufacturing costs (Amis & Nel, 2011). Increased water costs may negatively impact a company's profitability – hence the need for companies to find ways to save, recycle or reuse water in their operations.

Barton (2010) stated that clean water is critical to many production processes, which can present a range of costs, namely pre-treatment, recovery and remediation costs. Historically, water scarcity has not been a major source of insurance claims, but some major insurance companies are starting to view water scarcity and its impacts as a significant emerging risk (Orr *et al*., 2009). Thus, another factor for companies to consider with regard to water scarcity may be the risk of increased insurance premiums, which in turn could affect a company's bottom line.

As indicated by Morrison *et al*. (2009), it is increasingly clear that the era of cheap and easy access to water is ending, posing a potentially greater threat to businesses than the loss of any other natural resource, including fossil fuel resources. There are various alternatives for oil, but there is no substitute for water. Therefore as explained by Orr *et al*. (2009), if and when businesses start to suffer from total water

shortages, they may not be able to bring about or influence better water management. Businesses may face closing or relocation because of environmental rather than financial constraints.

KPMG International (2012) reported that in 2008, the Portuguese government introduced a tax on key water users in farming and industry. More recently, in June 2012, China announced that it would implement high water rates for water-intensive industries and encourage the reuse and recycling of water. Singapore's regulators have priced water to reflect its scarcity value. The latter are but a few examples of cost increases for businesses. Hence companies may need to start measuring their water usage, and implementing water-saving initiatives, because with the cost of water expected to increase, this could affect their bottom line.

2.4.2 Physical risks

Too little water (scarcity), too much water (flooding) or water that is unfit for use (pollution) are all directly related to physical risks. These risks could lead to business disruptions which may be a result of regulated water supply restrictions which are the equivalent of electricity load shedding, or even unscheduled interruptions in water supply (Orr *et al.*, 2009). It could thus become increasingly imperative for companies to work together with government to jointly find solutions to the water-related issues affecting South Africa.

According to Morrison *et al.* (2009), supply chains will be impacted as water risks embedded in the supply chain are often not addressed by organisation's traditional water use estimates. Water supply risks are regularly hidden in an organisation's raw material inputs or intermediate suppliers. They also indicated that if companies have operations or suppliers in regions with water shortages like India or China this can have far-reaching impacts.

Orr *et al*. (2009) cited examples of insecure supplies of water: In South Africa, the world's second largest beer retailer, SABMiller was forced to stop production in 2007 at one of its plants because of water shortages. Anglo American, which is another business that is considered to be water intensive, was unable to mine a rich seam of platinum in the Limpopo Province owing to the lack of water in the area. These examples indicate that the lack of water is starting to have detrimental impacts on companies and that they may need to take action.

The Waterberg in Limpopo has 40% of South Africa's coal resources, yet the scarcity of water in the area could prove the main restriction to mining these resources. Meeting water demand for power generation is likely to prove a significant challenge as much of the additional power capacity will come from coal (CDP Water Programme, 2012). This is yet another example of the effects that water scarcity could have on companies and the country.

2.4.3 Reputational risks

According to Orr *et al*. (2009), an organisation's reputation is one of the most important corporate assets, and also one of the most difficult to protect. They also mentioned that reputational risks are tougher to manage than other types of risks mainly because of an absence of tools and techniques, and confusion about who is actually accountable for this type of risk. Furthermore, they indicated that as water scarcity becomes a crisis, companies perceived to be water intensive (rightly or wrongly) will be singled out for criticism.

Barton (2010) asserted that reputational risks increase as people become increasingly aware of their human right to access water. This issue is gaining global recognition. The right to water is not yet officially recognised as a human right in international law, but an increasing number of national governments in the developing world, including South Africa, have protected this right in their constitutions (Morrison, *et al*., 2009).

Large and/or well-known organisations are particularly susceptible to exposé and consumer boycotts, irrespective of their actual involvement in the problem (Orr *et al.*, 2009). Morrison *et al*. (2009) cited an example: Both PepsiCo and Coca-Cola's bottlers in Kerala, India, lost their licences to use groundwater, after drought prompted public opposition and increased competition for local aquifers.

Another example cited by Morrison *et al*. (2009) is that, in 2003, Nestlé Waters signed a contract with local government in California permitting the company to build the country's largest bottling plant. It was to provide 240 jobs and bring in $350,000 annually into a small town in Northern California called McCloud. Nestlé hoped to start operations in 2006, but almost half of the residents of that town (1 300) resisted and demanded that Nestlé resubmit its environmental permit application and conduct

new environmental impact studies. Nestlé Waters North America (2009) reported that it withdrew its proposal to build the bottling plant.

An example cited by KPMG International (2012) is that a number of mining companies in Peru, Argentina, and Chile have been impacted by community protests over water. In one case, the mining company concerned had to abandon access to 3.9 million ounces of gold reserves as a result.

Companies' water practices are subjected to greater scrutiny as public interest in the impacts of water withdrawal and wastewater discharge on ecosystems and local communities grows (Morrison *et al*., 2009). This may be why stakeholder engagement, particularly engagement with local communities before a company wants to expand operations, could assist the company in securing the deal.

2.4.4 Regulatory risks

According to Amis and Nel (2011), the nature and cost of doing business is at risk because of possible changes to water policy, laws and regulations. In addition, new businesses or businesses wanting to grow their operations in water scarce areas may find it more difficult to access legal water allocations (Amis & Nel, 2011). Furthermore, Orr *et al*. (2009) mentioned that regulatory risks also arise when those put in charge of water management are incompetent in their jobs or where that particular water sector is open to corruption.

Water shortages, increased concern among local communities regarding corporate water withdrawals, and water pollution, all put pressure on government to consider changes to water allocations or caps on water use, new permitting standards, reduced permit availability and the development of stringent wastewater standards (Barton, 2010). Moreover, because there is a shortage of water, regulations are more likely to become more stringent and communities will be more anxious about the business's relationship to water, especially where the public does not have access to sufficient amounts of water to fulfil their basic needs and expectations (Orr *et al*., 2011).

Government is recognising the need for infrastructure investment. It has therefore proposed strengthening regulation of the water sector and revising water pricing, including removing a cap on water price increases and removing exemptions from some users (Van Ast & Maclean, 2012).

There may be many more risks that organisations face with regard to water scarcity. However, the above could provide a good indication of the types of risks organisations might face as a result of water shortages, and similarly, it could make suggestions of additional costs that might need to be accounted for in the organisation.

2.5 MAIN DRIVERS OF WATER RISK IN SOUTH AFRICA

According to Amis and Nel (2011), the main drivers of water risk in South Africa are the following:

- lack of water resources;
- water quality constraints;
- climate change;
- demographic changes;
- unsustainable land use practices; and
- governance and institutional challenges.

A vital aspect of this study was to determine if the selected companies are assessing water-related risks in their operations. Since the above are the main drivers of water risk in South Africa, this study might be able to evaluate whether the selected companies are aware of and finding solutions to mitigate these types of risks in their operations.

These drivers will now be discussed in more detail in the subsections below.

2.5.1 Lack of water resources

Pegram (2010) reported that it is critical to view water differently to carbon or any other natural resource for a number of reasons. Firstly, the short- and long-term future availability of water is uncertain as water's availability is variable in time and space. For example, one river basin may have an extended drought, while a neighbouring river basin may be experiencing floods. A given river basin can experience droughts and floods in quick succession.

According to Pegram (2010), secondly, water is a finite, but renewable resource. The availability is physically inhibited by the infrastructure availability and legally constrained in many places by intricate historical water rights systems. Thirdly, it is also non-substitutable, and while there may be a substitute for carbon in energy

production, only water can be used for drinking and irrigation. Fourthly, because water is bulky and costly to move in volumes that are typically required for production, it is essentially a regional product. Finally, water is fundamental to life, human dignity and all ecosystems (Pegram, 2010).

The above-mentioned points may be crucial for companies to consider: Water is difficult and costly to transport if there are shortages; and there is no substitute for water. Hence water-intensive companies may cease to exist in the future.

2.5.2 Water quality constraints

Amis and Nel (2011) postulated that poor water quality is mainly caused by city and industrial effluent discharge into river systems, badly maintained waste water treatment works, salinity from irrigation return flows, acid mine drainage and inadequate sanitation amenities in informal settlements.

Furthermore, Amis and Nel (2011) stated that poor water quality has major consequences for business because of increased treatment costs. The health of workers can also be negatively impacted by drinking bad quality water, which in turn, affects the productivity of labour-intensive operations such as mines. Municipal infrastructure has also lagged behind growing populations, and this together with inadequate investment in maintenance, has resulted in higher levels of water pollution. The International Organisation for Standardisation (ISO, 2013) concurred when it indicated that two million tons of sewage and other effluents drain into the world's water every day, and in developing countries, 70% of industrial waste is dumped untreated every day. It therefore appears that not only is the lack of water a risk to companies, but also the quality of available water.

2.5.3 Climate change

According to Amis and Nel (2011), climate change is expected to intensify the risks associated with water scarcity and quality. Water is the principal medium through which climate change will affect ecosystems and, in turn, people's livelihoods and wellbeing. The impact of climate change on South Africa's water is already felt in the form of changes in rainfall and in the severity and frequency of flooding and droughts (CDP Water Programme, 2012).

The CDP Water Programme (2012) stated that climate change will impact all businesses, but the agricultural industry is anticipated to be the hardest hit.

Business will need to adapt and put strategies into place in order to survive the impacts across their value chain. Financial institutions need to evaluate the risks related to their investments and include these issues in their credit risk processes.

According to the Chartered Institute of Management Accountants (CIMA, 2010), research by the Carbon Trust and McKinsey in 2008 suggested that if a company is well positioned and acts pre-emptively by confronting climate change, it could generate opportunities for it to grow its value by up to 80%. However, up to 65% of value could be destroyed if the company is badly positioned or lags behind on climate change issues. Research has also shown that one of the key reasons companies fail is that they overlook significant external changes – climate change being an example of such an external change.

CIMA (2010) indicated that many organisations are only looking at the compliance issues with respect to climate change in order to comply with regulations, risk management and customer expectations. However, dealing with the risks of climate change and exploiting its opportunities also require a focus on performance. It is not about setting up paper recycling initiatives in the office, but rather about major changes to operational activities to provide real and sustainable transformation.

2.5.4 Demographic changes

According to Amis and Nel (2011), demographic changes in South Africa will present both business risks and opportunities. The demographic changes will come about from an increasing middle class, in which urban areas will be the most affected. Future water demand is expected to grow from 2.1 billion m^3 per year in 2005 to 3.2 billion m^3 by 2030. Industrial use is expected to increase from 1.5 billion m^3 per year to 3.5 billion m^3 in 2030. Amis and Nel (2011) posited that a rapidly increasing middle class will provide business with a good opportunity to develop new products that are more water efficient – hence increased competition will be experienced by business. Consequently, the aspect of demographic changes in South Africa may be used as opportunities for companies.

2.5.5 Unsustainable land use practices

Amis and Nel (2011) also indicated that unsustainable land use practices are a major threat to ecosystems, livelihood of local communities and business. Invasive alien trees are said to consume more than 7% of South Africa's available water resources.

In some catchment areas, this figure could even be as high as 20%. As invasive alien trees can consume between 7% and 20% of South African water, the removal of these trees may be a significant contributor to saving water, which companies can become involved in. This initiative may not just be for the forestry and paper industry, but for all sectors where alien trees have been identified at their respective operations.

2.5.6 Governance and institutional challenges

Compliance, monitoring, enforcement and infrastructure maintenance are all the responsibility of local authorities, but, in many cases they lack the skills and capacity to execute their duties. Failing wastewater treatment works resulting in raw sewage leaking into river systems are the main contributor to water pollution. The lack of qualified municipal engineers, and the long-term planning capacity to maintain and upgrade water infrastructure are all major risks, according to Amis and Nel (2011).

Orr *et al*. (2009) also mentioned that the type of business will determine the level and type of risks and the appropriate response. Water-intensive businesses with well-known brands will encounter the greatest reputational challenges. However, many other businesses will also experience changes and uncertainty because of water shortages.

According to Pegram (2010), water risk management at a strategic corporate level has only occurred in the past five years. Conventionally, most companies have managed water risks at an operational level. This may show that companies have not realised the impact the impending water crises could have on their business.

Orr *et al*. (2009) pointed out that even as companies seek to protect their long-term prosperity, maintain a competitive advantage, develop brand differentiation and secure stability and choice in supply chains, growing water scarcity will present financial, physical, reputational and regulatory risks. These risks were discussed in detail above in section 2.4 under water risks.

South African companies could be facing a number of serious challenges, and in the future, these challenges could include water shortages, poor water quality due to acid mine drainage and ageing water infrastructure. The aim of this research was to establish whether the selected companies are in a position to deal with this crisis.

2.6 WATER RISK RESPONSE

Even though responses to water risk are frequently considered according to the perspective of a company's infrastructure and capital investment in equipment or machinery, business water risk transfer through hedging, insurance and other market instruments has received increasing attention in recent years (Larson, Freedman, Passinsky, Grubb & Adriaens, 2012).

Ways to mitigate water risk for the business are discussed in the next subsections.

2.6.1 Hedging

Hedging is one of the ways to mitigate water risk in business and involves reducing or eliminating a financial risk by passing that risk on to someone else, normally a financial institution (Parkinson & Ogilvie, 2000).

According to Larson *et al*. (2012), weather derivatives are a fairly new option to mitigate risk. The first transaction in weather derivatives took place in 1997. Companies can use these derivatives to hedge against business risks that arise as a result of unusual weather. They are index-based products that quantify weather in terms of how considerations such as temperature or rainfall digress from the monthly or seasonal average in a particular city or region. Larson *et al.* (2012) cited the example of a global food producer that might decide to hedge against a growing season that analysts expect to be drier than the historical average, since its profits would be affected as a result of poor crop yields.

The global weather derivatives market reached US$ 11.8 billion in 2010-2011, which is an 18% increase from 2009 (Larson *et al*., 2012). In addition, they reported that weather derivatives, especially rainfall options, afford a company the opportunity to financially hedge against the change in costs, the risk of reduced water supplies and interruptions of supply chains. A major downside of trading weather derivatives is that weather risk is highly localised and cannot be projected exactly and reliably.

As mentioned by Larson *et al*. (2012), hedging is a relatively new method used to mitigate water risks. Through the evaluation of companies, it may be possible to establish if any of the companies are using this method, however water risk responses were not assessed in this study.

2.6.2 Insurance

Insurance is another way to mitigate water risk in business. In this context, weather insurance is more relevant to water scarcity, which is discussed in more detail. Larson *et al*. (2012) noted that traditionally, insurance has taken the form of crop insurance which was offered by national governments. Weather insurance, specifically rainfall insurance, is a specific type of weather insurance that pays out based on the rainfall recorded for a specific location. Rainfall-based index insurance can help balance the potential financial risks relating to water scarcity. They also mentioned that rainfall based index insurance provides a useful price indicator compared to the actual price of water on the market, this is beneficial to policy makers and water authorities. However, rainfall index insurance only mitigates the economic consequences and does not provide a long-term solution to water scarcity (Larson *et al*., 2012). The study might need to identify whether insurance, particularly water insurance, is being used by companies to mitigate their water-related risks.

2.6.3 Water trading and water rights

Water trading and water rights can also be used to minimise water risk in business. Water trading reallocates available water supplies and this risk response falls in between economic hedging and an action that affects supply and demand. It is the act of buying or selling or trading legal entitlements to water. Its main advantage is to promote more efficient water distribution among competing users. Agricultural users are normally the sellers, while municipal and industrial users are normally the buyers. Farmers usually receive substantial water rights and they pay less for water (Larson *et al*., 2012). In addition, Larson *et al.* (2012) stated that there first needs to be certainty over the water rights and a legal institution in place before these rights can be traded. In less developed countries, there is a greater chance of corruption and less recourse available in case of unjust trades. Analysis of the companies in this study could identify if water trading and water risks are being used to minimise water-related risks.

2.6.4 Reduce, recycle and reuse

Methods that are more extensively used by companies to lessen water risk are reducing, recycling and reusing. Reducing may include increased efficiency,

conservation and improved operations. Changing operations to recycle water, or taking used water and reusing it for other purposes with or without treatment, is called recycling. In the beverage sector, many companies save water by using innovative methods for cleaning bottles. For example, PepsiCo is using purified air instead of water to clean bottles (Larson *et al*., 2012). According to Larson *et al.* (2012), reducing, recycling and reusing normally reduce the demand for water, and in so doing, reduce water-related risks for the company. When initiatives are applied directly in a company's operations, they are completely under the company's control. A cost-benefit analysis from the investment can be calculated and companies have a reasonable guarantee of favourable outcomes. However, companies need to also look beyond their four walls as reducing demand alone does not ensure that supply will meet demand (Larson *et al*., 2012). Since these are common methods used to reduce water risk, this study could expect to find that many of the selected companies are using these methods.

2.6.5 Enhanced supply

Enhanced supply is another method that business can use to mitigate water risk which comprises community-based water projects. This response is to enhance and protect the water supply for ecosystems, community use and business operations. Certain prominent companies are partnering with local institutes to undertake projects outside of their operations, to safeguard and improve water sources to ensure sustainability for all users (Larson *et al*., 2012). Larson *et al*. (2012) went on to explain that improving water access for communities may not reduce competing demands for water, but it does build positive stakeholder support and signifies good corporate community commitment and enhances corporate reputation. Enhanced supply will be evident in the stakeholder engagement section of the Gauge™.

Figure 2.2 is a decision framework for analysing the consequences of water scarcity and developing a response strategy.

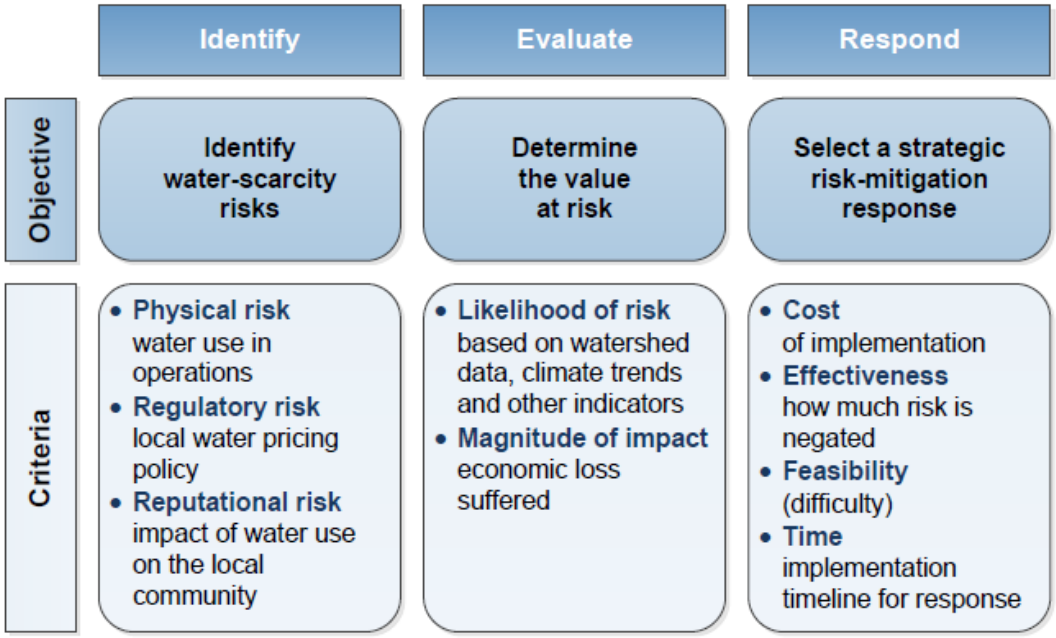

Figure 2.2: Water risk-response framework for businesses (Larson *et al*., 2012)

There may be a number of ways to mitigate water risks in the organisation, with some options, such as hedging, being quite new to business. The aim of this research was to investigate whether companies are succeeding or not succeeding in doing so.

2.7 BEST PRACTICE DISCLOSURE REQUIREMENTS

Morrison *et al*. (2012) indicated that corporate water disclosure is the act of collecting data on the existing state of a company's water management, evaluating the consequences of this information for the company, developing responses, and finally, reporting to stakeholders all of this information. They argued that current practice in corporate water disclosure even between the most robust of reporters, normally does not sufficiently capture the extremely multifaceted and location-specific nature of water resource dynamics and corporate action on this topic. Many companies are thus looking for comprehensive guidance on how to more effectively disclose the various fundamentals of corporate water management.

As mentioned by Morrison *et al*. (2012), the CEO Water Mandate's Corporate Water Disclosure Guidelines (CEO WMCWDG) suggest a common method for disclosure.

Water disclosure can be applied in a number of ways. It can act as either a foundation of a standalone report on a company's water management actions, serve as a section of a broader sustainability report, appear on the company's website, and be a starting point for discussion with the company's stakeholders.

According to Morrison *et al*. (2012), the CEO WMCWDG is built on three broad pillars of information as indicated in figure 2.3.

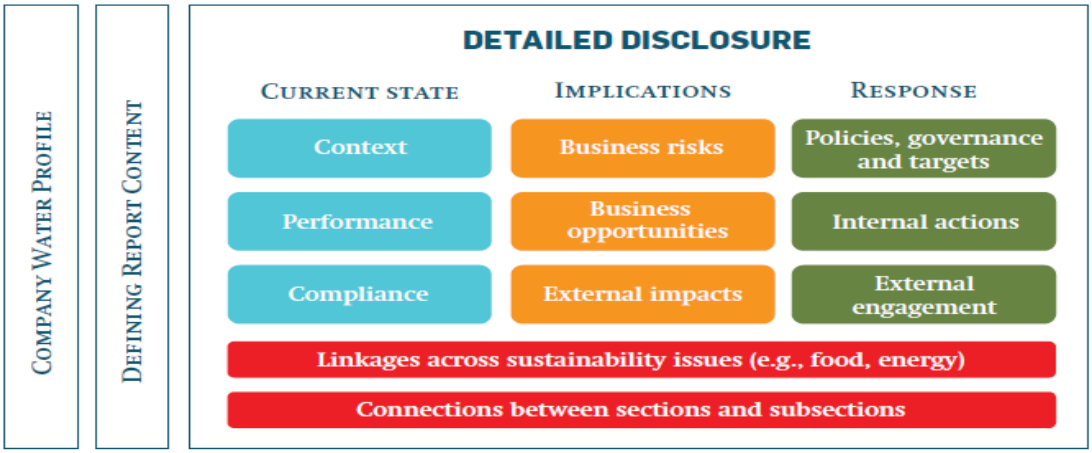

Figure 2.3: Corporate water disclosure framework (Morrison *et al*., 2012)

Each pillar is discussed below.

- **Pillar 1 – company water profile**

This is an overview of the company's dealings with water, water risks and opportunities, commitments and response, and the profile metrics. This is a company-wide water performance and risk metric, and it would include, for example, measurement of withdrawals in water-stressed areas and any compliance abuses.

- **Pillar 2 – defining report content**

This is where the company determines which water-related information to include in its report. The company should evaluate the consequences of different water topics for it and its stakeholders and the extent to which those topics will or will not in the future adversely affect the business, ecosystems or the community.

- **Pillar 3 – detailed disclosure**

This is where the company provides specific, comprehensive metric and qualitative information relating to its water management. It is subdivided into five subsections,

namely current state, implications, response, linkages across sustainability issues, and lastly, the connections between sections and subsections.

The current status of the company's processes is broken down into context, performance and compliance.

The second subsection is the implications section and here the consequences to business and its stakeholders would be disclosed. This is further broken down into business risk, business opportunities and external impacts.

The third subsection covers the response strategies that a company may take to address the business risks, business opportunities and external impacts that would have been identified in the previous subsection, which is called the implications section. This is further broken done into the following:

- **Policies, governance and targets:** The company should explain if it has established strategies and created systems to improve its water performance and reduce its water-related risks and impacts.
- **Internal action:** How does the company create variations to its production processes, procurement practices and product design to manage its risks and impacts?
- **External engagement:** How does the company improve the sustainable management of the water basins in which it works?

Lastly, companies also need to make connections between the sections and make linkages between water and other sustainability topics like climate change and energy use.

The Global Reporting Initiative (GRI, 2013) has developed the G4 Sustainability Reporting Guidelines which offer a globally applicable framework to support a standard approach to reporting, which encourages transparency and consistency that is essential to make information useful and credible to markets and the public. G4 is designed to be appropriate for all organisations, large and small, across the globe. The features of G4 are also to make the guidelines easier to use for both experienced reporters and those new to sustainability reporting from any sector. According to the GRI (2013), water would fall under the environmental category, which covers impacts relating to inputs such as water and energy and outputs such

as emissions, effluents and waste. It also covers impacts such as environmental compliance and the costs thereof.

The following would need to be reported under the G4 standard guidelines for water:

- G4-EN8: total water withdrawal by source;
- G4-EN9: water sources significantly affected by withdrawal of water; and
- G4-EN10: percentage and total volume of water recycled and reused (GRI, 2015:54 & 55).

In the Gauge™, the following is one of the activities under the disclosure requirements: Does the company include water data and analysis in published financial reports? Since there are no specific guidelines in the Gauge™, the researcher decided to use the G4 guidelines as the minimum financial disclosure to establish if the selected companies comply with this activity.

2.8 LATEST DEVELOPMENTS IN THE MEASURING AND DISCLOSURE OF WATER RISKS

Larson *et al*. (2012) pointed out that in response to several industry sectors expecting a cut in their water allotments, there has been a move towards full-cost water pricing, and ever more rigorous water quality regulations. An increasing number of protocols, tools and decision support frameworks are being developed and applied to evaluate corporate water practices and support development and implementation of sustainable water stewardship strategies.

According to Larson *et al*. (2012), many of these initiatives address numerous objectives, which can be grouped into the following four wide-ranging categories:

- water use accounting tools;
- business risk assessment frameworks;
- reporting and disclosure protocols; and
- standards and certification frameworks.

Larson *et al*. (2012) presented and explained the following tools:

- **The Aqueduct Water Risk Framework** was developed by the World Resources Institute (WRI), and provides an interactive mapping tool to facilitate businesses to quantify and map a range of water risks at a local

scale worldwide. Not many companies have access to comprehensive data on their supplier's water situation and performance, as information on company water-related data is infrequently disclosed. Most of a company's water footprint is embedded in its supply chain. The Aqueduct makes use of 12 global indicators to inform companies, investors and others about geographic exposure to water-related risks (Reig, Shiao & Gassert, 2013). As explained by Reig, *et al.* (2013), this framework allows users to obtain an aggregated score for overall water risk, into three risk categories, namely physical risks (both quantity and quality), reputational risk and regulatory risk.

- **The Global Environmental Management Initiative's (GEMI's) local water tool** developed by GEMI and the **water risk filter** developed by the WWF and DEG not only help companies assess site-specific water impacts and risks, but also afford a framework to prioritise or select between water management actions at high risk sites.
- **The Global Reporting Initiative and CDP Water Disclosure** are reporting frameworks that are primarily intended for information purposes for internal use or reporting to external stakeholders.
- **The Ceres Aqua Gauge™** was the framework used in this research to evaluate the selected companies. Barton and Adrio (2011) defined the Gauge™ as an Excel-based tool that produces a graphic output. It is used to evaluate a company's existing water risk management approach, policy development, business planning, goal–setting and stakeholder engagement and disclosure. The Gauge™ is not another channel of corporate disclosure.

It is an Excel-based tool that is easy to use and it provides a graphical output of a company's performance. It covers all areas of water risk management, namely policy development, data gathering, business planning, goal setting, stakeholder engagement and disclosure. The Gauge™ was developed by a number of organisations with input from more than 50 financial institutions, companies and NGOs (Ceres, 2015).

The risk assessment tools discussed in section 2.8 could help companies to understand where their greatest water-related risks lie. These risks could be in their own processes or in their supply chain. Some of the risk assessment tools could even offer ideas on how to reduce or mitigate the given risk.

2.9 REVIEW OF SIMILAR RESEARCH CONDUCTED IN SOUTH AFRICA

The CDP's Water Programme for 2013 is discussed in the next subsection.

2.9.1 The CDP's South Africa Water Report (2013)

In 2010, the CDP launched its water programme, known as the CDP Water Disclosure. It offers international and South African companies the chance to publicly report on how they are managing their water risks, taking advantage of opportunities and contributing to the overall management of the earth's freshwater resources. South Africa is one of the first countries to take part in the CDP's water information request. This is due in part to the increasing appreciation by the businesses operating in the region of the growing strategic value of water.

In 2010, a small sample of only six South African companies took part, plus an additional six voluntary responses. In 2011, 56 companies listed on the JSE 100 were invited to participate, and 26 companies responded, equating to a 46% response rate. The global response rate was 60%. In 2012, 61 companies on the JSE 100 were asked to participate. Thirty of the 61 answered the questionnaire, which is an improvement on 2011, with the response rate up by 3%. In 2013, 59 companies on the JSE 100 were invited to participate, and 33 of them participated, which is a 56% response rate. The response rate is slightly lower than the 60% of the Global 500, but higher than the response rates in Australia and the USA, which are both around 40%.

2.9.1.1 Key findings: consumer discretionary and staples: combines the beverage sector, food producers and food retailers

This sector has the lowest response rate with only eight out of 21 responding. Pioneer Foods responded last year, but not in 2013, and AVI, Oceana and Tiger Brands declined to respond in 2013. The response rate dropped from 2011.

All the companies that responded reported water withdrawals, and the majority have a policy/strategy in place supported by board-level oversight. There is growing awareness in the sector of risks in the supply chain. A total of 75% of respondents reported exposure to risks in direct operations and their supply chains. However, only 38% of the companies in this sector require their key suppliers to report on their water risks. Because this sector relies on agricultural produce and has a high recognition of the water risks at 75% in its supply chain, more of the companies

should be requiring their suppliers to report on water risks. Of these companies, 63% have water-related targets or goals in place. The majority of these risks focus on direct operations and not supply chain. Of the respondents, 75% identified various opportunities, mainly cost savings and increased brand value, with limited recognition of new products or services.

2.9.1.2 Key findings: health-care: combines pharmaceuticals and health-care providers

Four out of five companies responded, that is, an 80% response rate. Both Adcock Ingram and Aspen responded. Of the companies, 75% report on water withdrawals, 75% have a policy/strategy in place, two of the four companies have board-level oversight. All of companies (100%) identify risks in direct operations, two of the four companies report supply chain risks and none of the companies require their key suppliers to report on water.

All the companies in this sector report on water-related opportunities in the business, but these all relate to cost savings, except one company that relates to new products or services.

2.9.1.3 Key findings: materials and energy: combines chemicals, energy, mining and oil and gas sectors

The response rate was 60%, with the vast majority of responses being mining companies, but with one chemical company, one forestry company and one energy company. All respondents have a water policy in place, and all except one has board oversight. A total of 75% have quantitative targets. This sector faces considerable water-related risks and shows a remarkable awareness of these risks. The supply chain is less understood than direct operations. Half of the respondents identify risks in the supply chain, and only 25% require key suppliers to report on water risks. All the companies in the sector, apart from Northam, identified water-related business opportunities. These relate to cost savings and increased brand value, and not to new products or services.

The key findings of the CDP South African Water Report 2013 are presented in table 2.1.

Table 2.1: Table comparing some key indicators between South Africa's CDP Water Programme 2011 and 2013, and the Global CDP Water Programme 500 for 2013

Key indicator	CDP's Water Programme SA 2013	CDP's Water Programme SA 2011	CDP's Global Water Programme Global 500 2013
Data availability			
Report water withdrawals	97%	92%	99%
Report recycling	69%	62%	66%
Report water sources significantly affected by withdrawals	14%	n/a	12%
Report water bodies or habitats affected by discharges	7%	n/a	8%
Risk awareness			
Experienced detrimental impacts	72%	58%	53%
Exposure to risk (direct operations)	86%	85%	66%
Able to identify risks in supply chain	72%	62%	77%
Recognises opportunities	83%	77%	77%
Management and governance			
Response rate	56%	46%	59%
Water policy or strategy	83%	69%	93%
Board-level oversight	72%	65%	58%
Requires suppliers to report on water risk	21%	19%	37%
Quantitative goals or targets	59%	58%	66%
Taking actions (beyond the policy) to manage water	100%	n/a	96%

Adapted source: *(CDP South Africa Water Programme, 2013)*

The CDP Water Programme project is a questionnaire that is sent out to the largest 100 companies on the JSE that are considered to be water intensive. Since this project appeared to be similar to the topic of the current research study, it was deemed an appropriate source to use as a benchmark.

2.10 REVIEW OF SIMILAR RESEARCH CONDUCTED AT A GLOBAL LEVEL

The results below are from the 2008 Global Study which was conducted on 100 of the largest publicly traded companies from eight water-intensive sectors based on their 2008 annual revenues and market capitalisations. Geographic exposure was

also taken into account in the selection. The companies' 2008 corporate reporting information was used for this study.

2.10.1 Results of the 2008 Global Study (Barton, 2010)

The key findings by sector are discussed next.

- **Beverage sector:** This sector proved to be the second best water risk disclosure of all the other sectors reviewed in this study. SAB was included in this survey. Seven of the ten beverage companies reported data on their total water usage for their facilities, but none of the companies broke this down to facility level. Only four beverage companies reported data on wastewater discharge. Six of the beverage companies reported water use reduction targets. Four out of the ten companies reported information on their water management systems and policies. Four of the ten companies reported on their water management systems and policies. Nine companies reported some level of risk relating to water scarcity, mostly with regard to their supply chains. However, only three companies reported working with their suppliers on decreasing water risks and impacts. The beverage sector reported significant engagement and collaboration with stakeholders, and seven companies disclosed engaging with their stakeholders.

  This report mentions that SAB was the only company to report an estimate of water use embedded in the company's supply chain.

- **Chemical sector:** AECI, Afrox and Omnia were not included in 2008 Global Study, but 15 other chemical companies were included. The chemical sector showed weak water risk disclosure as a whole. Twelve of the companies reviewed reported on water usage and wastewater discharge, and only three provided site-level breakdowns of their water use. Only three companies reported reduction targets on water use or wastewater discharge. None of the companies disclosed information on water-specific management systems or policies. Half the companies reported on water-related risks in their businesses. Ten of the 15 disclosed market opportunities related to products that save water or improve water quality. None of the companies reported any engagement with their suppliers. More than half the companies reported engaging with their stakeholders on water-related issues.

- **Food sector:** This sector presented limited water risk disclosure overall. None of the companies from this research study were included, and 13 companies were selected in the 2008 Global Study. Eleven out of the 13 companies reported data on total water usage, but none of them broke this down by facility. Only four of the companies reviewed reported on wastewater discharge. Six companies set water reduction targets. Three companies disclosed having water-specific policies. All the companies disclosed water-related risks in their operations, especially in their supply chain. However, only four companies reported working with their suppliers on water-related risks. Six of the companies reported engaging with their stakeholders.
- **Mining sector:** This study found that the mining sector showed the strongest water risk disclosure of all the sectors surveyed. Thirteen mining companies were included in the 2008 Global Study, but none of them were included in the researcher's study. Ten out of the 13 companies reported on their water usage, four companies broke down water use data to the site level, and six companies disclosed information on wastewater discharge. All companies reported on their water-related risks. Six of the 13 companies set quantitative targets to improve water use efficiency. Eight companies provided information on water-specific strategies and policies. Only one of the mining companies disclosed that it engaged with its suppliers on water-related risk. Ten of the 13 companies reported engaging with their stakeholders on water risks.
- **Oil and gas sector:** Thirteen companies were selected for this sector for the 2008 Global Study, Sasol and SacOil were not included. This sector showed weak water risk disclosure. Eight out of the 13 companies reported on water usage, and of these, only two gave a breakdown of their water usage by facility. Six companies disclosed wastewater discharge. None on the companies provided information on their supplier's water usage. Slightly more than half the companies disclosed information on water-related risks. Only two companies disclosed water use reduction targets. No companies disclosed engaging with their suppliers on water management or risks. Seven companies disclosed engaging with their stakeholders on water issues. Five companies reported water-related policies or standards.

2.10.2 Summary of findings

In this section, the findings of the 2008 Global Study are discussed according to the study's stipulated categories, namely water accounting, risk assessment, direct operations, supply chain and stakeholder engagement.

- **Water accounting:** A total of 63% of companies disclosed corporate-wide data on direct water use, and 40% reported on wastewater discharge. Only 14 companies provided data on water withdrawals broken down by site. No companies provided data on their supplier's water performance, although Danone, SABMiller, and Unilever provided estimates of water that is embedded in their supply chains.

  The overall key finding of this study is that even though these companies are operating in sectors that face significant water risk, their disclosure of water-related risks and corporate water performance is unexpectedly weak.
- **Risk assessment:** Of the companies, 73% reported some exposure to water-related physical risks for example drought. Nine companies reported reputational risks relating to water, 67% reported water-related regulatory risk, and 48% reported litigation risk.
- **Direct operations:** Most companies disclosed that they had environmental policies, only 24 companies stated that they had water-specific policies, standards, plans or management systems. The mining sector had the best disclosure for this topic.

  Only 21 companies disclosed that they had quantitative water reduction targets, and only 15 companies had goals to reduce wastewater.
- **Supply chain:** Barton (2010) mentioned that for many big companies, water use is embedded in the supply chain which accounts for the greatest percentage of their water footprint. Information on supply chain management is becoming increasingly important, as there is a greater need for investors to understand a company's full life cycle exposure to water risk. Only 12 companies disclosed that they worked with their suppliers to help them reduce water use or wastewater discharge. For companies that had a significant percentage of their corporate water footprint in their supply chain, there was little discussion of working with suppliers to manage water risk.

- **Stakeholder engagement:** Companies in the beverage and mining companies led the way on stakeholder engagement. Only five companies disclosed that they engaged with stakeholders on water-related impacts when expanding operations.

2.11 EXAMPLES OF HOW WATER CONSCIOUS COMPANIES ARE SAVING WATER IN THEIR ORGANISATIONS

According to Deloitte (2012), it is difficult not to be overwhelmed by the severity of the world's water crisis, and any single company would find it a challenge to contribute meaningful solutions to the crisis. It also reported that this explains the increase in the number of companies that are jointly addressing water-related issues, engaging with communities, partnering with competitors and NGOs and working with governments to attain numerous water-related goals.

The following companies are discussed below: Nestlé, Puma, SAB, Woolworths and Anglo American.

2.11.1 Nestlé

Nestlé (2012) has partnered with the 2030 Water Resources Group, the UN Global Compact CEO Water Mandate, the Water Footprint Network and the Alliance for Water Stewardship. The company also collaborates with its suppliers to promote good water management through the Sustainable Agriculture Initiative at Nestlé (SAIN). It has direct contact with over 690,000 farmers and several million others in surrounding communities. Nestlé is committed to joining its efforts to develop sound water management practices and find effective solutions. In 2012, it conducted 16 additional water resource reviews at its factories.

Nestlé (2012) was helping to develop a new standard, ISO 14046: Water Footprint Principles, Requirements, and Guidelines, to be completed by 2014. ISO 14046:2014 provides principles, requirements and guidelines for conducting and reporting a water footprint assessment as a stand-alone assessment, or as part of a more comprehensive environmental assessment. Nestlé has reduced water withdrawals by 53% per ton of product since 2002, reduced water discharges by 64% per ton of product since 2002, and recycled 6.9 million cubic metres of water in 2012. It has run over 489 water-saving projects in its factories saving 6.5 million m^3 of water. Nestlé launched 217 clean drinking water projects in the South Asian

region, helping to improve access and sanitation to more than 100 000 students in village schools across several countries.

2.11.2 Puma

Puma (2012) is the first company in the world to have an environmental profit and loss account (EP&L). An EP&L is a way of placing a financial value on the environmental impacts along the whole supply chain of a given business. Puma is a member of the Sustainable Apparel Coalition (SAC). SAC has developed the Higg Index which measures environmental impacts across the industry's supply chain taking into account water and energy use, waste, chemicals and toxicity.

2.11.3 South African Breweries (SAB)

SAB (2012) consumes 3.9 litres of water, on average, to produce one litre of beer, an improvement of 8% over the past two years. As part of the SABMiller group, it is committed to reducing its water consumption in the brewing environment by 25% to 3.5 litres per litre of beer by 2015. SAB is working closely with barley farmers to save water through better barley irrigation through measurement of soil moisture. It also undertook research in collaboration with the University of the Free State to determine an irrigation strategy for barley. A long-term approach is to breed more drought-resistant barley.

SAB has begun engaging with its major suppliers of bottles, cans and packaging on understanding their water use, efficiency and risks in order to collaborate with their suppliers to develop and implement joint water strategies. SAB is part of the strategic alliance between the Worldwide Fund for Nature South Africa (WWF-SA) and the Deutsche Gesellschaft fur Internationale Zusammenarbeit (GIZ) GmbH, which is known as the Water Futures Partnership. This partnership aims to assess and reduce risks, and to strengthen water stewardship and governance in specific regions.

SAB co-chairs the Strategic Water Partnership Network in South Africa (SWPN) with the Department of Water and Environmental Affairs, which is a public-private initiative to close the water gap facing the country by 2030. SAB works with the community to identify projects that will provide them with safe drinking water. For example, in 2011, SAB provided a community in Venda with clean running water by donating a solar powered borehole.

2.11.4 Woolworths

Woolworths (2013b) is pioneering a new method of farming that is allowing its farmers to grow food sustainably and in harmony with nature. This method is known as Farming for the Future. It is an all-inclusive methodology that manages the entire farming process systematically. It all starts with building and maintaining the soil. Healthy soil can retain water better, and needs less irrigation and fewer chemicals. Fewer chemicals mean less chemical run-off, which helps to preserve water quality, as well as contributing to conserving biodiversity, both in and above the soil. Woolworths plans to expand this programme to its dairy products and other food businesses.

Woolworths currently stands as the only retailer taking part in WWF-SA's Water Balance Programme. This initiative encourages organisations to balance their own water use through schemes that increase supplies of clean fresh water into the environment. A case in point is Woolworths' drive to help remove water-hungry invasive alien plants in the Tankwa Karoo National Park.

Before Woolworths opens a new store, it makes sure the design is water efficient. Its Head Office is tapped into an underground water supply which runs about 20 metres under the building in the centre of Cape Town. It flows into the storm water system and eventually discharges into the sea without being used. This water is treated and used to flush toilets, cooling for air-conditioning units and other uses. This water-saving initiative is estimated to save 27,375,000 litres of water a year.

2.11.5 Anglo American

Anglo American (2012) has implemented a Water Efficiency Target Tool (WETT), which was implemented in 2011, which estimates the projected business water demand for its different operations. This tool also establishes a register of water savings for each project. These WETT targets are included in business unit CEO performance contracts and also in those of relevant operational staff. Sixty water-saving projects achieved a saving of 6.8% against projected water usage in 2012. This included a $66 million investment in projects specifically designed to save water. Anglo American's goal is to reuse and recycle as much water in its operations as possible. In 2012, 72% of its operational water use was recycled or reused water versus 67% in 2011. Some of its operations reached as high as 90% and 97%.

Anglo is also aiming to decrease its reliance on high-quality water by converting to the use of lower grades of water. Potable water accounts for only 18% of its total water requirements currently.

The above examples suggest that some companies are making progress towards securing their operations and that of communities against water scarcity. This research could bring to light other examples of companies that are making positive contributions to improving South Africa's water shortage problems.

2.12 HOW WATER SCARCITY WILL CHANGE BUSINESS MODELS

According to Schneider (2010), together with return on investment, capital requirements and quarterly returns, companies that want to stay in business need to add skilled staff to manage the new market indicators in the era of water scarcity. Companies need to predict market pressures to correctly price water. He also mentioned that food companies and farmers who use approximately 70% of the world's fresh water will be prompted to develop more effective water conserving irrigation and production practices due to water scarcity.

Water shortages will alter products and how they are marketed. For instance, household appliance manufacturers are already promoting water savings alongside energy savings in their product advertising. Clothing manufacturers and retailers are seeking ways to help consumers reduce water use by developing clothing fabrics that require less frequent washing (Schneider, 2010).

Industrial companies, according to Schneider (2010), will no longer have the luxury of making water-intensive products like cars, steel and chemicals, in water-stressed areas, simply because labour, land and electricity costs are low. Furthermore, companies that are preparing now for the changes in their processes, supply chains, and markets, caused by water scarcity, instead of only concentrating on decreasing their direct water consumption will be much better positioned to seize opportunities and minimise risks and disruptions.

Grossman, Erikson and Patel (2013) postulated that there may be increased consumer demand for building materials and designs that integrate renewable resources, recycled materials, and energy and water-efficient technologies and processes. For example, concrete and cement companies will face increased pressure to decrease their electricity and water use, to recycle concrete and to

reduce their greenhouse gas emissions. Furthermore, according to Grossman *et al.* (2013), there will be an ever-increasing demand for contractors and consultants to have sustainability skills and training.

Grossman *et al.* (2013) also highlighted the fact that there will be an increased demand for the chemical sector to produce products that sterilise, purify and desalinate water as water quality and scarcity challenges increase. The development of drought-resistant seeds and crop-protection products will also increase. There will also be enormous pressure for industries to switch to cleaner energy.

Fears about chemicals, pollution and ocean health may result in an increasing demand from consumers and retailers for sustainably grown or caught foods. Growing concerns about water accessibility and plastic waste may reduce consumer demand for bottled water in some markets (Grossman *et al*., 2013).

Water scarcity could pose a risk to business, not only water-intensive industries, but to all organisations. If companies choose to be innovative and take advantage of new investment opportunities, they could stay ahead of their competitors. However, this does not only constitute measures to save water in their operations, but by creating new opportunities and changing current business models, and by having conducted this research these initiatives could be brought to light.

2.13 LIFE CYCLE ASSESSMENT AND WATER FOOTPRINT

In this section life cycle assessment and water footprinting will be discussed.

2.13.1 Life cycle assessment

According to KPMG International (2012), suppliers are the hidden water users. The business risk of water scarcity spreads well beyond a company's own operations and deep into its supply chains. Much more water is used in the supply chain than in direct operations. An example cited is a survey conducted on the companies listed on the Japan Nikkei 225 index where three quarters of water consumption occurs in the supply chain of the surveyed companies.

Morrison *et al.* (2009) defined life cycle assessment (LCA) as a systems analysis tool that was developed explicitly to measure the environment sustainability of products and services through all components of the value chain. They went on to say that

LCA has existed for several decades and hundreds of thousands of LCA studies have been done in the past. However, water use has not yet been accounted for within this method in any sort of detail or comprehensive fashion. If measured at all, water use has normally been accounted for strictly as an inventory of a product's total water withdrawal, rather than consumption, and with no succeeding impact assessment.

Morrison *et al.* (2009) indicated that with companies' growing concern about water scarcity, better ways have been developed to account for water use. LCA practitioners have come to realise the importance of differentiating between consumptive and non-consumptive water use, specifying the geographical location of water withdrawals, the sources of water use, that is, lake, river, groundwater, rainwater, and whether or not these sources are renewable. CDP's Water Programme (2012) report found that risks to the supply chain are considered far less important than those that affect direct operations. This is why the LCA could be an essential assessment for business.

2.13.2 Water footprint

Morrison *et al*. (2009) defined water footprinting as a method presented in 2002 and developed primarily by researchers at the University of Twente in the Netherlands. It measures the total annual volume of freshwater used to produce the goods and services consumed by any well-defined group of consumers, including a household, community, town, province, state, nation and a business or its products. Water footprints are envisioned to allow these entities to better comprehend their relationship with watersheds, make informed management decisions and spread awareness of water challenges.

According to Chapagain and Tickner (2012), a water footprint analysis has the following key applications:

- **National water footprints:** These address how dependent the import and consumption of goods in a country is on the water resources in that country and elsewhere. In other words, the water footprint accesses how vulnerable a nation is to global water-scarcity risks. An example is the UK's agricultural water footprint which is 62% embedded in imported goods.

- **River basin water footprint:** This is the true picture of water stress or scarcity in a particular river basin.
- **Product water footprints:** These are water footprints of specific products or of individuals who use a range of different products.
- **Business water footprints:** These gauge where or when in the value chain a business has possible negative impacts on the environment or other water users. In other words, in which part of the world is this risk prevalent?

Chapagain and Tickner (2012) asserted that water footprint analysis is a useful tool for mapping and understanding water-related business risks and impacts. It can also be useful in helping operational managers to understand the significant proportion of water risks to the business that lies beyond factory walls. However, they also mention that while water footprint analysis can help companies to understand water-related risks, it offers no information on what actions to take to address these risks.

Water footprinting may be an important technique to help business in the management and mitigation of water risks. In the Gauge™, water footprint assessment is one of the tools mentioned in order to track risks. During the evaluation of the selected companies, the researcher was able to establish if any of the companies were using this tool in their operations.

2.14 THE MANAGEMENT ACCOUNTANT'S ROLE

According to the International Federation of Accountants (IFAC, 2013), the accounting profession has a vital role to play in building awareness of the business case for natural capital, and developing new valuations, accounting and reporting methods for it. According to the Chartered Institute of Management Accountants (CIMA, 2010), management accountants have a key role to play in driving sustainable strategic and operational choices. Furthermore, CIMA's research demonstrates that even where finance teams are engaged in climate change-related activities, this has often been on an ad hoc basis. The institute also reported that this should change, as management accountants have the necessary tools and techniques to guarantee that businesses understand the scale of the problem. Management accountants can come up with workable solutions and ensure they are correctly implemented. They have a crucial role to play in providing business intelligence to support strategy and influence decision making.

CIMA (2010) stipulated that without the rigidity and commercial acumen of the finance function, it may prove difficult to really entrench sustainability in normal business life. Failure of management accountants to become involved now, when significant decisions are being made in areas of compliance with new climate change related regulations, could result in far higher costs, lost opportunities or reduced competitive advantage. The institute suggested the following areas in which management accountants could effect change with regard to water scarcity in the business:

- **Business forecasting and planning:** Accountants need to offer awareness and more sophisticated forecasts, including scenario planning and modelling of uncertainty. If any business is developing three-year plans now without factoring in climate change, water scarcity and energy costs, it is making a mistake.
- **Financial and cash-flow planning:** Management accountants are best placed to offer guidance on the obtainability and best use of cash. They can also search for and offer advice on any tax advantages, capital allowances on investments in energy and water-saving equipment, or on support offered such as tax breaks, interest-free financing or advice on measurement and reporting on water issues and carbon emissions.
- **Performance measurement:** Benchmarking and clear reporting enable management accountants to show exactly how their companies are doing in terms of reducing their water footprint. If you do not measure it, you cannot manage it, as the age-old saying goes.
- **Performance management:** Measurement is vital and management accountants are skilled in applying targets, key performance indicators (KPIs) and scorecards to ensure the organisation's sustainability strategy is providing results.
- **Preparing business cases:** However, accountants should challenge, not suppress ideas, by providing measurement and analysis of projects undertaken. For example, if new concepts around sustainability fail, and given the absence of established best practice in this area, they should offer ways through which they could become successful. Feedback during this process by the management accountant is essential.

- **Investment appraisal:** Investigating investments in new technologies, plant and equipment, requires arduous financial and strategic appraisal which management accountants can provide.
- **Cost/benefit analysis:** Management accountants can assist business to comprehend the possible cost-saving and income-generating opportunities associated with sustainability projects.
- **Value-based management:** Accountants are best suited to measure value, whether that is value at risk or value that can create opportunities.
- **Change management:** Accountants establish the economic scene, measure the enormity of the need for change and then follow up with possible methodologies and approaches. They can also play a prominent role in assisting senior management in comprehending the economic costs of future policy, permitting them to participate in regulatory policy discussions, deliberating with policy makers and stakeholders in an educated way, even perhaps allowing companies to work with public and private stakeholders to shape the regulatory environment.
- **External reporting:** The finance department should be involved in the production of external reports for their businesses.

Lusher (2012) reported that reviewing the big four accounting companies' websites and other accounting sites like IFAC, and the American Institute of Certified Public Accountants (AICPA), clearly shows that the accounting profession has taken an active role in addressing sustainability topics, and it might be expected to take the lead in developing the standards that will create a realistic sustainable green accounting process. It is accounting professionals who are equipped to provide vital guidance to help organisations achieve long-term financial, social and environmental accountability.

Water shortages may be expected to impact a company's bottom line. Since accountants could be seen as being responsible for all financial aspects of the business, the accounting profession may be the best equipped to take the lead in organisations to help scrutinise, report and manage all the issues facing the organisation around water scarcity.

2.15 GOVERNMENT'S ROLE

Ultimately, it is the responsibility of governments to manage water to ensure the delivery of basic services to its citizens, for economic growth and to maintain healthy water environments (Orr *et al*., 2009). They (2009) asserted that water scarcity presents a collection of risks to government that could impact on policy agendas regarding poverty and inequality, economic growth, food security and trade, health and conflict reduction.

Orr *et al*. (2009) also explained that government risks have usually been seen as relating to the failure to deliver water to people or to secure water for agricultural and industrial purposes. Hence there has to be a shared risk agenda between government and business, predominantly when business operations and supply chains exist in places where water availability and costs are subject to sudden change. Normally, quick fixes are the solution to sudden water shortages, that is, water trucks and inter-basin transfers, but these measures are expensive, and the fiscal burden of such interventions inevitably falls on taxpayers. It would be better for the government to plan competent responses to water scarcity, that is, long-term healthy water supply, strong demand management, a sound regulatory system and effective and flexible infrastructure (Orr *et al*., 2009).

One of South Africa's most innovative public and private sector partnerships is the Strategic Water Partners Network (SWPN-SA) whose main objective is to help close South Africa's 17% water demand-supply gap projected by 2030. The partnership is made up of the Department of Water Affairs (DWA) and representatives from the private sector according to the 2030 Water Resources Group (2030 WRG, 2013).

According to the 2030 WRG (2013), the SWPN-SA has been cooperatively developing pilot projects that have the possibility of positively affecting and closing South Africa's estimated water gap. In the first wave, one "National Impact Project" is in progress for each of its three work streams, namely water efficiency and leakage reduction, effluent and wastewater management, and agriculture and supply chain.

2.15.1 Water efficiency and leakage reduction

The "no drop" certification strategy and scorecard is aimed at incentivising and facilitating municipalities to reduce water leaks. "No drop" is a scorecard that

evaluates and ranks municipalities. Close to a quarter of the total water in municipal systems in South Africa is lost through physical leakage. This was the finding of a study by the Water Research Commission (2030 WRG, 2013).

2.15.2 Effluent and wastewater management

One of South Africa's largest coal-producing provinces, in terms of quantity, is Mpumalanga, estimated to account for 83% of South African coal production. It is also the third largest coal exporter in the world, with Witbank being the largest coal producer in Africa. The Department of Water Affairs' Reconciliation Strategy that looked at the water balance in the area indicates that the system is expected to run into a shortfall by 2017. Critical interventions are needed immediately to be effective by that time (2030 WRG, 2013).

The development and utilisation of water from mining operations on the Highveld Coalfields is one of the significant water reconciliation strategies that will be used to bring the system back into balance. According to an evaluation, which is part of the reconciliation strategy, mine water can contribute to closing the systemic water shortfall by as much as 11% (2030 WRG, 2013).

The 2030 WRG (2013) cited another example of collective action by the SWPN-SA in a joint venture between Anglo American and BHP Billiton. These companies have collaborated to build a desalination plant which, by using reverse osmosis, can remove 99% of salt before water used by the mines is discharged back into streams to ensure an acid-neutral effluent. More of these plants are planned. A vital point mentioned by CDP's Water Programme (2012) is that the Department of Water Affairs (DWA) is considering transferring the building and running of some wastewater treatment plants to the private sector.

2.15.3 Agriculture and supply chain

2030 WRG (2013) pointed out that in excess of 60% of the water consumed in South Africa is by the agricultural sector. Only 1.5% of land in South Africa is under irrigation, which produces 30% of the crop output. About 20% of the water withdrawn by the Vaalharts irrigation scheme, one of the country's largest and oldest irrigation schemes, is lost in distribution. Rehabilitating irrigation schemes like the Vaalharts offers water-saving opportunities, and a further saving of approximately 10% of water can be made through improved farming practices. Since water is a

shared resource, the best option might be a collective response to resolve and improve water issues in South Africa.

2.16 SUMMARY

This chapter reviewed the existing literature on the global and South African water crisis. It is evident that water shortages are not a new problem, and that as far back as the 1970s, overpopulation and water scarcity were already mentioned in the literature.

One of the main objectives of this study was to investigate if companies are showing a commitment to combating water scarcity in South Africa. Owing to this objective, the literature review identified and discussed the main drivers of water risk in South Africa, which was important for this study as South African listed companies were being assessed.

The types of risks that companies could face on account of water scarcity were discussed in detail, namely financial, physical, reputational and regulatory risks. Water risk responses were highlighted as these methods can be used to help companies mitigate water risks in their businesses. Such methods include hedging, insurance, water trading and water rights, reducing, recycling and reusing, and enhancing supply. A water risk response framework developed by Larson *et al*. (2012) was presented, which could assist organisations with water risk mitigation. In addition, best practice disclosure requirements were introduced as a framework for global sustainability reporting, which is imperative for companies.

Based on the literature relating to the latest developments in the measurement and disclosure of water risks, the Gauge™ was used in this study to assess the corporate water management practices of the selected companies.

The key finding of two studies, namely the CDP Water Programme of 2013 and 2008 Global Study, were reviewed and used to compare and contrast with the findings of this study.

Furthermore, the literature review evaluated various companies that are deemed to be pioneers in the field of corporate water management in order to understand what companies are doing to secure their businesses and local communities against water scarcity.

The manner in which water scarcity can change business models was investigated as water scarcity can encourage companies to become more innovative and take advantage of new business opportunities.

As it is imperative for a company to determine how much water is used in its direct operations and those of its suppliers, life cycle assessments and water footprinting concepts were outlined. Water footprinting is a method that measures the total volume of freshwater used to produce goods and services. Life cycle assessment is a systems analysis tool used to measure how much water is used throughout the entire value chain of a product.

The literature highlighted the role of the management accountant with regard to driving sustainability in an organisation and various areas in which management accountants can effect change were suggested. Lastly, the government's role in managing the country's water supply was discussed.

From the literature review it is evident that there are many risks relating to water scarcity, and how the role players can influence the way in which these risks are managed. However, owing to the enormity of the risk to business and human existence, water scarcity is an issue that cannot be borne only by government, the private sector or the individual – joint collaboration by all is required.

The next chapter discusses the research design, collection methods and data analysis that were employed to solve the research problem and establish if the objectives of this study were met.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 INTRODUCTION

In the previous chapter, a literature review was conducted on the existing literature on water scarcity. The purposed of this chapter according to Biggam (2008), is to provide the reader with clear and unambiguous information on the research method used, therefore if the reader so wishes, he or she could easily replicate the study. A qualitative approach was adopted in order to ascertain how and if the selected South African listed companies are measuring, managing, engaging with stakeholders and disclosing water-related risks.

This chapter describes the research design in section 3.3, and the methods used to collect and analyse the data are explained in sections 3.4 and 3.5. The limitations and problems experienced in conducting this study are discussed in section 3.6. The ethical considerations are dealt with in section 3.7, while section 3.8 provides a summary of the chapter.

3.2 CHAPTER LAYOUT

An illustration of the chapter layout is provided in figure 3.1.

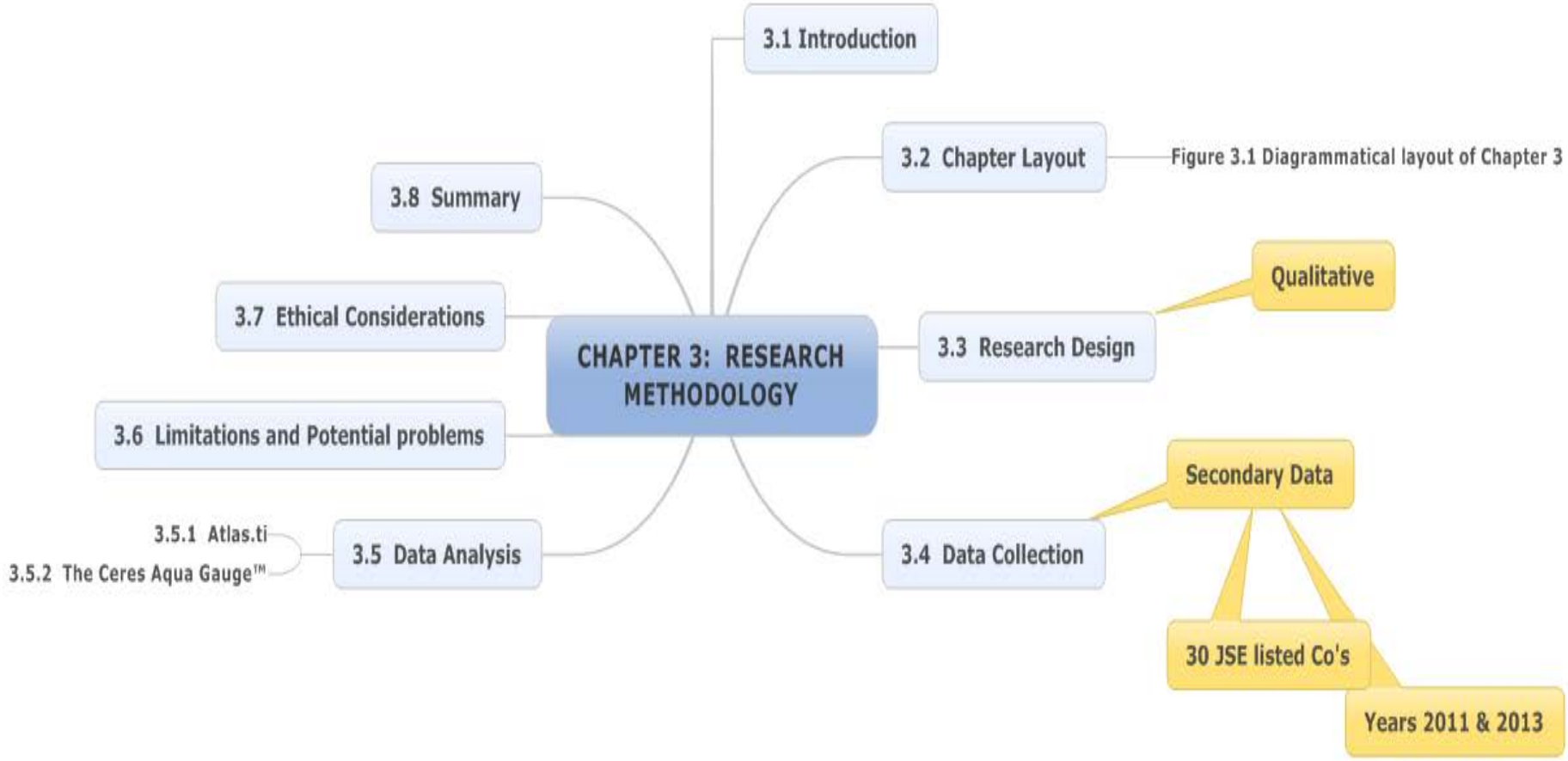

Figure 3.1: Diagrammatic layout of chapter 3

3.3 RESEARCH DESIGN

A qualitative approach was applied in this study. Qualitative research can involve studying things, attempting to make sense of or interpret them (Biggam, 2008).

This study wanted to determine if the selected South African listed companies recognised the importance of water in their organisations and if they showed a commitment to water scarcity in South Africa. The reason for this study is that South Africa is considered a water scarce country and companies are the biggest users of water, therefore they can make the biggest impact. A qualitative check list was developed from the activities described in the Gauge™. Data was downloaded in the form of sustainability/integrated/annual reports for the years 2011 and 2013 for the selected companies, Atlas.ti was used to analyse these reports, which was then used to complete the Gauge™.

3.4 DATA COLLECTION

Secondary data was collected by way of sustainability reports, which were downloaded off the websites of each of the selected companies. Where sustainability reports were not available, annual reports and integrated reports were downloaded.

This study chose the high water risk industries because they are the main users of water and could make the greatest impact by managing their water risks. These high water risk sectors were identified from a list compiled by the World Wide Fund for Nature and the DEG (2012), a German investment bank. This list includes 16 industries that are considered to have high water risk profiles. For the current study, the following eight industries were chosen: beverage; food producers; food retailers; chemicals; forestry and paper; mining; pharmaceuticals and biotechnology; and the oil and gas sector. Beverage, food producers and food retailers were chosen as agriculture is considered to be the primary user of water at 70%. Mining was chosen since South Africa is synonymous with mining, and there was a lot of media attention around acid mine drainage. The oil and gas sector was selected owing to public interest and media attention around fracking in South Africa. The chemical, forestry and paper, and pharmaceuticals and biotechnology industries were chosen as these sectors have large well-known companies operating in them. The aim of the study

was to investigate the contribution of the chosen companies to South Africa's water scarcity problems.

Only companies with a primary listing on the JSE were selected, as other countries have different laws and regulations regarding water. Every country has its own water scarcity problems and stakeholder pressures, and if the company has a primary listing in another country, this will have an impact and influence on the South African division.

The selection was made using the 7 September 2012, *Star* Newspaper Business Report, JSE share-price listing, because this report has a list of all JSE-listed companies grouped in their sectors. The researcher downloaded a report from the JSE called dual-listed companies in order to ascertain which companies have a primary listing on the JSE (JSE, 2012).

In the beverage sector, there were only four companies listed, namely Awethu Breweries, Capevin, Distell and SAB. Awethu Breweries does not have a website to disseminate information, and the researcher could not find any sustainability, annual or integrated reports on the internet. The researcher telephoned the company to verify that there was indeed no website, and this was confirmed. Since Awethu Breweries is a small company with a market capitalisation of R5.9 million, the researcher decided to exclude it from the study. Capevin Holdings Ltd is an investment holding company that holds as it sole asset an indirect interest in the Distell Group. Distell Holdings Ltd is included as it has a primary listing on the JSE, however as SAB has a secondary listing on the JSE, and should not have been included in this study, but to enable contrasts and comparisons to be made in the beverage sector SAB had to be included.

In the chemicals sector there are six companies, but only three have a primary listing on the JSE – these three were selected. The food producer sector, six companies were selected based on those with the highest market capitalisation. Under food retailers, the four companies that are household names having a primary listing on the JSE were selected. For forestry and paper, there are three companies with a primary listing, the two with the highest market capitalisation were selected.. The mining sector had 35 mining companies, the selection could have been made by determining the mineral being mined, the extraction process and whether the mining

process was water intensive, however the selection was made using the companies with the highest market capitalisation figures of those that have a primary listing on the JSE. This was done to keep the selection criteria consistent with that of the other sectors in this study. For oil and gas, there are three companies, with two that have a primary listing on the JSE, and these two were chosen. Pharmaceuticals and biotechnology, has four companies with a primary listing on the JSE, the two with the highest market capitalisation were selected.

The market capitalisation figures were obtained from the website (Sharedata, 2012). Current market capitalisation figures are available on this website for all JSE listed companies. The figures used for the mining companies were for 2011 as they were available when the selection was made in 2012 when the proposal was done

From each individual company's website, the company's sustainability reports were downloaded in portable document format (PDF). Where the selected companies did not have separate sustainability reports, annual or integrated annual reports were downloaded. Most company websites have a special area/tab for investors where these reports can be found, and the years 2011 and 2013 were downloaded.

It was concluded while downloading the selected companies reports, that, in 2011, companies started producing integrated annual reports. This is why 2011 was selected as the researcher believed that more information would be included in these reports regarding water and the risks associated with water scarcity. 2013 was selected in order to compare and observe any improvements. The researcher expected that a two year gap being 2011 and 2013 would show more of an improvement in the reporting regarding water scarcity than 2012.

The reason why the 2014 reports were not used was because all the data analysis was done during 2014, and not all the reports were available in 2014, especially companies with financial year ends at the end of December.

3.5 DATA ANALYSIS

All the downloaded company reports then had to be analysed for any information on water. Once the word "water" was found, it had to be evaluated to ascertain under which activity in the Gauge™ it fell. The data was analysed using Atlas.ti, which is discussed in the next subsection.

3.5.1 Atlas.ti

Data content was analysed using Atlas.ti. To manually analyse all the sustainability, integrated or annual reports for the selected companies looking for the word “water” would have taken too long, and the quality and reliability of the data analysis would not have been consistent or accurate if done manually.

Atlas.ti allows all the documents to be saved in one area, called a hermeneutic unit (HU). Large amounts of information can be compared and analysed. The analysis can be done by searching for key word/s in each document, and in this study, the key word was “water”.

Once all the company files had been loaded into Atlas.ti, the coding could commence. The codes were derived by taking key words and phrases from the Gauge™, and additional codes were created as the study progressed, where the codes from the Gauge™ did not describe the issue adequately in the sector or individual company. Each file was opened individually, and “control f” (control find) was used with the word “water”, so that all text that contained the word “water” could be analysed. The researcher had to read wherever the word water came up and decide under which code it could be categorised.

Once all the coding had been done, the codes were checked in Atlas.ti to see if any could be deleted if they were not used or if codes could be combined. For each company, for the years 2011 and 2013, an output was produced from Atlas.ti, which contained all the quotations around “water” found in the company reports. These output files were saved individually as MsWord documents. These MsWord documents were used to complete the Gauge™. The output files from Atlas.ti are on a memory stick included in this dissertation.

3.5.2 The Ceres Aqua Gauge™

The Gauge™ is a framework for assessing the corporate management of water risk. The Gauge™ uses an Excel spread sheet. It has a quick gauge that can be used as a first step. It has a short set of questions to evaluate if a company has applied fundamental water management practices. The quick gauge identifies companies that are worthy of further analysis. The Gauge™ uses terms that are consistent with other water tools and initiatives, like the Ceres Roadmap for Sustainability, the World Business Council for Sustainable Development, the CDP Water Survey, and the

United Nations, and that is one of the reasons why it was used in this study. For each company, two Gauges™ were used, one for 2011 and another for 2013, in order to make comparisons. The two Gauges™ by company are on a memory stick included in this dissertation.

The Gauge™ has four main activities, namely measurement, management, stakeholder engagement and disclosure. Measurement is split further into data gathering and risk assessment. Management is split under the headings, governance and accountability, policies and standards and business planning. For each activity, a company's progress can be accessed against the following four stages:

- **No action:** There is no evidence that the company has taken action in this area.
- **Initial steps:** Action has been taken, but the company is only beginning to implement the practice.
- **Advanced progress:** Action has been taken and good progress towards leading practice has been made, but gaps still exist in the company's approach.
- **Leading practice:** Action is consistent with what leading companies are doing and are aspiring to do in this area.

According to the descriptions for each activity in the Gauge™, the researcher went through each quotation for the respective companies and evaluated whether the company had no action, initial steps, advanced progress or leading practice.

3.6 LIMITATIONS AND POTENTIAL PROBLEMS

According to Kumar (2011), when using data from secondary sources there may be certain difficulties with the availability, format and quality of data. The researcher therefore needs to be vigilant.

The reports of some companies could not be downloaded from their respective websites as the link the company had created was lost or the file was not accessible. However, since these are listed companies on the JSE, the researcher was able to download them from other sites in the public domain.

Grouping families together in Atlas.ti took time, and the researcher found that it served no purpose for this research. It was thus easier to use the output by company by year in order to complete the Gauge™.

In question 1.6 in the Gauge™ – "Does the company identify and quantify water-related risk in direct operations"? – the Gauge™ asks whether the company uses third-party tools such as WBCSD's Global Water Tool, GEMI's Local Water Tool and so on. There was no mention of third-party tools in most of the company's reports. Hence the researcher did not look for third-party tools, but rather for whether the company did in fact identify water-related risks in direct operations.

For some of the questions asked in the Gauge™, specifically under governance and accountability, 2.1 and 2.2, no evidence could be found in a number of company's reports. However, from the various initiatives the companies were undertaking with regard to water management and the money being invested, the researcher came to the conclusion that there should be board oversight and senior executive involvement.

Regarding question 2.3 in the Gauge™, "Aligns public policy positions and lobbying with water stewardship goals", the researcher did not understand what was being asked here and had to email Ceres, the company, and ask someone for clarification on this activity. In an email conversation with Collins (2015), she explained what was being asked, namely, is the company "walking the talk"?

Question 3.1 in the Gauge™ asks the following: "Does the company engage with local communities on water-related issues at existing or potential new direct operations?" The question in fact contains the following two sub-questions: (1) Do the facility personnel of the company consult with communities in advance of expanding operations? (2) Do the facility personnel work on external water projects that benefit local communities? In all the selected companies, there was no evidence of the first part of the question. The researcher therefore only searched for the second part of the question in the companies' reports.

Regarding question 4.2 in the Gauge™ – "Does the company include water data and analysis in published financial filings/reports?" – the initial step is described as follows: the company complies with minimum financial disclosure requirements relevant to water. Since there are no specific guidelines in the Gauge™ on this

activity, the researcher used the G4 guidelines from the GRI, which is on page 49 of this study.

Regarding question 4.3 in the Gauge™ – "Does the company provide third-party assurance or audit water-related information"? – this activity was not easy to verify, unless the company specifically mentioned it in its reports. The reason for this is that it is not a legal requirement in South Africa to obtain assurance for sustainability reports from an appropriate and independent third party. This activity requires assurance on data relating to the company's direct water use/discharge and impacts, and performance relative to any goals relating to water. If a company mentioned that it had received ISO14001 accreditation, which is an environmental management system, in order to obtain this accreditation, an independent third party would have to conduct an audit, which would cover waste water management, soil and groundwater protection, water consumption, supply chain impacts and so on.

The CDP Water Programme for 2013 is a study that can be used as a benchmark. However, the sectors were grouped together, which made comparisons by sector difficult and impractical. For example, consumer discretionary and staples, combined the beverage sector, food producers and food retailers. Materials and energy, combined energy, forestry, mining and oil and gas sectors. Hence the figures from the overall study were used.

It was found that 30 companies was too many for this particular study, it was not necessary to have nine mining companies and six food producers. The researcher found that a number of companies had the same information in the 2011 and the 2013 reports. The researcher initially believed that the gap between 2011 and 2013 would be sufficient to see a greater improvement in the reporting of water scarcity and the risks associated with it. However it was concluded that the two year gap was not sufficient to see a vast difference.

If the researcher could not find the information pertaining to the activities in the Gauge™ in the company's reports, no evidence was selected. However, this does not mean the company does not undertake the activity, but merely that it does not disclose the activity.

3.7 ETHICAL CONSIDERATIONS

Ethical clearance for secondary data was obtained from the Ethical Clearance Committee in Unisa's College of Accounting Science (see appendix B).

3.8 SUMMARY

The research methods used to evaluate the 30 selected companies were discussed in this chapter. Information was collected by downloading the company's reports from the internet. Atlas.ti was used to evaluate the information in the reports, by searching for the word "water". The water-related issues were coded by the researcher according to the Gauge™ criteria, and outputs were extracted by company from Atlas.ti, for 2011 and 2013. The Gauge™ was completed using these outputs. The research findings are discussed in the next chapter.

CHAPTER 4: RESEARCH FINDINGS

4.1 INTRODUCTION

In the previous chapter, the research methodology used in this study was explained. This chapter discusses the research findings in order to establish if the objectives of this study were met. The main objectives of this study were to assess if the selected South African listed companies recognised the importance of water in their businesses and if these companies indicated a commitment to addressing water scarcity issues in South Africa. This research was also compared and contrasted with two studies that were discussed in chapter 2, the literature review, namely the South African CDP Water Programme of 2013 and 2008 Global Study.

The various categories and activities of the Gauge™ are described in section 4.3. In sections 4.4 to 4.11, the findings of the study are discussed by industrial sector, under the headings used in the Gauge™. The overall findings for all the sectors are evaluated in section 4.12, and the chapter concludes with a summary in section 4.13.

4.2 CHAPTER LAYOUT

An illustration of the chapter layout is provided in figure 4.1.

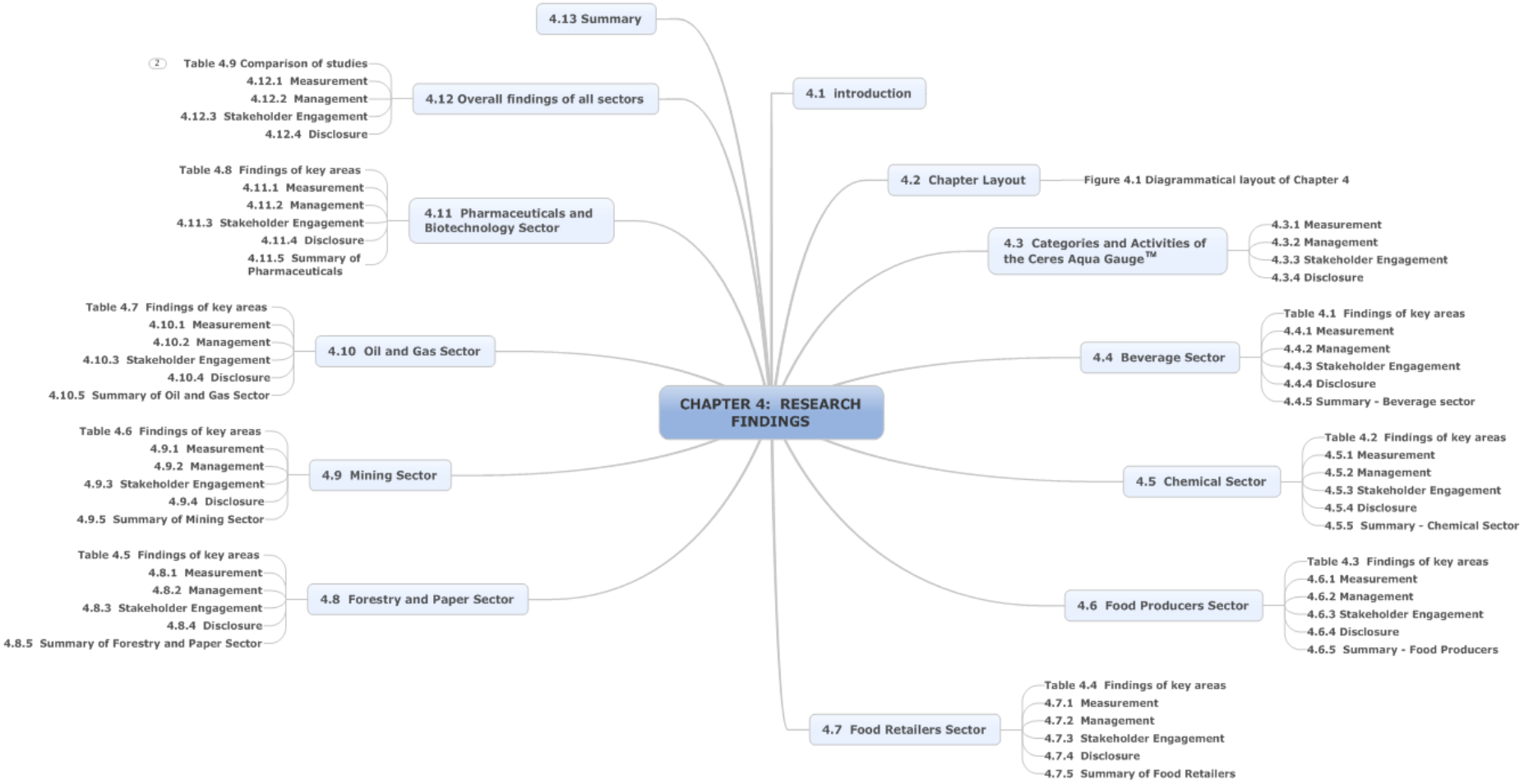

Figure 4.1: Diagrammatic layout of chapter 4

4.3 CATEGORIES AND ACTIVITIES OF THE GAUGE™

The discussion will be done by sector, under the main headings used in the Gauge™, namely measurement, management, stakeholder engagement and disclosure.

4.3.1 Measurement

Measurement is broken down into two subsections, namely data gathering (points 1.1–1.5); and risk assessment (points 1.6–1.7). As a first step, a company needs to collect and monitor data on water consumption/use and wastewater discharge. Data needs to be gathered on how and if the company's operations are impacting on direct water sources. Understanding and monitoring external risks that can affect the company's direct water sources, for example that climate change and regulatory changes relating to water needs to be evaluated. Another step in the external environment analysis is to collect and monitor the perceptions and concerns of the company's stakeholders relating to water issues. Another key data gathering activity is to collect and monitor the effectiveness of the company's suppliers' water management practices.

Once all this data has been collected, the next step is to assess the company's water-related risk exposure in direct operations and the supply chain. The Gauge™ asks, in points 1.6 and 1.7, if the company uses third-party tools to identify and quantify the risks. The current study established from the reports that not many of the selected companies use these third-party tools – hence this study only investigated if the company was identifying water-related risks in its direct business and its suppliers' businesses.

4.3.2 Management

Management is broken down into three subsections of water-related activities that a company needs to manage, namely governance and accountability (points 2.1–2.3), policies and standards (points 2.4–2.8) and business planning (points 2.9–2.11). Governance and accountability begin with board oversight and commitment with regard to water-related issues. Whether or not senior management is directly involved in the management of water-related issues, an effective way to drive better performance with regard to water is to establish links with financial incentives. The

last step under governance and accountability is to ascertain whether the company is “walking the talk”.

Setting policies and performance standards will assist the company to drive awareness of water. Does the company have a publicly available water policy? Does the company set goals and targets on water consumption and water discharge? Does the company develop plans to address watershed risks? Does the company evaluate its suppliers’ water management standards and are these set as criteria for procurement and contracting policies?

The last of the subsections is business planning. Does the company integrate water into its business planning and investment decision making? This is of vital importance when dealing with water issues in the long term. What impact does water have on the company’s products? Since all the companies in this study are considered highly water intensive, water plays a crucial role in product design and development. The last activity in this section involves the following question: Does the company identify water-related business opportunities? The focus here is on the following question: Are companies undertaking research and development to develop new products that can take advantage of water scarcity or new processes that produce benefits from better stewardship of water?

4.3.3 Stakeholder engagement

Stakeholder engagement comprises points 3.1 to 3.7. The Gauge™ has identified a number of stakeholders that the company should be engaging with regarding water issues, namely local communities, employees, suppliers, government, NGOs/community organisations, other industries/water users and customers. It was therefore necessary to ascertain how and to what extent the selected companies are engaging with their stakeholders, as the water scarcity problem affects everyone and all the stakeholders need to work together in order to lessen the effects of water shortages.

4.3.4 Disclosure

Disclosure comprises points 4.1 to 4.3. When research was being done on the Gauge™ it was found that it is imperative for companies to communicate what they are doing to manage water issues as this is an important way to build stakeholder relationships and to identify impacts and solutions for water-related issues.

Channels of communicating could, for example, include sustainability/integrated annual reports and the CDP Water Programme. The last point in the Gauge™ also asks if the water information disclosed has been verified by an independent third party.

After a thorough investigation of the 30 selected company reports, using the guidelines given in the Gauge™, the findings are set out below.

4.4 BEVERAGE SECTOR

The beverage sector included two companies, namely South African Breweries (SAB) and Distell.

The following legend was used for table 4.1:

LP = leading practice **AP = advanced progress**

IS = initial steps **NE = no evidence of action**

Table 4.1: Key areas of corporate water risk management identified in the Ceres Aqua Gauge™ – beverage sector: 2011 and 2013

	Company	Distell		SAB	
	Years	2011	2013	2011	2013
1. MEASUREMENT					
Data gathering					
1.1	Its own regulatory compliance, water use and discharge	AP	AP	LP	LP
1.2	Its own environmental and social impacts on direct water sources	AP	AP	AP	AP
1.3	External factors – such as economic and social development, impacts of other users, climate change and public policy – affecting direct water sources	AP	AP	LP	LP
1.4	Stakeholder perceptions and concerns relating to water issues	NE	NE	LP	LP
1.5	The effectiveness of suppliers' water management practices	NE	NE	LP	LP

	Company	Distell		SAB	
	Years	2011	2013	2011	2013
Risk assessment					
1.6	Water-related risks in direct operations	AP	AP	LP	LP
1.7	Water-related risks in the supply chain	NE	NE	LP	LP
2. MANAGEMENT					
Governance and accountability					
2.1	Clarifies board responsibilities for oversight of water	NE	NE	LP	LP
2.2	Involves senior executives directly in management of water-related issues	NE	NE	IS	IS
2.3	Aligns public policy positions and lobbying with water stewardship goals	IS	IS	LP	LP
Policies and standards					
2.4	Has a publicly available water policy and recognises the importance of water to the business	IS	IS	LP	LP
2.5	Sets performance standards and goals on water withdrawals/consumption for direct operations	AP	AP	LP	LP
2.6	Sets performance standards and goals on wastewater discharge for direct operations	NE	NE	NE	NE
2.7	Requires direct operations to develop plans to address local watershed risks	NE	NE	LP	LP
2.8	Addresses sustainable water management in supplier standards and codes, and in procurement and contracting practices.	NE	NE	LP	LP
Business planning					
2.9	Considers water in business planning and investment decision making	NE	NE	LP	LP

	Company	Distell		SAB	
	Years	**2011**	**2013**	**2011**	**2013**
2.10	Considers water in product design and development	NE	NE	LP	LP
2.11	Identifies water-related business opportunities	AP	AP	LP	LP
3. STAKEHOLDER ENGAGEMENT					
3.1	Requires engagement with local communities on water-related issues at existing or potential new operations	NE	NE	LP	LP
3.2	Engages with employees on water issues	NE	AP	IS	IS
3.3	Works with suppliers to help them improve water management	NE	NE	LP	LP
3.4	Engages openly with local, regional and national governments or regulators to advance sustainable water policies and management	AP	AP	LP	LP
3.5	Engages with NGOs and community organisations on water issues	NE	IS	LP	LP
3.6	Engages with other industries/companies/water users	AP	AP	LP	LP
3.7	Educates customers to help them minimise product impacts	NE	NE	AP	AP
4. DISCLOSURE					
4.1	Makes water-related information publicly available	IS	IS	LP	LP
4.2	Includes water data and analysis in published financial filings/reports	IS	IS	LP	LP
4.3	Provides third-party assurance or audits water-related information	NE	IS	IS	IS

4.4.1 Measurement

Measurement entails the collection and monitoring of data on a number of key areas in the business. The findings of the measurement activities for the two beverage companies, Distell and SAB, are presented in the subsections below.

4.4.1.1 Data gathering

This subsection assesses whether the company is collecting and monitoring information on water consumption and discharge, and if and how the company's production processes are affecting water sources. It then evaluates what external factors could affect the current and future water supply for the company. Then stakeholders' perceptions and the reputation of the company are monitored, and finally, how a company's water-intensive suppliers are managing water-related issues are also assessed.

1.1	Does the company collect and monitor data on the company's own regulatory compliance water use and discharge?

As indicated in table 4.1, advanced progress was selected for Distell because the company does collect and monitor water consumption and wastewater discharge for all direct operations.

Distell: All water usage at the different Distell sites is measured and recorded on a continual basis. To allow for improved management and reporting of water usage at a corporate level, Distell has developed a "site services" database to allow for recording of site and point-of-use water usage. This will allow for improved management of water per sub-sector of the sites to determine individual production unit water usage over time, as well as improved corporate monitoring and reporting against performance targets. *(**Source:** Distell Group Limited, 2011:1)*

Because SAB does monitor water consumption, water recycling and wastewater discharges for all direct operations, leading practice was selected.

1.2	Does the company collect and monitor data on the company's environmental and social impacts on direct water sources?

Distell does report on environmental impacts on water sources for all direct operations – hence advanced progress was selected. SAB does report on the environmental and social impacts of its direct operations, as well as the impact that its suppliers/farmers have on key sources, and advanced progress was thus selected. Leading practice was not selected for this activity as the description is that the company identifies all sources, and this could not be established from the reports.

1.3	Does the company collect and monitor data on external factors affecting direct waters sources?

Since Distell identifies and tracks a wide range of external factors affecting the current and future sustainability of water sources, advanced practice was selected.

Distell is dependent on water not just for the agricultural production of its raw materials, but also for its production processes. The importance of securing a reliable supply of water and ensuring that the quality of the water is protected is of critical importance as climate variability becomes more evident. Distell further recognises its obligation to use water responsibly, in particular with regard to the treatment and disposal of waste water. *(**Source:** Distell Group Limited, 2011:1)*

SAB identifies and tracks a wide range of external factors affecting the current and future sustainability of all water sources upon which the company's direct operations rely – hence leading practice was selected for SAB.

SAB: As water scarcity becomes more apparent, then so do the risks the business potentially faces – not least competition for resources, higher costs, the effect on water quality, and the possibility that water shortages will limit production.

*(**Source:** SAB Miller plc, WWF-UK, GIZ, 2011:5)*

Although changing climate is likely to lead to further water stress, competition for groundwater resources with urban areas are likely to pose even greater risks.

*(**Source:** SAB Miller plc, WWF-UK, GIZ 2011:10)*

1.4	Does the company collect and monitor data on stakeholder perceptions and concerns related to water issues?

There is no evidence of this activity in Distell's reports. Leading practice was selected for SAB as it was evident from the company's reports that it does monitor the attitudes and concerns of all key stakeholders on a proactive and systematic basis.

1.5	Does the company collect and monitor data on the effectiveness of its supplier's water management practices?

There is no evidence of this activity in Distell's reports for 2011 and 2013. However, leading practice was selected for SAB as it is evident from the company's reports that it works extensively with its suppliers on water management issues.

4.4.1.2 Risk assessment

Once the company has gathered all the necessary data, as per section 4.4.1.1, it is time to assess the company's risk exposure in both direct operations and the supply chain.

1.6	Does the company identify and quantify water-related risks in direct operations?

Distell does identify potential water risks, including scarcity, regulations, and so on, for all direct operations – hence advanced progress was selected. Distell does not quantify these risks.

Distell: There are a number of risks related to water management which will impact on Distell's activities: Changes in physical climate parameters (changes in temperature, mean (average) precipitation, precipitation patterns, and precipitation extremes (flooding and droughts). Changes in the water regulatory environment. Changes that may affect the company's reputation. *(**Source:** Distell Group Limited, 2011:1)*

For SAB, leading practice was selected as the company uses a combination of water risk tools to identify a range of current and future water risks.

SAB: Risks to SABMiller breweries and bottling plants have been evaluated using a combination of tools including watershed risk assessments, business water risk assessments, the World Business Council for Sustainable Development water risk

tool and the business's own water foot printing analyses. This enables each local business to assess its own specific risks and develop tailored strategies and action plans to address them. The development of the Water Futures Partnership has been an important factor in facilitating this process, particularly as many of the water-risks faced by SABMiller cannot be mitigated through solitary action alone and need to be tackled through collective action. *(**Source:** SAB Miller plc et al., 2011:5)*

Identifying actions to protect SAB Ltd.'s brewery at Polokwane against the risks relating to potential water scarcity and water quality arising from its location in the north of the country, which has been identified as being water stressed.

*(**Source:** SAB Miller plc et al., 2011:10)*

1.7 Does the company identify and quantify water-related risk in its supply chain?

There is no evidence of this activity in Distell's reports. Leading practice was selected for SAB as the company works with and gathers data on its suppliers located in current and future water-stressed areas in order to understand current and future water risks in the supply chain.

SAB: Priority areas for action

The findings of the water footprint assessment identified a number of potential water risks for SAB Ltd, of which two were agreed in February 2010 as priority areas to be addressed:

Understanding the vulnerabilities in SAB Ltd.'s agricultural supply chain, particularly the availability of water to hop farms located in the Gouritz watershed in the Western Cape – an area where water availability is precarious. These farms supply SAB Ltd.'s hop processing plant at George. Identifying actions to protect SAB Ltd.'s brewery at Polokwane against the risks relating to potential water scarcity and water quality arising from its location in the north of the country, which has been identified as being water stressed. *(**Source:** SAB Miller plc et al., 2011:10)*

4.4.2 Management

Management comprises three subcategories of activities, namely governance and accountability, policies and standards, and business planning, that a company should use to manage water-related issues. In the subsections below, the findings

of the management activities for the two beverage companies, Distell and SAB, are presented.

4.4.2.1 Governance and accountability

For a company to take water-related issues seriously there should be board-level commitment and senior management involvement. Even financial incentives could be linked to senior executives' sustainability scorecards. The last element in this subsection is to ensure that the company does "walk the talk" on water-related issues.

2.1 Does the company clarify board responsibility for oversight of water?

There is no evidence of this activity in Distell's reports. For SAB, there is no mention of this activity in its reports. However, after evaluating the company's reports, because of the emphasis on water, stakeholder engagement and the money being spent on water-related issues, leading practice was selected. The description of this step is that the board and board committee have formal and explicit oversight of all significant water-related issues and are regularly briefed on water-related risks and opportunities.

2.2 Are senior executives directly involved in the management of water-related issues?

There is no evidence of this activity in Distell's reports. Initial steps was selected for SAB as the company's executive management has explicit oversight over strategic water management. Advanced progress could not be selected as the researcher could find no evidence in SAB's reports that there are clear lines of responsibility between the executive management committee and responsible site-level personnel. Leading practice could also not be selected for SAB for this activity as there is no evidence that it has water as part of a sustainability scorecard or pays incentives to senior executives if water-related issues are achieved.

2.3	Does the company align public policy positions and lobbying with water stewardship goals – in other words, does the company "walk the talk"?

Distell does show in its reports that it "walks the talk" – hence the selection of initial steps.

Distell is committed to ensuring that all proposed activities comply with legal requirements. When plans for one of our waste water treatment facilities exceed thresholds specified in legislation, we undertake the stipulated Environmental Impact Assessments (EIA). *(**Source:** Distell Group Limited, 2013:53)*

Leading practice was selected for SAB as the company's public policy positions are consistent with both its own stated water stewardship goals and with internationally recognised water stewardship and development goals. SAB does work to encourage wider industry adoption of policy positions. SAB does "walk the talk".

4.4.2.2 Policies and standards

Setting policies, performance standards and goals, helps guide the company on water issues, raises awareness and helps measure and drive performance. However, the company needs to look further than just its own facilities in order to take into account its water sources and who it shares this water with. Lastly, the company's supply chain performance standards and goal setting are addressed in this subsection.

2.4	Does the company have a publicly available water policy and recognise the importance of water in the business?

Initial steps were selected for Distell as the company does have a water policy that is publicly available and it recognises the importance of water in the business.

It was found in the SAB report that it has an easily identifiable, publicly available policy on water, that sets out clear goals, the company does demonstrate a commitment to water, and it does recognise its responsibility to respect the human right to water and sanitation – hence leading practice was selected.

2.5	Does the company set performance standards and goals on water withdrawals/ consumption for direct operations?

Advanced progress was selected for Distell as the company has set water reduction targets for all its facilities.

Distell has developed a water use reduction target for 2018.

*(**Source:** Distell Group Limited, 2011:1)*

Leading practice was selected for SAB as the company has set business-wide targets for reductions in water consumption for all facilities and for facilities deemed high risk. The researcher could find no evidence that facilities deemed high risk have more aggressive targets.

SAB: In managing these risks, SABMiller has set stretching targets to reduce its own water consumption by 25% per hectolitre of beer brewed by 2015 and has adopted a clear water strategy based on the 5 "Rs" (pRotect, Reduce, Reuse, Recycle and Redistribute). As a result, the business has reduced its water consumption by 8% per hectolitre of beer since 2008, when the target was first set, and has established a consistent approach across all its operations to make sure that water-related risks are considered throughout the value chain. In doing this, SABMiller has invested significant resources and management time at both a local and group level to understand the challenges of water scarcity, and how these relate to the business.

*(**Source:** SAB Miller plc et al., 2011:5)*

2.6	Does the company set performance standards and goals on wastewater discharge for direct operations?

There is no evidence in Distell's reports that targets have been set for wastewater discharge, and no evidence of this activity in SAB's reports.

2.7	Does the company's direct operations develop plans to address local watershed risks?

For Distell, there is no evidence of this activity in 2011 or 2013. At SAB, however, all the company's facilities have developed source water protection plans that address critical external water risks. Plans to engage key local stakeholders and projects to

improve conditions for watersheds supplying affected facilities are put in place – hence the selection of leading practice.

SAB: In South Africa it was decided to focus on hops production in the Southern Cape due to the precarious nature of water availability in this area and the recent droughts. *(**Source:** The South African Breweries, WWF, GIZ, Federal Republic of Germany, 2013:6)*

2.8	Does the company address sustainable water management in supplier standards, and codes, and in procurement and contracting practices?

There is no evidence of this activity in Distell's reports for 2011 and 2013. Upon investigation, it was found that SAB does have a supplier code of conduct, but there is no specific mention of water. Leading practice was chosen for SAB as it is evident from the company's reports how it works with its key suppliers regarding water-related issues. From the definition of leading practice for this activity, the researcher could safely assume that SAB does deserve leading practice.

SAB: We are committed to engaging and working with our suppliers to continuously raise the sustainability standards in our supply chain. SAB requires that at a minimum, its suppliers comply with all relevant national environmental legislation and conduct business in a way which protects and preserves the environment.

Our accreditation process requires our suppliers to be transparent about their business and sustainability practices and to engage actively in our policies and processes with a combination of self-assessment questionnaires and possibly ethical and technical audits on site.

We build strong relationships with our key suppliers and we work with them to ensure that our global standards are continuously maintained.

*(**Source:** SAB Miller plc.,2015)*

4.4.2.3 Business planning

This subsection evaluates whether a company incorporates water into its long-term planning by including water risks and opportunities in investment decision making, budgeting, product design and development.

2.9 Does the company consider water in business planning and investment decision making?

Distell shows no evidence of this activity in its 2011 and 2013 reports. SAB, however, takes full consideration of water risks and opportunities, including well-founded values for water, in all major decisions, as well as systematic planning and budgeting. Water risks are integrated into the company's enterprise risk management system – leading practice was thus selected.

2.10 Does the company consider water in product design and development?

There is no evidence of this activity in Distell's reports for 2011 and 2013. However, leading practice was selected for SAB because the company's reports show that it has undertaken water footprints on all its products and has a programme and targets in place to reduce the water footprint of these products.

SAB: The net water footprint for SAB Ltd – SAB Miller's South African subsidiary – and its value chain is 511,100 million litres. The most significant part of this relates to water used to cultivate crops, which accounts for over 95% of the total footprint. The next most significant element relates to water used for brewing and soft drink production, accounting for the remaining 5%. *(**Source:** SAB Miller plc et al., 2011:10)*

2.11 Does the company identify water-related business opportunities?

According to the Gauge™, "*Business opportunities can include new products and processes, as well as the benefits from better stewardship of water either in reduced costs, enhanced brand equity, improved stakeholder relations or other business benefits."*

Distell is reporting on water-saving projects and is demonstrating improved water stewardship – hence advanced progress was selected.

Distell: Water saving projects that have been successfully implemented in 2010/11 which include:

At Nederburg, water from the separator is recycled and will save approximately 82,000 litres per month; and at Greenpark a cooling tower was installed on one pasteuriser which will result in potential savings of an average of 10,000l/hour. A further investigation is also under way to look at options for water recovery from the bottle washers at the pre-wash area. *(**Source:** Distell Group Limited, 2011:2)*

Leading practice was selected for SAB because it cites numerous examples of being a good water steward, improved stakeholder relations, and so on.

SAB was one of the first companies to undertake a detailed water footprinting study, which revealed that more than 85% of water used across the value chain of a beer rests in the agricultural supply chain. For SAB this relates primarily to the barley and hops we use to brew the good quality beers the company has become famous for.

*(**Source:** The South African Breweries et al., 2013:6)*

4.4.3 Stakeholder engagement

Engaging with stakeholders can help a company identify water-related risks and the impacts the company could have on water sources. It is important to understand what level of interest and power the company's stakeholders have as this helps decide how to deal with the different types of stakeholders. The Gauge™ has identified a number of stakeholders that should be engaged with in managing water issues, and these will be discussed next.

3.1	Does the company engage with local communities on water-related issues at existing or potential new direct operations?

There is no evidence of this activity in Distell's reports for 2011 and 2013. Leading practice was selected for SAB as the company is involved in external projects that contribute to local sustainable water management and/or access to water and sanitation.

SAB: We believe that only by understanding these local issues in detail and taking action in the communities which are at risk, can we protect water resources that are needed, brew beer, and sustain local people's livelihoods, ecosystems, and biodiversity. *(**Source:** SAB Miller plc et al., 2011:3)*

3.2 Does the company engage with employees on water issues?

There is no evidence of this in Distell's reports for 2011, but for 2013, advanced progress was selected as the company was shown to have a business-wide programme to engage and educate employees, which encourages them to take ownership of water issues.

Distell: A new contractor will engage with staff at site level to create further awareness around water. *(**Source:** Distell Group Limited, 2013:39**)***

As part of our internal war on waste programme, employees identified and were involved in the implementation of a new water recycling project at our Springs production facility. Hot water released from our pasteurisers, and previously discharged as municipal sewage, is now used again after it is pumped through cooling towers. We estimate that the amount of water saved as a result of this project is approximately 100,000 m^3 per annum. The team of employees who initiated this project were awarded first prize for their innovative proposal.

*(**Source:** Distell Group Limited, 2013:46)*

Initial steps were selected for SAB as the company mentions in its report "mobilise staff to save water." However, it does not give any details of how this would be done.

SAB: Water governance: keep water on SAB strategic and risk agenda, mobilise staff to save water. *(**Source:** The South African Breweries et al., 2013:5)*

3.3 Does the company work with suppliers to help them improve water management?

There is no evidence of this activity in Distell's reports for 2011 and 2013. SAB, however, actively advises and works with all key suppliers to improve water management. The company systematically works with or funds efforts to improve

the water management practices of water-intensive smaller suppliers – hence leading practice was selected for SAB.

SAB: One example of SAB water stewardship in the supply chain is where the company is working closely with small scale farmers in Taung, using soil moisture measurement to inform irrigation. Research is being undertaken with the University of the Free State to determine a crop factor for barley and develop a computerised irrigation strategy. Improved irrigation timing for barley will improve producer's sustainability by cutting costs of unnecessary irrigation water and electricity. This project is part of our commitment to understand and reduce the water risks facing SAB, our farmers and other stakeholders.

*(**Source:** The South African Breweries et al., 2013:5)*

3.4	Does the company engage openly with local, regional and national governments to advance sustainable water policies and management?

Distell has reported that it engages with government on water-related issues; engagement is transparent and is aimed at promoting sustainable water management – hence advanced progress was selected.

Distell: The Stellenbosch Municipality and Department of Water Affairs' Adopt a River programme. The programme aims to manage and improve the conditions of all the rivers within the jurisdiction of Stellenbosch Municipality. Stakeholders meet bimonthly to identify problem areas and discuss the progress of all ongoing improvement projects. The Krom River was recently cleared of litter and invasive alien trees and the focus has since shifted to the Plankenbrug River Bank's stability and the potential for erosion in both rivers has now been assessed. The river bank erosion identified at our Bergkelder facility is currently being assessed in more detail.

*(**Source:** Distell Group Limited, 2013:37)*

An investigation revealed that an underground effluent pipeline had ruptured and allowed water from the river to seep into the pipeline during high flow periods. We repaired the pipeline and worked closely with the local and district municipality to address the problem.

*(**Source:** Distell Group Limited, 2013:53)*

SAB engages with government on water-related public policy issues in areas deemed high risk, and engagement is in line with overall engagement strategy and is

aimed at promoting sustainable water management – hence the selection of leading practice for SAB.

SAB: To establish a local Water User Association (WUA) to provide robust and credible data about water resources in the area and create a monitoring programme that measures groundwater levels on hop farms. This will draw upon specialist support from the Water Futures Partnership, as well the Department of Water Affairs, catchment management agencies, and local municipalities. To address the risks at Polokwane brewery, the Water Futures Partnership is working closely with the local authorities and will jointly commission a study by an independent engineering consultant to assess the extent of these problems and prepare a plan setting out how the various issues might be addressed. The partnership will also approach other, private sector, organisations to contribute funding to these solutions.

*(**Source:** SAB Miller plc et al., 2011:11)*

3.5	Does the company engage with NGOs and community organisations on water issues?

There is no evidence of this activity in Distell's 2011 reports. For 2013, initial steps was selected for Distell as the company reports to be engaged with an NGO on an ad hoc basis to undertake specific actions on water.

Distell: All Distell farms are registered with the Scheme for the Integrated Production of Wine (IPW), a voluntary environmental sustainability scheme established by the South African wine industry in 1998. IPW aims to reduce industrial inputs into the farming (in this case vine-growing) system, reduce carbon emissions, and introduce a more integrated approach to pest management, waste water management, solid waste recycling, health and safety of workers and biodiversity conservation. The scheme requires accurate record keeping of all vineyard activities.

*(**Source:** Distell Group Limited, 2013:53)*

Leading practice was selected for SAB because the company engages in formal partnerships and specific projects with NGOs on water issues relevant to the company's core business/areas of operation.

SAB: Over the last two years, SABMiller, GIZ, and WWF have worked together in Peru, South Africa, Tanzania, and Ukraine, engaging local stakeholders to assess water risks shared by SABMiller's local businesses, and surrounding communities and environment. We are now in the process of finalising local action plans to work with a variety of stakeholders to help improve water security.

*(**Source:** SAB Miller plc et al., 2011:3)*

SABMiller is also a founding signatory of the UN CEO Water Mandate, an initiative to help companies develop, implement, and disclose sustainable water practices. Building on this high-level commitment, SABMiller has taken a much more granular approach, recognising that water issues can only really be addressed within the context of a local area and with detailed knowledge and insight about the contributing factors and risks found there. *(**Source:** SAB Miller plc et al., 2011:5)*

3.6 Does the company engage with other industries/companies/water users?

Advanced progress was selected for Distell as the company does support and participates in efforts to work within or across industries to address water risk.

Distell: Effluent disposal and treatment initiatives. Distell, in association with KWV and Brenn-O-Kem, constructed a dedicated effluent disposal facility in Worcester at a cost of R13.3 million. Solamoyo Processing Company (Proprietary) Limited, the joint-venture company involving the three parties, has secured a 30-year agreement with the Breede Valley municipality to operate the controlled evaporation plant at the municipal Klipvlak site. The facility has now been completed and will be operational from 1 July 2011. *(**Source:** Distell Group Limited, 2011:4)*

SAB actively leads efforts to work within or across industries to address water risks, and impacts. It shares water-related tools and non-commercially sensitive information with others in the industry or watersheds – hence leading practice was selected.

SAB: We believe this is probably the most comprehensive shared water risk analysis in the hops industry ever undertaken anywhere in the world. As such we will use this path-breaking study to ensure water stewardship for this vital crop. We also hope it will inspire and inform other corporations to take a water stewardship approach. Ultimately, this is a journey of shared learning.

*(**Source:** The South African Breweries et al., 2013:6)*

3.7 Does the company educate customers to help them minimise product impacts?

There is no evidence of this activity in Distell's reports for 2011 and 2013. Advanced progress was selected for SAB as the company provides information to all customers on how to save water. SAB has an active programme of education and engagement for its customers. Leading practice was not selected as there is no evidence in SAB's reports that it provides mechanisms for product take-back, for example, a drop-off for empty bottles and cans.

SAB: We are very excited that Dale Steyn is prepared to use his stature as the world's leading fast bowler to assist in making ordinary South Africans aware of the need to save water," says Andre Fourie, SAB Head Sustainable Development. As the SAB Water Ambassador, Dale will:

- use his passion for the environment to promote water saving at household level.
- use his profile as top cricketer to encourage the broad public and sports enthusiasts to take water stewardship more seriously.
- inspire other sport stars to take on the cause of water responsibility.
- encourage SAB staff, customers and consumers to minimise water use and re-use water where possible.
- remind political leaders of the importance of minimising waste of water at municipal level and investing the required infrastructure to ensure clean water into the future.

*(**Source:** The South African Breweries, 2011)*

4.4.4 Disclosure

The Gauge™ encourages companies to disclose their water-related information, both qualitative and quantitative, as this is a way for a company to communicate to its various stakeholders and to show transparency. The last step in this section is to

ask whether the water-related information has been verified by an independent third party. Below are the findings of the disclosure activities for the two beverage companies.

4.1 Does the company make water-related information publicly available?

Distell does disclose some qualitative and quantitative information relating to water in its reports – hence the selection of initial steps. Since SAB does disclose comprehensive and forward-looking qualitative and quantitative information relating to water, such as risks, opportunities, water use, discharge, impacts and so on, leading practice was selected.

4.2 Does the company include water data and analysis in published financial filings/reports?

The option of initial steps was selected for Distell as the company does provide minimum financial disclosure requirements relevant to water in its reports. SAB includes quantitative and quantitative data on water and discusses material water risks and opportunities in its annual reports, which demonstrates linkages to strategy, governance and financial performance – leading practice was thus selected for SAB.

4.3 Does the company provide third-party assurance or audit's water-related information?

For Distell, in 2011, no evidence of this is reported, but in 2013, Distell reported that seven sites were fully ISO 14001 certified. In order for Distell to be ISO 14001 accredited, audits would need to be conducted by an external company – hence the selection of initial steps.

Distell: Seven sites fully ISO 14001 certified while three more sites are advancing well towards certification. *(**Source:** Distell Group Limited, 2013:5)*

At SAB there is no evidence in the company's reports that water information is audited by an external party. However, all of SAB's breweries are also ISO 14001 accredited, and as mentioned above, in order to obtain and keep this accreditation, audits would have to be conducted by an external company – hence the selection of initial steps for SAB.

4.4.5 Summary of the beverage sector

As indicated in table 4.1, leading practice was selected for most of SAB's activities. SAB is in a league of its own when it comes to water in the business environment. SAB was selected for this study so that Distell was not the only company in the beverage sector. SAB is what other companies should strive to be like when it comes to commitment to water in their business. This explains why, in the literature review, SAB was described as being one of the pioneers.

There are a number of areas in the Gauge™ where Distell needs to improve. It does not report performing any of the activities relating to its suppliers. The company does not show any evidence in a number of areas in the management category. It has advanced progress selected for a number of areas in the measurement category. Distell does not report to engage with local communities in the areas in which the company operates.

The 2013 CDP Water Programme was difficult to compare with as the beverage, food producers and food retailers sectors were combined. In the 2008 Global Study, ten beverage companies were selected for the survey, of which SAB was one. The study mentions that SAB was the only company to report an estimate of water use which is embedded in the company's supply chain. This study found SAB to have leading practice wherever supplier activities were required. The 2008 Global Study found the beverage sector to have the second best water-risk disclosure.

4.5 CHEMICAL SECTOR

The chemical sector included three companies, namely AECI, Afrox and Omnia.

The following legend is used for table 4.2:

LP = leading practice **AP = advanced progress**

IS = initial steps **NE = no evidence of action**

Table 4.2: Key areas of corporate water risk management identified in the Ceres Aqua Gauge™ – chemical sector: 2011 and 2013

	Company	AECI		Afrox		Omnia	
	Years	2011	2013	2011	2013	2011	2013
1. MEASUREMENT							
Data gathering							
1.1	Its own regulatory compliance, water use and discharge	AP	AP	NE	IS	AP	AP
1.2	Its own environmental and social impacts on direct water sources	IS	IS	NE	IS	AP	AP
1.3	External factors – such as economic and social development, impacts of other users, climate change and public policy – affecting direct water sources	NE	NE	NE	IS	AP	AP
1.4	Stakeholder perceptions and concerns relating to water issues	NE	NE	NE	NE	NE	NE
1.5	The effectiveness of suppliers' water management practices	NE	NE	NE	NE	NE	NE
Risk assessment							
1.6	Water-related risks in direct operations	NE	IS	NE	NE	NE	NE
1.7	Water-related risks in the supply chain	NE	NE	NE	NE	NE	NE

	Company	AECI		Afrox		Omnia	
	Years	2011	2013	2011	2013	2011	2013
2. MANAGEMENT							
Governance and accountability							
2.1	Clarifies board responsibilities for oversight of water	NE	NE	NE	NE	NE	NE
2.2	Involves senior executives directly in the management of water-related issues	NE	NE	NE	NE	NE	NE
2.3	Aligns public policy positions and lobbying with water stewardship goals	NE	NE	NE	NE	NE	NE
Policies and standards							
2.4	Has a publicly available water policy and recognises the importance of water to the business	IS	IS	NE	NE	NE	NE
2.5	Sets performance standards and goals on water withdrawals/consumption for direct operations	NE	NE	NE	NE	NE	NE
2.6	Sets performance standards and goals on wastewater discharge for direct operations	NE	NE	NE	NE	NE	NE
2.7	Requires direct operations to develop plans to address local watershed risks	IS	IS	NE	NE	AP	AP
2.8	Addresses sustainable water management in supplier standards and codes, and in procurement and contracting practices	NE	NE	NE	NE	NE	NE
Business planning							
2.9	Considers water in business planning and investment decision making	NE	NE	NE	NE	LP	LP
2.10	Considers water in product design and development	NE	NE	NE	NE	NE	NE
2.11	Identifies water-related business opportunities	NE	LP	NE	NE	LP	LP

	Company	AECI		Afrox		Omnia	
	Years	2011	2013	2011	2013	2011	2013
3. STAKEHOLDER ENGAGEMENT							
3.1	Requires engagement with local communities on water-related issues at existing or potential new operations	NE	IS	NE	NE	NE	NE
3.2	Engages with employees on water issues	NE	NE	NE	NE	NE	NE
3.3	Works with suppliers to help them improve water management	NE	NE	NE	NE	NE	NE
3.4	Engages openly with local, regional and national governments or regulators to advance sustainable water policies and management	IS	IS	NE	NE	NE	NE
3.5	Engages with NGOs and community organisations on water issues	NE	IS	NE	NE	NE	NE
3.6	Engages with other industries/companies/water users	NE	NE	NE	NE	AP	AP
3.7	Educates customers to help them minimise product impacts	NE	NE	NE	NE	AP	AP
4. DISCLOSURE							
4.1	Makes water-related information publicly available	IS	IS	NE	NE	IS	IS
4.2	Includes water data and analysis in published financial filings/reports	IS	IS	NE	NE	IS	IS
4.3	Provides third-party assurance or audits water-related information	NE	NE	NE	NE	NE	NE

4.5.1 Measurement

Measurement entails the collection and monitoring of data on a number of key areas in the business. Below are the findings of the measurement activities for the three chemical companies, AECI, Afrox and Omnia.

4.5.1.1 Data gathering

This subsection assesses whether the company is collecting and monitoring information on water consumption and discharge, and if and how the company's production processes are affecting water sources. It then evaluates what external factors could affect the current and future water supply for the company. Then stakeholders' perceptions and the reputation of the company are monitored, and finally, how the company's water- intensive suppliers are managing water-related issues, are also assessed.

1.1	Does the company collect and monitor data on the company's own regulatory compliance, water use and discharge?

As indicated in table 4.2, advanced progress was selected for AECI as the company does monitor data on water consumption and wastewater discharge for all direct operations.

AECI: As stated in last year's Annual Report, there was a substantial increase in the Group's water usage in 2010. The main reason for this was the inclusion, for the first time, of environmental performance figures for AEL's operations outside of Modderfontein. It is pleasing to report that the Group's water consumption for 2011 was 3% lower at 4,748,000 m^3 2010: 4,870,000 m^3. This reduction was due to a range of efficiency improvements in AEL and the specialty chemicals cluster. Heartland and STF recorded small increases in water consumption related to increased production rates. ***(Source:** AECI, 2011:105)*

Afrox did not report on water consumption and discharge in 2011, and for 2013, initial steps was selected as Afrox does give water consumption figures, but not discharge figures, and it is not clear if it is for all direct operations. Furthermore, Omnia collects and monitors data on water consumption and water discharge on all direct operations – hence advanced progress was selected.

1.2	Does the company collect and monitor data on the company's environmental and social impacts on direct water sources?

Initial steps was selected for AECI as the company does report on contaminations, although it is not clear if some or all direct operations are being reported. No evidence was selected for Afrox in 2011, and initial steps in 2013.

AECI: During a heavy downpour, contaminated storm water from Resinkem's operations at Umbogintwini was inadvertently released into the Umbogintwini Industrial Complex's storm water system; a third party contractor was moving Crest's products from Durban to Cape Town. The driver suffered a heart attack and lost control of the vehicle, which ploughed into the Orange River; at AEL, Modderfontein, approximately 10 tonnes of nitric acid overflowed from a tank during pumping operations. Some of this acid ran into the effluent system where it was neutralised.

Regrettably, one serious environmental incident occurred when approximately 25 tonnes of ammonium nitrate solution (ANS) were discharged on the ground at a Zambian operation due to a faulty discharge valve on a tanker. The majority of the ANS was cleaned up successfully. Between two (2) tonnes and four (4) tonnes entered a nearby water course. There was no obvious damage to the aquatic environment and no complaints from downstream areas were received. The rest of the discharged product crystallised, was collected, and sold as fertilizer.

*(**Source:** AECI**,** 2013:42)*

Since Omnia does report on environmental impacts on water sources for all direct operations, advanced progress was selected.

Omnia: A project to investigate the nature and extent of pollution that was caused by the leaking of the existing storm water containment ponds of the Springs facility is in progress. Consultants were appointed to conduct a 3D characterisation of the pollution which will assist in the recommendation of remediation measures that are required. *(**Source:** Omnia, 2011:67)*

1.3	Does the company collect and monitor data on external factors affecting direct waters sources?

In 2011, there was no evidence of this in AECI's and Afrox's reports on this activity. Since Omnia identifies and tracks a wide range of external factors affecting current and future sustainability of water sources, advanced progress was selected.

Omnia: Water scarcity is an alarming global problem that is becoming urgent. Over the last century, water use has grown at more than twice the rate of population increase and an increasing number of regions are chronically short of water. About 1.2 billion people live in areas of physical scarcity, and 500 million people are approaching this situation. Another 1.6 billion people, or almost one quarter of the world's population, face economic water shortages due to countries not having the necessary infrastructure to take water from rivers and aquifers.

The deterioration of water quality is an increasing global problem caused by inadequate environmental practices. *(**Source:** Omnia, 2013:10)*

1.4	Does the company collect and monitor data on stakeholder perceptions and concerns relating to water issues?

In its 2011 and 2013 reports, AECI states that it is under close public scrutiny, but there is no evidence that it collects and monitors its stakeholders' perceptions or concerns. There is no evidence of this activity for both Afrox and Omnia.

AECI: The heavy industrial zoning of the site implies close public scrutiny of the conduct of operations and their environmental impacts in terms of liquid effluent, gaseous emissions, water usage and risk profiles. *(**Source:** AECI, 2013:51)*

1.5	Does the company collect and monitor data on the effectiveness of its supplier's water management practices?

There is no evidence of this activity in any of the three selected chemical companies' reports for 2011 and 2013.

4.5.1.2 Risk assessment

Once the company has gathered all the necessary data as per the previous section, it is time to assess its risk exposure in both direct operations and the supply chain.

1.6 Does the company identify and quantify water-related risks in direct operations?

There is no evidence in AECI's report for 2011 of water-related risk being identified, but in the 2013 report, the water use licence for one of its sites is mentioned – hence the selection of initial steps. There is no evidence that Afrox and Omnia identify water-related risks in their direct operations.

AECI: Most operational risks identified as being material in 2012, such as an Integrated Water Use Licence for the Modderfontein site. *(**Source:** AECI, 2013:9)*

1.7 Does the company identify and quantify water-related risk in its supply chain?

All three chemical companies show no evidence in their reports of identifying and quantifying water-related risk in their supply chains.

4.5.2 Management

Management comprises three subcategories of activities, namely governance and accountability, policies and standards, and business planning that a company should use to manage water-related issues. Below are the findings of the management activities for the three chemical companies, AECI, Afrox and Omnia.

4.5.2.1 Governance and accountability

For a company to take water-related issues seriously, there should be board-level commitment and senior management involvement, and even financial incentives could be linked to senior executives' sustainability scorecards. The last element in this subsection is to ensure that the company does "walk the talk" on water-related issues.

2.1 Does the company clarify board responsibility for oversight of water?

There is no evidence of this activity in AECI's and Afrox's reports. The nature of Omnia's business is to provide solutions to other industries and companies on water treatment, but there is no evidence that the board has oversight of water issues in Omnia's own business.

2.2	Are senior executives directly involved in the management of water-related issues?

There is no evidence of this activity in AECI's, Afrox's and Omnia's reports.

2.3	Does the company align public policy positions and lobbying with water stewardship goals, in other words, does the company "walk the talk".

There is no evidence of this activity in AECI's, Afrox's and Omnia's reports for 2011 and 2013.

4.5.2.2 Policies and standards

Setting policies, performance standards and goals helps guide the company on water issues, raises awareness and helps measure and drive performance. The company needs to look further than its own facilities, and take into account its water sources and who it shares this water with. Lastly, the company's supply chain performance standards and goal setting are addressed in this subsection.

2.4	Does the company have a publicly available water policy and recognise the importance of water in the business?

Initial steps was selected for AECI as the company does report on water-related issues, and it recognises the importance of water in the business. In the company's 2011 report it mentions that it is in the process of developing a group water policy and strategy.

AECI: Development of a Group Water Policy and Strategy by end 2012.

*(**Source:** AECI, 2011:101)*

There is no evidence of this activity in Afrox's and Omnia's reports for 2011 and 2013.

2.5	Does the company set performance standards and goals on water withdrawals/ consumption for direct operations?

Although AECI reports on water consumption and compares year-on-year results, there is no evidence that the company has set performance standards and goals. There is no evidence of this activity in Afrox's and Omnia's reports.

2.6	Does the company set performance standards and goals on wastewater discharge for direct operations?

There is no evidence of this activity in AECI's, Afrox's and Omnia's reports.

2.7	Does the company's direct operations develop plans to address local watershed risks?

AECI reported in 2011 to have implemented a "Clean up the River" campaign, but there is no mention in the company's reports of the status of or initiatives undertaken in this campaign in the 2013 report – initial steps was thus selected as the company has plans in place to improve conditions for the watersheds supplying or affected by each facility.

AECI: Identifies issues of concern and prioritises these to prevent further deterioration of the existing water quality in river courses impacted by AECI's activities. Implement "Clean up the River" campaigns. ***(Source:** AECI, 2011:101)*

There is no evidence of this activity in Afrox's reports for 2011 and 2013. Advanced progress was selected for Omnia, as the company has developed source water protection plans for all major facilities.

Omnia: Important projects that were commissioned to improve the water, waste and effluent monitoring within our Chemicals division can be summarised as follows:

- A project to investigate the nature and extent of pollution that was caused by the leaking of the existing storm water containment ponds of the Springs facility is in progress. Consultants were appointed to conduct a 3D characterisation of the pollution which will assist in the recommendation of remediation measures that are required.
- A storm water management plan and associated infrastructure which will replace the existing storm water management system of the Springs site has been developed. The new storm water management plan for the site will be based on the separation of clean water and potentially contaminated storm water on the site as well as the containment of storm water and effluent at the source.
- Consultants have been appointed to investigate the nature and extent of

historical pollution underlying the old acid tank farm at the Wadeville facility. A remediation plan will be submitted for authorisation by the authorities once the study has been completed.

- A project involving the installation of a groundwater monitoring plan and associated infrastructure as well as the construction of containment bunds in certain areas has been commissioned at the Durban facility.
- The new effluent treatment plant at the Zetachem Mobeni site has been commissioned.
- The water monitoring systems of the Wadeville and Springs sites have been upgraded. *(**Source:** Omnia, 2011:67)*

2.8 Does the company address sustainable water management in supplier standards and codes, and in procurement and contracting practices?

There is no evidence of this activity in any of the three selected chemical companies' reports for 2011 and 2013.

4.5.2.3 Business planning

This subsection evaluates whether a company incorporates water in its long-term planning by including water risks and opportunities in investment decision making, budgeting, product design and development.

2.9 Does the company consider water in business planning and investment decision making?

There was no evidence of this activity in AECI's and Afrox's reports for 2011 and 2013.

Owing to the fact that Omnia is in the water treatment business, water is considered in business planning and investment decision making, the company is aware of water scarcity and water quality problems and makes strategic expansion decisions based on water. Leading practice was thus selected as the company fully considers water risks and opportunities in all major decisions, and for systematic planning and budgeting.

Omnia: Protea Chemicals and Nalco, the world leader in water treatment and process improvement based in Illinois, USA, have formed an associate, Nalco Africa, that will provide an extensive range of water and process treatment services to the African market. *(**Source:** Omnia, 2011:12)*

2.10 Does the company consider water in product design and development?

There is no evidence of this activity in AECI's and Afrox's reports for 2011 and 2013. Omnia does not show in its reports that the company considers water in product design and development, by conducting water footprint assessments. The company's products treat water, but it is not reported if these products consider water in the product design.

2.11 Does the company identify water-related business opportunities?

According to the Gauge™, "*Business opportunities can include new products and processes, as well as the benefits from better stewardship of water either in reduced costs, enhanced brand equity, improved stakeholder relations or other business benefits."*

There is no evidence of this activity in AECI's reports for 2011, and Afrox's reports for 2011 and 2013. Leading practice was selected for AECI for 2013 as the company had acquired a water treatment business, showing that it has a clear strategy for identifying, funding and launching water-related opportunities. AECI has also developed a group-wide environmental framework, showing improved water stewardship.

AECI: The Group concluded an agreement with Clariant to acquire its water treatment business in Africa and the related South African assets. The acquisition will strengthen AECI's footprint in the water treatment business on the continent and will also provide additional scope for its South African business in the water treatment sector. *(**Source:** AECI, 2013:39)*

The acquisition, which is subject to certain conditions precedent including approval by the relevant competition authorities, is in line with our strategy to extend our presence in Africa in the provision of water treatment solutions for a broad range of industrial and municipal customers. *(**Source:** AECI, 2013:34)*

A significant development in AECI's management approach during 2011 was the introduction of Green Gauge, a framework of Group-wide environmental objectives and targets. The first phase of this comprises resource efficiency assessments. Water, waste, and energy efficiency assessments were conducted at prioritised Group operating sites. The objective is to achieve reductions in waste disposal as well as water and energy consumption so as to reduce the environmental impact of operations while making a positive contribution to the Group's cost base. For each site, the assessments will be used to develop:

- a water conservation ("WC") and water demand management ("WDM") plan;
- a waste inventory;
- a waste management plan ("WMP") (incorporating the waste hierarchy); and
- an energy reduction action plan ("ERP"). *(**Source:** AECI, 2011:100)*

Since Omnia has a clear strategy for identifying, funding and launching water-related opportunities and sets goals relating to revenue or profit from new business opportunities, leading practice was selected.

Omnia: Research is under way on the growth of algae to clean contaminated water and possible use as biofuel. *(**Source:** Omnia,2011:12)*

Zetachem undertook a significant modernisation of a key monomer production reactor to ensure its continued ability to provide critical potable water clarification chemicals to the South African market. The treatment of acid mine drainage provides a significant growth opportunity for Protea Chemicals. *(**Source:** Omnia, 2011:13)*

4.5.3 Stakeholder engagement

Engaging with stakeholders can help a company identify water-related risks and the impact the company could have on water sources. It is important to understand what level of interest and power the company's stakeholders have, for that will help decide how to deal with the different types of stakeholders. The Gauge™ has identified a number of stakeholders that should be engaged with in managing water issues. These will be discussed next.

3.1	Does the company engage with local communities on water-related issues at existing or potential new direct operations?

There is no evidence of this activity in AECI's report for 2011, and Afrox's and Omnia's reports for 2011 and 2013. Initial steps was thus selected for AECI in 2013, as there was mention of two water projects that would benefit the local community.

AECI: Specific stakeholder and community liaison forums that deal with inter alia water quality (including discharges to sea). *(**Source:** AECI, 2013:14)*

Water For Life programme which aims to provide education and awareness on issues of water conservation and strengthen efforts to provide potable water, especially to rural communities. It is expected that more than R10 million will be invested in 2014 – a pilot year that will test the robustness of the Trust's strategy and objectives and implementation thereof. *(**Source:** AECI, 2013:79)*

3.2	Does the company engage with employees on water issues?

There is no evidence of this activity in AECI's, Afrox's and Omnia's reports for 2011 and 2013. Since Omnia is in the business of water treatment, it cannot be assumed that employees know about water issues – hence no evidence was selected as this was not reported.

3.3	Does the company work with suppliers to help them improve water management?

There is no evidence of this activity in AECI's, Afrox's and Omnia's reports for 2011 and 2013.

3.4	Does the company engage openly with local, regional and national governments to advance sustainable water policies and management?

There is no evidence of this activity in Afrox's and Omnia's reports for 2011 and 2013. However, AECI engages with the DWA on water policy aimed at promoting sustainable water management – hence the selection of initial steps.

AECI: During 2011 the Department of Water Affairs ("DWA") issued a new Water Use Licence for the Group's operations at the Modderfontein site. This site had been operating for some years under a draft Water Use Licence. The new Licence was issued with stringent conditions which came into immediate effect upon issue. The site is not able to meet all of these conditions in the short term in line with the provisions of the Licence and negotiations continue with the DWA in a spirit of cooperation in a bid to resolve this situation in a mutually satisfactory manner, whilst efforts to bring the site into compliance are progressed. ***(Source:** AECI, 2011:26)*

3.5 Does the company engage with NGOs and community organisations on water issues?

There is no evidence of this activity in AECI's report for 2011, and Afrox's and Omnia's reports for 2011 and 2013. AECI reported in 2013 that it participated in the CDP Water Programme. Initial steps was chosen as the company engages with NGOs on an ad hoc basis to perform specific actions on water.

3.6 Does the company engage with other industries/companies/water users?

There is no evidence of this activity in AECI's and Afrox's reports for 2011 and 2013. Because Omnia's products treat water, the company would obviously deal with other industries/companies/water users. Advanced progress was chosen, as Omnia works within or across industries to address water risks and impacts, and the company needs to engage with other industries in order to sell its products. Leading practice was not selected because part of this step's description is that the company should share water-related tools and information with others in the industry. Omnia does this because, it is selling a product, but the sharing is not free.

3.7 Does the company educate customers to help them minimise product impacts?

There is no evidence of this activity in AECI's and Afrox's reports for 2011 and 2013. Advanced progress was selected for Omnia as it was found that the company does educate its customers on the benefits of effective water management.

4.5.4 Disclosure

The Gauge™ encourages companies to disclose their water-related information, both qualitative and quantitative, as this is a way for a company to communicate to its various stakeholders and to show transparency. The last step in this section is to ask whether the water-related information has been verified by an independent third party. Below are the findings of the disclosure activities for the three chemical companies, AECI, Afrox and Omnia.

4.1 Does the company make water-related information publicly available?

Since AECI and Omnia do disclose some qualitative and quantitative information relating to water in their reports, initial steps was selected. Afrox reported in 2013 on this (points 1.1–1.3), but for all the rest, there is no evidence.

4.2 Does the company include water data and analysis in published financial filings/reports?

Initial steps was selected for AECI and Omnia as the companies do provide minimum financial disclosure requirements relevant to water. Afrox does not include water data in its published financial reports

4.3 Does the company provide third-party assurance or audit water-related information?

There is no evidence in either years, 2011 or 2013, that the three selected companies provide third-party assurance or audit water-related information.

4.5.5 Summary of the chemical sector

Afrox is a weak performer, according to the Gauge™, and this company does not show a commitment to water in the business, or that water is important to the business. Out of AECI and Omnia, Omnia shows better water stewardship, with two leading practice activities being selected – that is, for considering water in business planning and investment decisions and identifying water-related business opportunities. Since Omnia manufactures fertiliser, farmers would be a major customer of the company. Omnia can make a huge impact in the agricultural sector by educating customers, and working with government and NGOs. No evidence was selected for engagement with government and NGOs, and as indicated in table 4.2, there are many activities that Omnia needs improve.

AECI manufactures explosives and chemicals, and there are many activities in the Gauge™ where no evidence was selected, such as the company not working with its suppliers or engaging with its stakeholders. In light of the fact that this sector is considered highly water intensive, the results of the three companies do not show that water is considered important to their businesses, and these companies are not showing a commitment to water scarcity in South Africa.

The 2013 CDP Water Programme was difficult to compare, as the chemical sector was combined with the energy, mining and oil and gas sectors. The 2008 Global Study included 15 chemical companies, but AECI, Afrox, and Omnia were excluded. The study reported that the chemical sector showed weak water-risk disclosure as a whole, and none of the 15 companies reported engaging with their suppliers, which confirms this research finding for this sector.

4.6 FOOD PRODUCERS SECTOR

The food producers sector includes, AVI, Illovo Sugar, Oceana, Pioneer Foods, Tiger Brands, and Tongaat Hulett.

The following legend was used for table 4.3:

LP = leading practice **AP = advanced progress**

IS = initial steps **NE = no evidence of action**

Table 4.3: Key areas of corporate water risk management identified in the Ceres Aqua Gauge™ – Food producers sector: 2011 and 2013

	Company	AVI		Illovo Sugar		Oceana		Pioneer Foods		Tiger Brands		Tongaat Hulett	
	Years	2011	2013	2011	2013	2011	2013	2011	2013	2011	2013	2011	2013
1. MEASUREMENT													
Data gathering													
1.1	Its own regulatory compliance, water use and discharge	IS	IS	IS	IS	IS	IS	AP	AP	NE	AP	AP	AP
1.2	Its own environmental and social impacts on direct water sources	NE	NE	AP	AP	IS	IS	NE	NE	NE	NE	IS	IS
1.3	External factors – such as economic and social development, impacts of other users, climate change and public policy – affecting direct water sources	NE	NE	IS	IS	AP	AP	IS	IS	IS	IS	AP	AP
1.4	Stakeholder perceptions and concerns relating to water issues	NE	NE	NE	NE	NE	IS	NE	NE	NE	NE	NE	NE

	Company	AVI		Illovo Sugar		Oceana		Pioneer Foods		Tiger Brands		Tongaat Hulett	
	Years	**2011**	**2013**	**2011**	**2013**	**2011**	**2013**	**2011**	**2013**	**2011**	**2013**	**2011**	**2013**
1.5	The effectiveness of suppliers' water management practices	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Risk assessment													
1.6	Water-related risks in direct operations	NE	IS	AP	AP	NE	IS	AP	AP	IS	IS	AP	AP
1.7	Water-related risks in the supply chain	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
2. MANAGEMENT													
Governance and accountability													
2.1	Clarifies board responsibilities for oversight of water	NE	NE	NE	AP	IS	IS	NE	NE	NE	NE	NE	NE
2.2	Involves senior executives directly in management of water-related issues	NE	NE	NE	LP	IS	IS	NE	NE	NE	NE	NE	NE
2.3	Aligns public policy positions and lobbying with water stewardship goals	NE	NE	IS	IS	IS	IS	NE	NE	NE	NE	AP	AP
Policies an standards													
2.4	Has a publicly available water policy and recognises the importance of water to the business	NE	NE	IS	IS	IS	IS	IS	IS	IS	IS	AP	AP
2.5	Sets performance standards and goals on water withdrawals/consumption for direct operations	NE	NE	NE	IS	NE	NE	NE	IS	AP	AP	AP	AP

	Company	AVI		Illovo Sugar		Oceana		Pioneer Foods		Tiger Brands		Tongaat Hulett	
	Years	**2011**	**2013**	**2011**	**2013**	**2011**	**2013**	**2011**	**2013**	**2011**	**2013**	**2011**	**2013**
2.6	Sets performance standards and goals on wastewater discharge for direct operations	NE	NE	NE	IS	NE	NE	NE	NE	NE	IS	IS	IS
2.7	Requires direct operations to develop plans to address local watershed risks	NE	NE	NE	IS	NE	NE	NE	NE	NE	NE	IS	IS
2.8	Addresses sustainable water management in supplier standards and codes, and in procurement and contracting practices	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Business planning													
2.9	Considers water in business planning and investment decision making	NE	NE	NE	IS	IS	IS	NE	NE	NE	NE	IS	IS
2.10	Considers water in product design and development	NE	NE	AP	AP	NE	NE	NE	NE	NE	NE	AP	AP
2.11	Identifies water-related business opportunities	NE	NE	AP	AP	NE	NE	NE	NE	NE	IS	IS	IS
3. STAKEHOLDER ENGAGEMENT													
3.1	Requires engagement with local communities on water-related issues at existing or potential new operations	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	IS	IS
3.2	Engages with employees on water issues	NE	NE	NE	LP	IS	IS	NE	NE	LP	LP	NE	NE
3.3	Works with suppliers to help them improve water management	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	AP	AP

	Company	AVI		Illovo Sugar		Oceana		Pioneer Foods		Tiger Brands		Tongaat Hulett	
	Years	**2011**	**2013**	**2011**	**2013**	**2011**	**2013**	**2011**	**2013**	**2011**	**2013**	**2011**	**2013**
3.4	Engages openly with local, regional and national governments or regulators to advance sustainable water policies and management	NE	NE	NE	NE	NE	IS	NE	NE	NE	NE	NE	IS
3.5	Engages with NGOs and community organisations on water issues	NE	NE	NE	IS	NE	NE	IS	IS	IS	IS	IS	IS
3.6	Engages with other industries/companies/water users	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
3.7	Educates customers to help them minimise product impacts	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
4. DISCLOSURE													
4.1	Makes water-related information publicly available	NE	NE	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS
4.2	Includes water data and analysis in published financial filings/reports	NE	NE	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS
4.3	Provides third-party assurance or audits water-related information	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

4.6.1 Measurement

Measurement entails the collection and monitoring of data on a number of key areas in the business. Below are the findings of the measurement activities for the six food producer companies, AVI, Illovo Sugar, Oceana, Pioneer Foods, Tiger Brands and Tongaat Hulett.

4.6.1.1 Data gathering

This subsection assesses whether the company is collecting and monitoring information on water consumption and discharge, and if and how the company's production processes are affecting water sources. What external factors could affect the current and future water supply for the company? Then stakeholders' perceptions and the reputation of the company are monitored, and finally, how their water-intensive suppliers are managing water-related issues, are also examined.

1.1	Does the company collect and monitor data on its own regulatory compliance water use and discharge?

As indicated in table 4.3, AVI has taken initial steps, and the company does mention in its reports how much water has been consumed, but it is not clear if it is some or all direct operations. In the AVI 2011 excerpt below, only two factories are mentioned.

AVI: Water conservation – The Snackworks Isando factory achieved a 9.3% reduction and the Entyce Beverages Isando factory achieved a 4% reduction in water consumption. Emissions, effluents and waste – Snackworks made pleasing progress in regard to effluent handling and water treatment, with further initiatives planned for the year ahead. Entyce Beverages is currently investing measures to improve roaster emissions and coffee dust emissions *(**Source:** AVI Limited, 2011:38)*

Illovo Sugar does mention water consumption and wastewater discharge, and the excerpt below indicates that water discharge is usually done – hence the selection of initial steps for this company.

Illovo: Water discharge volumes and methods vary by site, but are usually monitored and regulated to ensure compliance with relevant national statutes. We continually evaluate and implement new processes to improve efficiencies in an effort to reduce overall water consumption and maximise the recycling of water in its secondary processes. *(**Source:** Illovo Sugar Limited, 2013:99)*

Oceana has taken initial steps for this activity as the company does monitor data on water consumption and wastewater discharge for direct operations. However, the researcher was not sure if all the operations were included in the company's figures.

Oceana Waste water: At the Lucky Star Hout Bay facility, sewage water effluent is pumped into the municipal sewage system. No water effluent is discharged into the sea. The water effluent is pumped to the City of Cape Town's sewage plant in Hout Bay. The factory samples the water effluent monthly and sends it to an independent laboratory for analysis. The French fries plant's wastewater is discharged into the sea. Marsh Risk Consulting conducted an independent audit on the Water licence conditions of the Lambert's Bay site. The Etosha Fishing Corporation facility in Walvis Bay has an effluent treatment plant and has started measuring their waste water effluent disposed. *(**Source:** Oceana Group Limited, 2013:26)*

For Pioneer Foods, advanced progress was selected as the company does monitor data on water consumption and wastewater discharge for all direct operations.

Pioneer: In terms of water management, all the divisions monitor their water usage and identification of reduction opportunities is a priority. Quality checks are also conducted depending on the water source and production method. At some divisions, such as The Ceres Beverage Company and the Agri-business, on-site water treatment systems are used to treat water before or after use according to the different sources. The reuse of treated effluent water on some plants for irrigation on adjacent farms is an effective way of reducing the amount of potable water used for irrigation on agricultural land. At Sasko a water management forum was established to monitor and measure consumption for production and non-production use.

*(**Source:** Pioneer Group Limited, 2011:65)*

Water consumption is one of four highly material sustainability issues for the Group. As a first step in understanding this issue, the Group is focusing on measuring and tracking water consumption. *(**Source:** Pioneer Group Limited, 2013:73)*

Tiger Brands mentioned in its report for 2011 that the company measures water usage, but these figures are not included in the integrated report – hence no evidence was selected. In 2013, because actual water consumption figures were reported on all operations, advanced progress was selected.

For Tongaat Hulett, advanced progress was selected as the company does monitor data on water consumption and wastewater discharge for all its direct operations.

Tongaat: At Tongaat Hulett Starch, water usage is monitored on a daily basis and optimised to run at relevant world standards for wet milling operations.

*(**Source:** Tongaat Hullett Limited, 2011:27)*

1.2	Does the company collect and monitor data on its environmental and social impacts on direct water sources?

There is no evidence in the AVI, Pioneer Foods and Tiger Brands reports that these companies collect and monitor data on the company's environmental and social impacts on direct water sources.

Advanced progress was selected for Illovo Sugar as the company does identify key sources of water for all direct operations and tracks a range of data relating to the company's environmental and social impacts on these sources.

Illovo: Water contained in sugar cane amounts to between 68% and 72% of total content. During the extraction process, this water is released and recycled for use within the factory, reducing reliance on external water resources.

***(Source:** Illovo Sugar Limited, 2011:86)*

The effluent produced outside South Africa is, after treatment to an acceptable level, disposed of under permit in local rivers, except for our operations at Dwangwa and Nchalo, where the effluent is retained in a dunder dam and then used for irrigation. Treatment outside Malawi varies from lime application to being mixed with clean water to being retained in settling maturation ponds, before discharge into rivers.

Waterways. In South Africa, effluent is, after various treatment processes at our different sites, discharged under permit either into rivers, the sea, settling dams, a municipal sewage works, or, as is the case with the Glendale distillery, used for irrigation under controlled conditions. ***(Source:** Illovo Sugar Limited, 2013:100)*

Oceana does identify key sources, that is, the sea, and tracks some data relating to the company's environmental and social impacts on these sources – hence initial steps was selected. Tongaat Hulett does identify key sources of water for some direct operations and tracks some data relating to the company's environmental and social impacts on these sources – hence the selection of initial steps.

Tongaat: Subsequent to the "zero effluent" philosophy that has been adopted by several operations to minimise the quantity of liquid effluent leaving each mill or plant, the sugar mills recycle and re-use water within the factories, while the remaining effluent undergoes biological treatment (aerobic and anaerobic) to reduce its chemical oxygen demand to acceptable levels being discharged in accordance with the relevant environmental requirements. *(**Source:** Tongaat Hulett Limited, 2011:27)*

Tongaat Hulett Mozambique sugar mill the second Level 2 complaint related to environmental issues raised through a media broadcast at the Xinavane operation. There were allegations regarding water pollution of the river system emanating from mill effluent discharge. Xinavane currently conducts regular water testing both upstream and downstream of the mill operations, as well as of some of the agricultural locations. The operation uses the services of an external third party laboratory, which has confirmed that the results of the water tests continue to fall within the business's minimum standards. *(**Source:** Tongaat Hulett Limited, 2013:34)*

1.3	Does the company collect and monitor data on external factors affecting direct waters sources?

AVI shows no evidence of this activity in its reports. Because Illovo Sugar does identify some external factors like climate change, initial steps was selected.

Advanced progress was selected for Oceana as the company identifies and tracks a wide range of factors affecting the current and future sustainability of water sources.

Oceana: Sustainability Forum – At its five meetings this year, the forum paid attention to employee wellness; training and development; the health and safety of employees; CSI; stakeholder engagement; reviewing divisional environmental risk registers; assessing the internal ECS; permits and licences; climate change; GHG emissions; efficient use of non-renewable resources; water conservation initiatives; reduction of energy usage; recycling and waste minimisation.

*(**Source:** Oceana Group Limited, 2011:43)*

Since Pioneer Foods does identify and track some external factors that may affect the quality and availability of water, initial steps was selected.

Pioneer: The agricultural sector is subject to a number of key risks that may impact the supply of raw materials including water security cyclical production fluctuations availability and cost of energy land reform and climate change.

*(**Source:** Pioneer Group Limited, 2011:49)*

For Tiger Brands, initial steps was selected as the company does identify and track some external factors, such as climate change currently affecting the quality and availability of water sources for key facilities.

Tiger: The current projections for climate change that impacts on the areas where we operate indicate declining availability. Consequently, the company's response is twofold – internally to manage usage and standards and to understand the external influences on water availability quality and the reliability of supply.

*(**Source:** Tiger Brands Limited, 2011:63-64)*

Tongaat Hulett does identify and track a wide range of external factors affecting the current and future sustainability of water sources for key facilities – hence advanced progress was selected for the company.

Tongaat Hulett is continuing to evaluate its carbon and water footprint and developing new approaches to understand and deal with potential opportunities and consequences of both climate change and constrained water supplies in the future.

*(**Source:** Tongaat Hulett Limited, 2013:29)*

A growing population in the SADC region, demographic shifts from rural areas to cities, and the impacts of climate change are contributing to concerns related to fresh

water availability. With two-thirds of all fresh water used in agriculture and demand for water set to rise by some 50% by the year 2030, water scarcity is a possible scenario for a third of the world's population.

*(**Source:** Tongaat Hulett Limited, 2013:32)*

1.4	Does the company collect and monitor data on stakeholder perceptions and concerns relating to water issues?

There is no evidence of this activity in the reports of AVI, Illovo Sugar, Oceana in 2011, Pioneer Foods, Tiger Brands and Tongaat Hulett. Oceana does report in 2013 of meeting with external stakeholders on an ad hoc basis to discuss water quality – hence the selection of initial steps for 2013.

1.5	Does the company collect and monitor data on the effectiveness of its suppliers' water management practices?

There is no evidence of this activity in any of the six selected food producers' reports for the years 2011 and 2013.

4.6.1.2 Risk assessment

Once the company has gathered all the necessary data as per the previous section, it is time to assess its risk exposure in both direct operations and the supply chain.

1.6	Does the company identify and quantify water-related risks in direct operations?

Because AVI does identify water-related risks in the business in the 2013 reports, initial steps was selected.

AVI: Water conservation – Poor water quality and shortages are a significant potential risk to the Company, and the subsidiaries take steps to minimise these risks. These steps include utilising boreholes and reservoirs for storing water, recycling condensate produced during the heating processes back to the boilers, and adopting environmentally friendly storm water reticulation, while simultaneously taking measures to measure and manage water consumption.

*(**Source:** AVI Limited, 2013:44)*

Deteriorating water quality through pollution, including tainted groundwater from mining operations.

*(**Source:** AVI Limited, 2013:47)*

Illovo Sugar did mention in the 2013 report that a group-wide water footprint was going to be undertaken, which indicates that the company would be using a tool to help identify all direct operations in areas of potential water risk. Advanced progress was therefore selected.

Illovo: Ensuring access to a reliable supply of water is a critical strategic priority for Illovo to meet both its business needs and that of surrounding communities. Risk factors for sustainable procurement of water are exacerbated by issues of scarcity and accessibility across community and national boundaries and often involve interdependent factors that vary from country to country and region to region.

(***Source:*** *Illovo Sugar Limited, 2013:98)*

Assessing water-related risks is an important component of the overall risk management strategy for our business. Illovo recognises that water is a global resource that requires local management. The risk management strategy identifies that risk factors concerning water are exacerbated by issues of scarcity and accessibility across community and national boundaries and often involve interdependent factors that vary from country to country and region to region. Ultimately, through developing a better understanding of our water-related risks we hope to be able to provide strategic direction to our operations and an elevated understanding of localised water resource risk factors.

(***Source:*** *Illovo Sugar Limited, 2013:99)*

The commencement of a group-wide water footprint project which will guide us in developing an effective and efficient water management strategy for our business.

(***Source:*** *Illovo Sugar Limited, 2013:2)*

For Oceana, there is no evidence of this in the 2011 reports, but in 2013, the company does identify the risk of a lack of water in all direct operations – hence the selection of initial steps.

Oceana: Our risk context:

Inadequate fresh water infrastructure and management could lead to loss of production. Inadequate fresh water on large vessels due to improper desalination could lead to loss of production. (***Source:*** *Oceana Group Limited, 2013:4)*

Since Pioneer Foods does identify areas of potential water risks, scarcity, quality or other factors, advanced progress was selected for the company.

Pioneer: As part of the sustainability roll-out project, energy and water consumption, raw material consumption (as an efficiency management indicator) and waste management have been identified as key sustainability risks and opportunities that are material to the business. (***Source:*** *Pioneer Group Limited, 2011:64)*

Water availability is an issue in large parts of the country and with long-term forecasts highlighting water as a key scarce resource, the cost of water is likely to rise in the medium term. It is therefore critical to proactively encourage efficient water usage in the industry. (***Source:*** *Pioneer Group Limited, 2013:6)*

Water management will be incorporated into the business strategy as the risks relating to water availability and quality are already included in the Group's risk management processes. (***Source:*** *Pioneer Group Limited, 2013:73)*

For Tiger Brands, initial steps was selected as the company does identify water quality as a risk.

Tiger: A key concern regarding water is the fluctuating quality experienced at manufacturing sites. To address this, sites monitor and manage water received from municipalities to ensure water quality is maintained, and usage within the sites is monitored and improved. Monitoring takes place through impact assessments and the installation of water meters that record the monthly water consumption at all operations. (***Source:*** *Tiger Brands Limited, 2011:64)*

For Tongaat Hulett, advanced progress was selected as the company does identify water risks in the business, scarcity, quality and so on. The company also reported using the water footprint assessment.

Tongaat: Water quality is monitored on an on-going basis and the operation continues to identify Weather conditions, specifically the availability of water in the Zimbabwe operations, negatively impacted on the planting of new roots and the replacement of existing roots in the 2012/13 season.

(***Source:*** *Tongaat Hulett Limited, 2013:15)*

Tongaat: At the current low dam levels, irrigation has been reduced and cane expansion and root replanting for both private farmers and Tongaat Hulett's estates have been curtailed, to be resumed once dam levels recover. The business remains optimistic that the water mitigation measures put in place and the likely completion of the Tokwe-Mukorsi dam in the latter part of 2013 will enable the Zimbabwe sugar operations to sustain current levels of production, with an early season estimate that 460,000 tons of sugar will be produced in 2013/14. (***Source:*** *Tongaat Hulett Limited, 2013:22)*

1.6 Does the company identify and quantify water-related risk in its supply chain?

All six selected food producers show no evidence in their reports of identifying and quantifying water-related risk in their supply chain

4.6.2 Management

Management consists of three subcategories of activities, namely governance and accountability, policies and standards, and business planning that a company should use to manage water-related issues. Below are the findings of the management activities for the six food producer companies, AVI, Illovo Sugar, Oceana, Pioneer Foods, Tiger Brands and Tongaat Hulett.

4.6.2.1 Governance and accountability

For a company to take water-related issues seriously there should be board-level commitment and senior management involvement, and even financial incentives could be linked to senior executives' sustainability scorecards. The last consideration in this subsection is to ensure that the company does "walk the talk" on water-related issues.

2.1 Does the company clarify board responsibility for oversight of water?

There is no evidence of this activity in the reports of AVI, Pioneer Foods, Tiger Brands and Tongaat Hulett. Illovo Sugar's report for 2013 shows the board has formal and explicit oversight of all significant water issues – therefore advanced progress was selected.

Oceana has a sustainability forum which meets five times a year, senior operations managers are part of this forum, and it would be assumed that this forum would

report back to the board of Oceana on an ad hoc basis – hence the selection of initial steps.

2.2	Are senior executives directly involved in the management of water-related issues?

There is no evidence of this activity in AVI's, Pioneer Foods', Tiger Brands' and Tongaat Huletts' reports and Illovo Sugar's reports for 2011.

Illovo Sugar reported in 2013 that its operations director is accountable for environmental issues and employees are rewarded via incentive schemes for achievements relating to sustainability – hence leading practice was selected for this company.

Illovo: The sustainable steering committee's main function is to guide the organisation and provide specialist input on sustainability issues. Operational decisions on sustainability are made by the Executive Committee. The steering committee may establish subordinate committees to address specific sustainability aspects such as water.

Operationally, the most senior executives are accountable for the different elements of the economic, social and environmental components of sustainability. For instance, our operations director is accountable for environmental issues, whilst our human resources executive is accountable for the social issues. As indicated in the Remuneration Report, incentive schemes are used to reward employees for the achievement of specified targets and objectives, including those pertaining to sustainability. (***Source:*** *Illovo Sugar Limited, 2013:59)*

Initial steps was selected for Oceana as the company has sustainability forum members comprising senior operational managers. It can therefore be assumed that executive management has explicit oversight over strategic water management.

Oceana: As part of the governance structure within the group, a sustainability forum was established with formal terms of reference. It comprises senior operational managers who engage with divisional operational management to facilitate implementation and management of policy. The terms of reference of the forum are as follows:

- Promote understanding of environmental issues requiring attention
- Identify disciplines where initiatives would make the most impact
- Make recommendations on strategies, targets, projects and efforts.

(***Source:*** *Oceana Group Limited, 2011:43)*

2.3 Does the company align public policy positions and lobbying with water stewardship goals – in other words, does the company "walk the talk".

There is no evidence of this activity in the reports of AVI, Pioneer Foods and Tiger Brands for 2011 and 2013.

Illovo Sugar shows efforts to recycle water, and that its operations in South Africa are rain-fed, which means that the company does not make use of groundwater – hence the selection of initial steps for the company. However, the company does not report on any initiative to help local communities or government regarding water scarcity like the mining companies have done. Initial steps was selected for Oceana as the company is "walking the talk" on some water-related issues.

Advanced progress was selected for Tongaat Hulett as the company has undertaken a water footprint assessment, the water required for one kilogram of white sugar is lower than that of the global average, and the company can be seen to "walk the talk".

Tongaat: During the reporting period, Tongaat Hulett completed the Product Water Footprint for 1kg of refined white sugar in South Africa using a global standard. This assessment was performed on behalf of the business by an external service provider and confirmed that the water required by Tongaat Hulett to produce 1kg of refined white sugar is lower than the global average as stated by the Water Footprint Network.

(***Source:*** *Tongaat Hulett Limited, 2013:32)*

4.6.2.2 Policies and standards

Setting policies, performance standards and goals helps to guide the company on water issues, raises awareness, and helps to measure and drive performance. The company needs to look further than its own facilities, to take into account its water sources and who it shares this water with. Lastly, the company's supply chain performance standards and goal setting are addressed in this subsection.

2.4	Does the company have a publicly available water policy and recognise the importance of water in the business?

There is no evidence of this activity in AVI's reports. Initial steps was selected for Illovo Sugar, Oceana, Pioneer Foods and Tiger Brands as all of these companies do show in their reports that they have an easily identifiable, publicly available policy on water and they do set out clear goals and guidelines for action.

Advanced progress was selected for Tongaat Hulett as the company has an easily identifiable, publicly available water policy on water, and clear goals and guidelines are set out for actions. The company has publicly displayed a commitment to water.

Illovo: Water conservation, use, and availability have all been identified as material issues to the business. Consequently, Illovo's Sustainability Policy includes water governance criteria. Two of the key objectives of the Sustainability Policy are to reduce water consumption per unit of production within the organisation and to review waste water management so as to identify opportunities for improvement.

(***Source:*** *Illovo Sugar Limited, 2013:99)*

Oceana: The group's policy and management practice is to use water as sparingly and efficiently as possible in production, cleansing, and domestic applications. Detailed water management plans will be completed for each division during 2014. Usage in factories and on vessels directly under the company's control is monitored on a monthly basis and reported at monthly management meetings, and the bi-monthly sustainability forum meeting. (***Source:*** *Oceana Group Limited, 2011:48)*

Tiger: Water is a critical part of our operations and therefore Tiger Brands has adopted a group-wide water management policy. (***Source:*** *Tiger Brands Limited, 2011:63)*

Tongaat: The Water Policy which documents Tongaat Hulett's view on key elements include: prioritising sustainable management and effective use of water resources, local water resource optimisation, and protection. It continues to identify opportunities for water recycling, efficient use, and responsible waste water disposal. Tongaat Hulett's sugar operations are in various locations within the SADC region and different water techniques are applied across operations. As a result of the fact that the sugar cane plant comprises approximately 70% water, sugar mills in South

Africa is a net producer of water. Most of the sugar cane cultivated in South Africa is dependent on natural rainfall, while operations in Mozambique, Swaziland, and Zimbabwe, practise large-scale irrigation via purpose-built canal systems with water being extracted from rivers. The management of these canals and irrigation systems is in keeping with the highest agronomy and safety standards.

(***Source:*** *Tongaat Hulett Limited, 2013:32)*

2.5 Does the company set performance standards and goals on water withdrawals/consumption for direct operations?

There is no evidence of this activity in AVI's and Oceana's reports. For Illovo Sugar, there is no evidence of this activity in 2011. However, in 2013, the company reports that a key objective is to reduce water consumption, but specific figures to reduce water consumption by or by when are not reported – hence the selection of initial steps.

There is no evidence of this in the 2011 report for Pioneer Foods, but in 2013, the company does mention that there are targets for water – hence the selection of initial steps.

Pioneer: The 2012 benchmark data was used to set five-year targets for the Group for water. (***Source:*** *Pioneer Group Limited, 2013:71)*

Since Tiger Brands and Tongaat Hulett have set group-wide targets for reductions in water consumption, advanced progress was selected.

Tiger: We have set 2011 targets for water usage and effluent volume to enable us to monitor reductions going forward. (***Source:*** *Tiger Brands Limited, 2011:64)*

Tongaat: Over a 5-year period, Tongaat Hulett intends to establish a water efficiency improvement target for water consumption per ton of product produced. This will be done as a means of not only improving the company's water footprint, but of reducing the company's reliance on water sources that might affect local communities. It should be noted that the sugar milling operations are net producers of water, as the water which comes in with the cane is in excess of the water required to extract the sugar from the cane. (***Source:*** *Tongaat Hulett Limited, 2011:26)*

2.6 Does the company set performance standards and goals on wastewater discharge for direct operations?

There is no evidence of this activity in the reports of AVI, Oceana, Pioneers Foods and Illovo Sugar in 2011. In its 2013 report, Illovo Sugar mentions that a key objective is to review waste water management – hence the selection of initial steps.

Illovo: Water conservation, use, and availability have all been identified as material issues to the business. Consequently, Illovo's Sustainability Policy includes water governance criteria. Two of the key objectives of the Sustainability Policy are to reduce water consumption per unit of production within the organisation and to review waste water management so as to identify opportunities for improvement.

(***Source:*** *Illovo Sugar Limited, 2013:99)*

Since Tiger Brands sets group-wide targets in its 2013 reports for reductions in wastewater discharges for the next five years, initial steps was selected.

Tiger: The group will endeavour to reduce its operational water footprint without compromising the quality and integrity of its products. The group is targeting a reduction in water consumption and water discharges by 5% per year for the next three years. (***Source:*** *Tiger Brands Limited, 2013:126)*

Tongaat Hulett does have goals and standards on wastewater discharge, but the researcher was not sure whether they are in accordance with global wastewater standards. Initial steps was therefore selected.

Tongaat: Water quality is monitored on an on-going basis and the operation continues to identify business risks and opportunities for water access, reuse or recycling, efficient use and responsible waste water disposal.

(***Source:*** *Tongaat Hulett Limited, 2011:27)*

2.7	Does the company's direct operations develop plans to address local watershed risks?

There is no evidence of this activity in the reports of AVI, Oceana, Pioneer Foods and Tiger Brands for 2011 and 2013.

In 2011, there is no evidence of this activity in Illovo Sugar, but in 2013, the company reported conducting a high-level risk assessment to determine if its operations are situated in water-stressed regions. Initial steps was therefore selected as the company goes on to report that there is room for development of these watersheds.

Illovo: All of Illovo's South African operations fall within a Water Management Areas whose requirements for water already exceed availability. There is, however, room for development of supply infrastructure to augment the water supply.

(***Source:*** *Illovo Sugar Limited, 2013:100)*

Initial steps was selected for Tongaat Hulett because the company has developed source water protection plans in some facilities in areas that are high risk. For example, where there are low dam levels, the company reduces irrigation and curtails root planting.

2.8	Does the company address sustainable water management in supplier standards and codes, and in procurement and contracting practices?

There is no evidence of this activity in the reports of any of the six selected companies for 2011 and 2013.

4.6.2.3 Business planning

This subsection evaluates whether a company incorporates water into its long-term planning by way of including water risks and opportunities in investment decision making, budgeting, product design and development.

2.9 Does the company consider water in business planning and investment decision making?

There is no evidence of this activity in the reports of AVI, Pioneer Foods and Tiger Brands for 2011 and 2013.

In 2013, Illovo Sugar reported that it would be undertaking a water footprint project. Initial steps was thus selected for 2013, as the company would be developing a water management strategy, and it would therefore be considering water issues in major investments in the future.

Illovo: The commencement of a group-wide water footprint project which will guide us in developing an effective and efficient water management strategy for our business. (***Source:*** *Ilovo Sugar Limited, 2013:2)*

Because Oceana has a sustainability forum, it could be assumed that the company does consider water issues in major investments in areas considered high water risk – hence the selection of initial steps.

Since Tongaat Hulett reports on undertaking a water footprint assessment, initial steps was selected. This would be an expensive exercise, so the company does consider water issues in major investments.

2.10 Does the company consider water in product design and development?

There is no evidence of this activity in the reports of the AVI, Oceana, Pioneer Foods and Tiger Brands for 2011 and 2013.

Advanced progress was selected for Illovo Sugar as the company does assess the water impacts on key products (sugar only), and has a programme in place to reduce the impacts. Also, the company will be undertaking a water footprint exercise throughout its operations.

Illovo: Water contained in sugar cane amounts to between 68% and 72% of total content. (***Source:*** *Illovo Sugar Limited, 2011:86)*

Advanced progress was selected for Tongaat Hulett because the company has done a water footprint exercise showing that it does assess the water impacts of key

products and has a programme in place to reduce the water impacts of significant products.

2.11 Does the company identify water-related business opportunities?

According to the Gauge™: "*Business opportunities can include new products and processes, as well as the benefits from better stewardship of water either in reduced costs, enhanced brand equity, improved stakeholder relations or other business benefits."*

There is no evidence of this activity in the reports of AVI, Oceana, Pioneer Foods for 2011 and 2013. Since Illovo Sugar has demonstrated the benefits of better stewardship of water, advanced progress was selected for the company.

Illovo: As part of the project which was implemented over a four-year period, a total of R84 million was invested to install water and energy efficient irrigation systems on land previously irrigated with a sprinkler system with high energy requirements. Since the completion of the project, water use per season has been reduced by about 23%, and yields have increased by approximately 14 tons of cane per hectare, resulting in sugarcane production increasing by 72,000. The installation in 2011 of a refinery brine recovery plant at Noodsberg mill in South Africa, with the potential to recover 80% of the brine and 70% of the water contained within the factory effluent to be reused as process water. (***Source:*** *Illovo Sugar Limited, 2013:99)*

In 2013, Tiger Brands reported various water-saving initiatives in its factories, therefore showing better stewardship of water. Initial steps was thus selected for 2013.

Tiger: Changed cleaning habits in factories by using less water. Reduced steam seepage by fixing leaks. Introduced water recycling in manufacturing operations.

(***Source:*** *Tiger Brands Limited, 2013:127)*

Initial steps was selected for Tongaat Hulett as the company is showing good water stewardship by using sustainable farming practices.

Tongaat Hulett: is using sustainable sugarcane agriculture practice to promote and increase good practices that are environmentally sustainable. The practices seek to protect the natural resource base, prevent degradation of soil and water, conserve biodiversity, ensure a safe and high-quality supply of agricultural products, and consequently safeguard the livelihood and wellbeing of agricultural private farmers, employees and their families. (***Source:*** *Tongaat Hulett Limited, 2013:33)*

4.6.3 Stakeholder engagement

Engaging with stakeholders can help a company identify water-related risks and the impacts the company could have on water sources. It is important to understand what level of interest and power the company's stakeholders have, because that helps decide how to deal with the different types of stakeholders. The Gauge™ has identified a number of stakeholders that should be engaged with in managing water issues, and these will be discussed next.

3.1 Does the company engage with local communities on water-related issues at existing or potential new direct operations?

There is no evidence of this activity in the reports of AVI, Illovo Sugar, Oceana, Pioneer Foods and Tiger Brands for 2011 and 2013.

Since Tongaat Hulett does work on external water projects that benefit local communities, initial steps was selected.

Tongaat: The business continues to ensure that safe drinking water is available for local communities. (***Source:*** *Tongaat Hulett Limited, 2013:43)*

3.2 Does the company engage with employees on water issues?

There is no evidence of this activity in the reports of AVI, Pioneer Foods and Tongaat Hulett for 2011 and 2013. There is no evidence of this activity in Illovo's report for 2011, but in 2013, the company reported on incentive schemes used to reward employees for achievements regarding sustainability, and water initiatives would be part of this. Leading practice was selected as incentives to reduce the water footprint are part of this step.

Through Oceana's sustainability forum it is assumed that the company has taken some steps to engage with or educate its employees on water issues – hence the selection of initial steps.

Tiger Brands mentions in its reports in 2011, that management incentive schemes are linked to initiatives to reduce water consumption in all its manufacturing facilities. Paying incentives to employees falls under the leading practice step on the Gauge™.

Tiger: 2011 – The group has set water and electricity consumption targets for all of its manufacturing facilities and linked these to the short-term management incentive schemes. This has resulted in the businesses introducing initiatives to reduce consumption. (***Source:*** *Tiger Brands Limited, 2011:39)*

3.3	Does the company work with suppliers to help them improve water management?

There is no evidence in the reports of AVI, Illovo Sugar, Oceana, Pioneer Foods and Tiger Brands for 2011 and 2013. Advanced progress was selected for Tongaat Hulett as the company actively works with key suppliers identified as water intensive, in Tongaat Hulett's case farmers, to help improve their water management.

Tongaat Hulett supports a multi-stakeholder approach to sustainable agriculture that will help to protect its supply chain, as well as create successful farming communities. It has direct relationships with numerous private farmers in three countries to whom it provides agronomy support. This support includes providing quality seed cane as well as guidance on crop management, soil and water protection and environmental best practice. Where appropriate, the World Wildlife Fund standards are used to facilitate training of private farmers in order to ensure that sustainable principles are employed. (***Source:*** *Tongaat Hulett Limited, 2013:33)*

3.4	Does the company engage openly with local, regional and national governments to advance sustainable water policies and management?

There is no evidence of this activity in the reports of AVI, Pioneer Foods and Tiger Brands for 2011 and 2013. Illovo Sugar mentions the department of water affairs in its reports, but there is no evidence that the company has an engagement strategy and works together with government.

From the excerpt below it can be seen that in 2013, Oceana did engage with government, and that the company was fully transparent and aimed at promoting sustainable water management. Initial steps was selected for 2013, but there is no evidence of this activity in the company's 2011 reports.

Oceana: During the year Lamberts Bay Foods received a pre-directive for non-compliance in respect of its Water Use Licence. Lamberts Bay Foods is seeking to amend the conditions and will continue engaging with the Department of Water Affairs (DWA) and Department of Environmental Affairs (DEA) on this matter.

(***Source:*** *Oceana Group Limited, 2013:8)*

For Tongaat Hulett, there is no evidence of this activity in 2011. However, in 2013, the company mentions that it engaged with the Council for Scientific and Industrial Research (CSIR) to address water risks and sustainable water management – hence the selection of initial steps.

Tongaat: The company continued its engagement with the Council for Scientific and Industrial Research (CSIR) to identify future rainfall patterns and water scarcity due to the evolving impact of climate change. (***Source:*** *Tongaat Hulett Limited, 2011:27)*

3.5	Does the company engage with NGOs and community organisations on water issues?

There is no evidence of this activity in AVI's and Oceana's reports for 2011 and 2013. Since Illovo Sugar in 2013, Pioneer Foods in 2011 and Tiger Brands in 2011 reported participating in the CDP water project, initial steps was selected, showing that the company engages with NGOs on an ad hoc basis to perform specific actions on water.

Illovo: In 2012/13 we responded to the Carbon Disclosure Project – Water, being transparent on our water use and the associated risks and opportunities.

(***Source:*** *Illovo Sugar Limited, 2013:98)*

Pioneer: For the first time (2011), Pioneer Foods participated in the annual Carbon Disclosure Project (CDP) and its water disclosure initiative. Our submission was a qualitative one as this was taken as a preliminary assessment for the Group that will be progressively reviewed in more detail as the sustainability programme process unfolds. Our involvement in the CDP afforded us an opportunity to reflect on where we are as a business and to consider the risks and opportunities for the Group going forward. We realise that a lot more needs to be done and hope to include more meaningful data in future. (***Source:*** *Pioneer Group Limited, 2011:64)*

Tiger: In 2011, the group participated in the carbon disclosure project (water disclosure) for the first time. With baseline data collected and targets set, Tiger Brands will be able to monitor progress against targets from 2012 going forward.

(***Source:*** *Tiger Brands Limited, 2011:64)*

Since Tongaat Hulett does engage with NGOs on an ad hoc basis by participating in various sustainability reporting initiatives, initial steps was selected.

Tongaat: The company's participation in various sustainability reporting initiatives, including the Carbon Disclosure Project (CDP), the CDP Water Disclosure Project and its listing on the JSE's Social Responsibility Investment index for the seventh consecutive year are testimony to Tongaat Hulett's approach to sustainable development. (***Source:*** *Tongaat Hulett Limited, 2011:6)*

3.6 Does the company engage with other industries/companies/water users?

There is no evidence of this activity in the reports of any of the six selected company for the years 2011 and 2013.

3.7 Does the company educate customers to help them minimise product impacts?

None of the six selected food producers showed evidence in their reports that they educate their customers to help them minimise product impacts.

4.6.4 Disclosure

The Gauge™ encourages companies to disclosure their water-related information, both qualitative and quantitative, as this is a way for a company to communicate to its various stakeholders and to show transparency. The last step in this section is to ask whether the water-related information has been verified by an independent third party. Next, the findings of the disclosure activities for the food producer companies will be discussed.

4.1 Does the company make water-related information publicly available?

AVI mentions so little in its reports on water that no evidence was selected. Because Illovo Sugar, Oceana, Pioneer Foods, Tiger Brands and Tongaat Hulett do disclose some qualitative and quantitative information relating to water in their reports, initial steps was selected.

4.2 Does the company include water data and analysis in published financial filings/reports?

There is no evidence of this in AVI's reports. Initial steps was selected for Illovo Sugar, Oceana, Pioneer Foods, Tiger Brands and Tongaat Hulett as the companies do provide minimum financial disclosure requirements relevant to water in their reports.

4.3 Does the company provide third-party assurance or audit water-related information?

There is no evidence in either years, 2011 or 2013, that the six selected companies provide third-party assurance or audit water-related information.

4.6.5 Summary of the food producers sector

With food producers being the highest users of water at around 70%, from table 4.3 and the discussion above, it is evident that this sector is not doing enough to deal with water scarcity in its businesses. There is no risk assessment in the supply chain, and the companies do not assess sustainable water management for their suppliers. Little or no work is being done to address local watershed risks. In the area of stakeholder engagement, most of the companies are either not reporting on water scarcity or they are actually not engaging with their stakeholders. All these companies have well-known brands, but none of them have any initiatives in place to

educate customers on water scarcity. AVI and Tiger Brands are the weakest performers in this sector, while the sugar companies, Illovo Sugar and Tongaat Hulett, are the better performers in the sector. None of the selected companies are showing that water is important to their businesses or demonstrating their commitment to water scarcity in South Africa.

In the 2013 CPD Water Programme, the report mentions that Pioneer Foods participated in 2012, but did not participate in 2013. AVI, Oceana and Tiger Brands declined to respond in 2013, and this can be seen as not showing a commitment to water scarcity. One can observe from this study, that these companies are not recognising the importance of water in their business which is of great concern as the food producers are the primary users of water.

In Barton's (2010) Global Study, 13 companies were selected, but none were from the researcher's study. The global study found that this sector presented limited water-risk disclosure. All three studies are therefore in agreement that this sector is a weak performer when it comes to water-related risk disclosure.

4.7 FOOD RETAILERS SECTOR

The food retailers sector includes Pick n Pay, Shoprite, Spar and Woolworths.

The following legend was used for table 4.4:

LP = leading practice **AP = advanced progress**

IS = initial steps **NE = no evidence of action**

Table 4.4: Key areas of corporate water-risk management identified in the Ceres Aqua Gauge™ – food retailers sector: 2011 and 2013

	Company	Pick n Pay		Shoprite		Spar		Woolworths	
	Years	2011	2013	2011	2013	2011	2013	2011	2013
1. MEASUREMENT									
Data gathering									
1.1	Its own regulatory compliance, water use and discharge	NE	NE	NE	NE	NE	IS	LP	LP
1.2	Its own environmental and social impacts on direct water sources	NE	NE	NE	NE	NE	NE	LP	LP
1.3	External factors – such as economic and social development, impacts of other users, climate change and public policy – affecting direct water sources	NE	IS	NE	NE	NE	NE	LP	LP
1.4	Stakeholder perceptions and concerns relating to water issues	NE	NE	NE	NE	NE	NE	LP	LP

	Company	Pick n Pay		Shoprite		Spar		Woolworths	
	Years	**2011**	**2013**	**2011**	**2013**	**2011**	**2013**	**2011**	**2013**
1.5	The effectiveness of suppliers' water management practices	NE	NE	NE	NE	NE	NE	LP	LP
Risk assessment									
1.6	Water-related risks in direct operations	NE	NE	NE	NE	NE	NE	AP	AP
1.7	Water-related risks in the supply chain	NE	IS	NE	NE	NE	NE	LP	LP
2. MANAGEMENT									
Governance and accountability									
2.1	Clarifies board responsibilities for oversight of water	NE	IS	NE	NE	NE	NE	LP	LP
2.2	Involves senior executives directly in management of water-related issues	NE	NE	NE	NE	NE	NE	IS	IS
2.3	Aligns public policy positions and lobbying with water stewardship goals	NE	NE	NE	NE	NE	NE	AP	AP
Policies and standards									
2.4	Has a publicly available water policy and recognises the importance of water to the business	NE	NE	NE	NE	NE	NE	AP	AP
2.5	Sets performance standards and goals on water withdrawals/consumption for direct operations	NE	NE	NE	NE	NE	NE	LP	LP

	Company	Pick n Pay		Shoprite		Spar		Woolworths	
	Years	**2011**	**2013**	**2011**	**2013**	**2011**	**2013**	**2011**	**2013**
2.6	Sets performance standards and goals on wastewater discharge for direct operations	NE	NE	NE	NE	NE	NE	AP	AP
2.7	Requires direct operations to develop plans to address local watershed risks	NE	NE	NE	NE	NE	NE	AP	AP
2.8	Addresses sustainable water management in supplier standards and codes, and in procurement and contracting practices	NE	NE	NE	NE	NE	NE	LP	LP
Business planning									
2.9	Considers water in business planning and investment decision making	IS	IS	NE	NE	NE	NE	AP	AP
2.10	Considers water in product design and development	NE	IS	NE	NE	NE	NE	LP	LP
2.11	Identifies water-related business opportunities	NE	AP	NE	NE	NE	NE	LP	LP
2. STAKEHOLDER ENGAGEMENT									
3.1	Requires engagement with local communities on water-related issues at existing or potential new operations	NE	NE	NE	NE	NE	NE	NE	NE
3.2	Engages with employees on water issues	NE	IS	NE	NE	NE	NE	AP	AP
3.3	Works with suppliers to help them improve water management	NE	IS	NE	NE	NE	NE	LP	LP

	Company	Pick n Pay		Shoprite		Spar		Woolworths	
	Years	2011	2013	2011	2013	2011	2013	2011	2013
3.4	Engages openly with local, regional and national governments or regulators to advance sustainable water policies and management	NE	NE	NE	NE	NE	NE	AP	AP
3.5	Engages with NGOs and community organisations on water issues	NE	IS	NE	NE	NE	NE	LP	LP
3.6	Engages with other industries/companies/water users	NE	NE	NE	NE	NE	NE	IS	IS
3.7	Educates customers to help them minimise product impacts	NE	IS	NE	NE	NE	NE	IS	IS
3. DISCLOSURE									
4.1	Makes water-related information publicly available	NE	NE	NE	NE	NE	NE	LP	LP
4.2	Includes water data and analysis in published financial filings/reports	NE	NE	NE	NE	NE	NE	IS	IS
4.3	Provides third-party assurance or audits water-related information	NE	NE	NE	NE	NE	NE	IS	IS

4.7.1 Measurement

Measurement entails the collection and monitoring of data on a number of key areas in the business. Below are the findings of the measurement activities for the four food retailer companies, Pick n Pay, Shoprite, Spar and Woolworths.

4.7.1.1 Data gathering

This subsection assesses whether the company is collecting and monitoring information on water consumption and discharge, and if and how the company's production processes are affecting water sources. What external factors could affect the current and future water supply for the company? Then stakeholders' perceptions and the reputation of the company are monitored, and finally, how its water-intensive suppliers are managing water-related issues, are also examined.

1.1	Does the company collect and monitor data on the company's own regulatory compliance, water use and discharge?

As indicated in table 4.4, there was no evidence of this activity in the reports of Pick n Pay, Shoprite and Spar for 2011. Leading practice was selected for Woolworths as water consumption is measured in all its own operations and water efficiency is monitored in its supply chain too.

Woolworths: We continue to measure water and drive efficiency across all our operations and our supply chain. (***Source:*** *Woolworths Holdings Limited, 2013:15)*

1.2	Does the company collect and monitor data on the company's environmental and social impacts on direct water sources?

There is no evidence in the reports of Pick n Pay, Shoprite or Spar that these companies collect and monitor data on the company's environmental and social impacts on direct water sources.

Leading practice was selected for Woolworths for this activity, as the company does not directly impact water sources, but, its vast number of suppliers do, and Woolworths works closely with its suppliers in order to monitor this activity.

1.3	Does the company collect and monitor data on external factors affecting direct waters sources?

Pick n Pay shows no evidence of this in its reports for 2011, but in 2013 there is evidence that the company identified some external factors that could affect food security, one of them being water. There is no evidence of this activity in the reports of Shoprite and Spar. Leading practice was selected for Woolworths as the company does identify and track a wide range of external factors affecting the current and future sustainability of all water sources upon which the company and its suppliers' operations rely.

Pick n Pay: The most significant challenges we face involve resource (water, land, and good soil) access and efficiency. Climate and changing weather patterns also pose a threat. (***Source:*** *Pick 'n Pay Stores Limited, 2013b:32)*

1.4	Does the company collect and monitor data on stakeholder perceptions and concerns relating to water issues?

There is no evidence of this activity in the reports of Pick n Pay, Shoprite or Spar for 2011 and 2013. Leading practice was selected for Woolworths as it was found that the company does monitor the attitudes and concerns of all key stakeholders on a proactive and systematic basis.

1.5	Does the company collect and monitor data on the effectiveness of its supplier's water management practices?

There is no evidence of this activity in the reports of Pick n Pay, Shoprite or Spar for 2011 and 2013. Woolworths, however, assesses and monitors a range of information on water management practices and compliance, water use and water discharge from all direct suppliers identified as water intensive. Leading practice was therefore selected.

Woolworths: Water foot-printing of key products to inform priority areas in the supply chain. (***Source:*** *Woolworths Holdings Limited, 2013:23)*

4.7.1.2 Risk assessment

Once the company has gathered all the necessary data as per the previous section, it is time to assess the company's risk exposure in both direct operations and the supply chain.

1.6 Does the company identify and quantify water-related risks in direct operations?

There is no evidence of this activity in the reports of Pick n Pay, Shoprite or Spar reports for 2011 and 2013. Advanced progress was selected for Woolworths as the company was shown to identify all areas of potential risk.

Woolworths: Water scarcity could negatively affect our operations. We have invested in WWF's water neutrality programme, covering the water used in our direct operations. We have a Farming for the Future programme which ensures our food products are farmed in a more sustainable manner. We continue to install a water measuring system in all stores. (***Source:*** *Woolworths Holdings Limited, 2011:23)*

1.7 Does the company identify and quantify water-related risk in its supply chain?

Pick n Pay in 2011, Shoprite and Spar for 2011 and 2013, showed no evidence in their reports of identifying and quantifying water-related risk in their supply chain. However, in its 2013 report, Pick n Pay does report, as per the excerpt below, about key concerns for its local suppliers, for example, water demand and erratic rainfall. Initial steps was thus selected. Since Woolworths is working on developing a detailed understanding of current and future water risks in the supply chain, leading practice was selected.

Pick n Pay: Soil fertility, water demand, fertiliser prices and erratic rainfall are just some of the issues that are of key concern to our local produce suppliers, and all will have an increasing impact on our ability to provide quality food at affordable prices to our customers. (***Source:*** *Pick 'n Pay Stores Limited, 2013a:26)*

Woolworths: We are working on researching and understanding the water footprint of selected priority products. A recent water footprint analysis of carrots, beans, cheese, and dishwashing detergent, completed in conjunction with Pegasus, has helped us gain a better understanding of water dependencies and risks in our supply chain. (***Source:*** *Woolworths Holdings Limited, 2013:74)*

4.7.2 Management

Management consists of three subcategories of activities, namely governance and accountability, policies and standards, and business planning that a company should use to manage water-related issues. Below are the findings of the management activities for the four food retailer companies, Pick n Pay, Shoprite, Spar and Woolworths.

4.7.2.1 Governance and accountability

For a company to take water-related issues seriously there must be board-level commitment and senior management involvement, and even financial incentives could be linked to senior executives' sustainability scorecards. The last point in this subsection is to ensure that the company does "walk the talk" on water-related issues.

2.1 Does the company clarify board responsibility for oversight of water?

There is no evidence of this activity in Pick n Pay's report for 2011, and Shoprite's and Spar's reports for 2011 and 2013. However, in Pick n Pay's sustainable living report for 2013, the Chairman, Mr Gareth Ackerman, mentions the following: "I continue to be concerned by how severe climatic events, increasing energy costs and water supply limitations are threatening our global food system. Food insecurity arises when we cannot guarantee access to enough safe and nutritious food for all." Hence initial steps was selected for Pick'n Pay for 2013, because the board or board committee is occasionally briefed on water-related risks and opportunities.

For Woolworths, there is no specific mention of this activity in its reports. However, it is the researcher's opinion that because of the work the company is conducting and spending around water, the board or board committee would have formal and explicit oversight of all significant water-related issues, specifically with regard to Woolworths' supply chain – hence the selection of leading practice.

2.2 Are senior executives directly involved in the management of water-related issues?

There is no evidence of this activity in the reports of Pick 'n Pay, Shoprite or Spar for 2011 and 2013.

There is also no mention of this activity in Woolworths' reports, but as per point 2.1, owing to the information evident in the company's report regarding water, initial steps was selected. This information indicates that the executive management committee or committee members have explicit oversight over strategic water management. Advanced progress could not be selected as this step is described as the existence of clear lines of responsibility between the committee and responsible site-level personnel, which could not be verified in the company's reports.

2.3 Does the company align public policy positions and lobbying with water stewardship goals – in other words, does the company "walk the talk"?

There is no evidence of this activity in the reports of Pick 'n Pay, Shoprite or Spar for 2011 and 2013. Advanced progress was selected for Woolworths as the company's public policy positions and lobbying are consistent with its own water stewardship goals and internationally recognised water stewardship goals. Leading practice could not be selected as there is no evidence that Woolworths works to encourage wider industry adoption of policy positions. From the information in table 4.4, it is evident that Woolworths is not working with the other three retailers to help these companies become better water stewards.

4.7.2.2 Policies and standards

Setting policies, performance standards and goals helps to guide the company on water issues, raises awareness and helps measure and drive performance. The company needs to look further than its own facilities, and should take into account its water sources and who it shares this water with. Lastly, the company's supply chain performance standards and goal setting are addressed in this subsection.

2.4 Does the company have a publicly available water policy and recognise the importance of water in the business?

There is no evidence of this activity in the reports of Pick n Pay, Shoprite or Spar for 2011 and 2013. Advanced progress was selected for Woolworths as the company has an easily identifiable, publicly available policy on water, and clear goals and guidelines are set out for actions. The company has shown in its reports to have publicly displayed a commitment to water.

Woolworths: We support clear and decisive policy on water strategy and implementation planning and maintenance to ensure preservation of South Africa's scarce water resources; and we are working on researching and understanding the water footprint of selected priority products, having recently completed a study in the dairy industry. (***Source:*** *Woolworths Holdings Limited, 2011:53)*

2.5 Does the company set performance standards and goals on water withdrawals/consumption for direct operations?

There is no evidence of this activity in the reports of Pick n Pay, Shoprite or Spar for 2011 and 2013. Woolworths not only has goals for water consumption for its direct operations, but also for its suppliers – hence the selection of leading practice.

Woolworths is targeting a 30% reduction in water usage, reducing relative water usage in stores by 50% and municipal water usage by 70% in head office.

(***Source:*** *Woolworths Holdings Limited, 2013:74)*

Half of Woolworths clothing will have energy or water savings attributes by 2015.

(***Source:*** *Woolworths Holdings Limited, 2011:9)*

2.6 Does the company set performance standards and goals on wastewater discharge for direct operations?

There is no evidence of this activity in the reports of Pick n Pay, Shoprite or Spar for 2011 and 2013. Advanced progress was selected for Woolworths as the company not only manages waste water in its own operations, but also in its supply chain.

Woolworths: Water usage and managing wastewater and water effluent across our own operations, within our supply chain and through collective action, partnerships, research, and education. (***Source:*** *Woolworths Holdings Limited, 2013:74)*

2.7 Does the company's direct operations develop plans to address local watershed risks?

There is no evidence of this activity in the reports of Pick n Pay, Shoprite or Spar for 2011 and 2013. For Woolworths, this activity would not apply to its direct operations. However, the work that Woolworths does with its "Farming for the Future" initiative, whereby fresh produce farmers adhere to internationally recognised safe and

sustainable agriculture, without using harmful pesticides, therefore ensures that potentially harmful chemicals are not released into water supplies. Leading practice was not selected because the description is “all facilities”, and farmers are not the only suppliers of Woolworths’ products. Hence advanced progress was selected as it includes all major facilities in areas deemed high risk being required to develop source water protection plans that address water risks, engagement with key local stakeholders (farmers) and support for projects that improve conditions for the watersheds (fertilisers).

Woolworths: We completed a water trial with 66 food suppliers which has highlighted issues with runoff water (into rivers and aquifers) from irrigation practices, and waste water from farm processing and are working with the Global Compact and the German Development Agency (GTZ) to further analyse water usage in agriculture and develop methods for reduction (***Source:*** *Woolworths Holdings Limited, 2013:74).*

2.8	Does the company address sustainable water management in supplier standards and codes, and in procurement and contracting practices?

There is no evidence of this activity in the reports of Pick n Pay, Shoprite or Spar for 2011 and 2013. Leading practice was selected for Woolworths because the company has set a water use standard and a wastewater standard that meet or exceed local compliance for all major direct suppliers. Woolworths requires suppliers to have their own water management programmes that impose comparable standards on their own suppliers. Woolworths does integrate its suppliers’ water performance into policies, procurement and contracting practices.

Woolworths: All suppliers who make fabric for our clothes adhere to very strict standards. No materials, dyes, or chemicals used in the production of Woolworths clothing or textiles pose what we believe to be an unacceptable risk to health – or to the environment – during their manufacture or disposal. We continue to entrench our strict code of conduct regarding dyes (including the removal of Azodyes), chemicals, and water management in our supply chain.

(***Source:*** *Woolworths Holdings Limited, 2011:52)*

Woolworths measures the amount of water used by suppliers and works with them to reduce water use and improve water waste management during growing, production

and manufacture, having recently provided energy and water saving guidelines and tips to our suppliers. (***Source:*** *Woolworths Holdings Limited, 2011:53)*

Within the Foods unit this work includes the reduction of pesticides, fertilisers, and water usage. Woolworths' fresh produce farmers have adhered to Global gap farming practices, an internationally recognised standard for safe and sustainable agriculture, for a decade. Woolworths is the country's leading retailer in certified organic fresh produce, which is grown without the use of artificial chemicals, such as herbicides and pesticides, and does not release potentially harmful chemicals into water supplies.

Woolworths is also working with our conventional farmers to help them incorporate more responsible farming practices into the way they farm in order to establish a thriving and sustainable microbial population in the soil through the Farming for the Future programme. Farming for the Future measures the water required for the plant and irrigation is used only if and when required. The latest audits show significant water savings of 16% across top supplier farms. The conservative use of chemicals also prevents fertilisers and pesticides from possible fresh water contamination. We're pleased to say by 2012 all our locally grown fresh produce (other than organically certified produce) will be grown this way.

We completed a water trial with 66 food suppliers which has highlighted issues with run-off water (into rivers and aquifers) from irrigation practices, and waste water from farm processing and are working with the Global Compact and the German Development Agency (GTZ) to further analyse water usage in agriculture and develop methods for reduction. The project is also including the impacts of wine

(***Source:*** *Woolworths Holdings Limited, 2011:53)*

4.7.2.3 Business planning

This subsection evaluates whether a company incorporates water into its long-term planning by including water risks and opportunities in investment decision making, budgeting, product design and development.

2.9	Does the company consider water in business planning and investment decision making?

Initial steps was selected for Pick n Pay as the company mentions in its reports that water conservation is an integrated part of the store design. Pick n Pay therefore considers water issues in major investments. Shoprite and Spar demonstrated no evidence of this activity for 2011 and 2013.

Pick n Pay: Water conservation is an integrated part of the store design. With over 6,000m^2 of roofing covering the complex, rainwater harvesting has been implemented with a total storage capacity of 420 kilolitres. The water is used for irrigating the gardens and to supply water needed to operate the evaporative cooling system of the fridges. Projections on the amount of rainwater harvesting possible through the height of summer, estimate an annual saving of 30% or 7,500 kilolitres, on the usual water demand. Mindful of its impact on the greater Braamfontein Spruit, Pick n Pay on Nicol has also built 2 attenuation (or holding) dams where storm water will be cleared from pollution and its release managed over the wet season so as not to overburden the Jukskei system during flood cycles.

(***Source:*** *Pick 'n Pay Stores Limited, 2011:31)*

Since Woolworths does consider water issues in all major investments, which is evident in the excerpt below, advanced progress was selected. Leading practice could not be selected as there was no mention in the company's reports if water is included in planning and budgeting or if water risks are integrated into the company's enterprise risk management system. Water is deemed such an integral part of Woolworth's business, that the researcher was convinced that leading practice could be selected.

Woolworths: When evaluating new real estate opportunities, Woolworths considers if the design of the property enables the efficient use of water and water waste. This includes:

- water pulse meters in our facilities to accurately monitor water usage;
- storage and use of recycled and grey water systems, retaining as much water on site as possible for reuse;

- use of indigenous shrubs and ground covers, minimising irrigation needs; and storm water management – allowing rain water to be stored and used.

(***Source:*** *Woolworths Holdings Limited, 2011:52)*

2.10 Does the company consider water in product design and development?

Pick n Pay's 2013 sustainable living report indicates that a new brand of products known as "Green", has been developed. It is a range of household products that are non-toxic, non-corrosive, can be used in septic tanks and biodegrade within 14 days. Hence initial steps was selected for 2013 for Pick n Pay, as the company does consider the water impacts of some products.

There is no evidence of this activity in either Shoprite's or Spar's reports for 2011 and 2013. Since Woolworths is reported to have conducted water footprints on selected priority products and has a target that half of Woolworths clothes will have water saving attributes, leading practice was selected for this activity.

2.11 Does the company identify water-related business opportunities?

According to the Gauge™: *"Business opportunities can include new products and processes, as well as the benefits from better stewardship of water either in reduced costs, enhanced brand equity, improved stakeholder relations or other business benefits."*

Advanced progress was selected for Pick n Pay for 2013 because of the "Green" range of products, which shows that the company is demonstrating new business opportunities to address water issues There is no evidence of this activity in either Shoprite's or Spar's reports for 2011 and 2013.

Leading practice was selected for Woolworths as the company has so many examples in which it reports that it has a clear strategy for identifying, funding and launching water-related opportunities.

Woolworths has tapped into an underground water supply to meet some of its daily water needs. The underground water runs about 20 metres under Woolworths Head Office building in the centre of Cape Town. This water flows into the City of Cape Town's storm water system, and eventually discharges into the sea without previously having been used. After consulting with the City of Cape Town, and a range of experts, Woolworths realised it could harvest the underground water, treat it

and use it instead of municipal water. Woolworths then installed a water treatment system that purifies the water using a number of steps including reverse osmosis. Some of this water is then used to flush toilets, run the building's car wash, the fountain outside the building and the cooling towers for the air conditioning units.

(***Source:*** *Woolworths Holdings Limited, 2011:52)*

The treated water is completely safe for use even though it will not be used as drinking water. This will save the Cape Town municipality an estimated 27,375,000 litres of water a year or 75,000 litres of municipal water a day conserved by Woolworths. (***Source:*** *Woolworths Holdings Limited, 2011:52)*

Woolworths is investing in the water neutral programme by eliminating invasive water-thirsty alien plants on supplier farms and in protected areas, such as the Tankwa Karoo National Park. The project will release enough water into South Africa's water system to offset the water used by Woolworths' operations each year, ultimately making the company water neutral. According to WWF, approximately 7% of South Africa's average annual run-off is used by alien and invasive plants.

(***Source:*** *Woolworths Holdings Limited, 2011:53)*

4.7.3 Stakeholder engagement

Engaging with stakeholders can help a company identify water-related risks and the impact the company could have on water sources. It is important to understand what level of interest and power the company's stakeholders have, because that will help decide how to deal with the different types of stakeholders. The Gauge™ has identified a number of stakeholders that should be engaged with in managing water issues, and these will be discussed below.

3.1	Does the company engage with local communities on water-related issues at existing or potential new direct operations?

There is no evidence of this activity in the reports of Pick n Pay, Shoprite or Spar for 2011 and 2013. Woolworths' main focus for the community is education and food security, but there is only one example of the company helping the local community by donating 75 water tanks – hence no evidence was selected for Woolworths.

Woolworths: Donated 75 water tanks to EduPlant schools.

(***Source:*** *Woolworths Holdings Limited, 2013:39)*

3.2 Does the company engage with employees on water issues?

There is no evidence of this activity in either Shoprite's or Spar's reports for 2011 and 2013. In 2012, Pick n Pay started working with a water resource awareness campaign called "For the Love of Water", which is used to drive awareness, both internally and externally, among customers and the general public. Initial steps was selected for Pick n Pay because the company has taken some steps to engage and/or educate employees on water issues.

Advanced progress was selected for Woolworths as the company has a business-wide programme designed to engage and educate employees, and encourage them to take ownership of water issues.

Woolworths: Education, especially assisting to educate our supply chain and provide valuable water savings tips to both customers and employees; and we worked with the FLOW (for love of water) movement to highlight water issues over the duration of National Water Week through in-store communication, social media and internal awareness for employees. (***Source:*** *Woolworths Holdings Limited, 2011:53)*

3.3 Does the company work with suppliers to help them improve water management?

There is no evidence of this activity in either Shoprite's or Spar's reports for 2011 and 2013. Initial steps was selected for Pick n Pay for 2013, because its reports show that it is beginning to work with its suppliers on water issues.

Pick n Pay: Value chain opportunities. Our supply chain impact analysis indicates where we could use our leverage to achieve the greatest positive impact. This year, we will begin to work with specific internal departments and place the focus of our engagement on our largest corporate suppliers. We have identified the following priority engagement areas:

- energy
- water. (***Source:*** *Pick 'n Pay Stores Limited, 2013:17)*

Because Woolworths actively advises and works with all key suppliers to improve its water management, leading practice was selected.

Woolworths: We have a Farming for the Future programme which ensures our food products are farmed in a more sustainable manner.

(***Source:*** *Woolworths Holdings Limited, 2013:15)*

Farming for the Future measures the water required for the plant and irrigation is used only if and when required. The conservative use of chemicals also prevents possible freshwater contamination from fertilisers and pesticides. Woolworths is targeting a 30% reduction in water usage by all farming for the future suppliers by 2015. (***Source:*** *Woolworths Holdings Limited, 2013:74)*

We use only micro and drip irrigation, which minimises water evaporation and runoff, and calculate the exact amount of water needed per vineyard so we don't over-irrigate," De Wet explains, calculating that Bergsig uses 80 litres of water to make a bottle of wine. Bergsig's owners are as passionate about the endangered indigenous plants that grow on their land as they are about the soil. As members of the Biodiversity and Wine Initiative (BWI), they work tirelessly to remove water-guzzling alien plants from the slopes of the estate. Irrigation is used only if and when required. The latest farming for the future audits show significant water savings of 16% across top supplier farms. (***Source:*** *Woolworths Holdings Limited, 2011:45)*

3.4	Does the company engage openly with local, regional and national governments to advance sustainable water policies and management?

There is no evidence of this activity in the reports of Pick n Pay, Shoprite or Spar for 2011 and 2013. Advanced progress was selected for Woolworths because the company does engage on water-related public policy issues in watersheds deemed high risk. Engagement is in line with the company's overall engagement strategy on water policy, and is fully transparent and aimed at promoting sustainable water management.

Woolworths is the only retailer to form part of the world wide fund for nature South Africa's (WWF-SA) water balance programme. The programme, launched in association with the government's working for water programme, has multiple objectives of reducing the impact of invasive alien plants on our water supplies, improving the productive potential of land, restoring biodiversity and ecosystem functions, as well as creating jobs and economic empowerment for the workers removing the alien plants. (***Source:*** *Woolworths Holdings Limited, 2013:75)*

3.5 Does the company engage with NGOs and community organisations on water issues?

There is no evidence of this activity in either Shoprite's or Spar's reports for 2011 and 2013. Because Pick n Pay does participate in the CDP Water Programme, initial steps was selected in 2013. This step involves engaging with NGOs on an ad hoc basis to perform specific actions on water.

Woolworths engages formally with NGOs and community organisations on water issues relevant to the company's core business of operations – hence the selection of leading practice.

Woolworths joined the CEO Water Mandate during the last financial year. The CEO Water Mandate is a unique public-private initiative designed to assist companies in the development, implementation, and disclosure of water sustainability policies and practices. Endorsers of the CEO Water Mandate recognise that through individual and collective action they can contribute to the realisation of the Millennium Development Goals.

(***Source:*** *Woolworths Holdings Limited, 2011:52)*

We have invested in WWF's water neutrality programme, covering the water used in our direct operations. (***Source:*** *Woolworths Holdings Limited, 2013:15)*

Woolworths is investing in the water balance programme by finding ways to balance our water usage through projects that increase supplies of clean, fresh water into the environment, such as removing water-thirsty alien vegetation on supplier farms and in protected areas, such as the Tankwa Karoo National Park.

(***Source:*** *Woolworths Holdings Limited, 2013:75)*

3.6 Does the company engage with other industries/companies/water users?

There is no evidence of this activity in the reports of Pick n Pay, Shoprite or Spar for 2011 and 2013. However, initial steps was selected for Woolworths as the company engages with other companies, users or industry efforts on an ad hoc basis to address water risks and impacts.

3.7 Does the company educate customers to help them minimise product impacts?

Shoprite and Spar showed no evidence in their reports that they educate their customers to help them minimise product impacts.

Initial steps was selected for Pick n Pay in 2013 as the company does make information available to customers on how to minimise water impacts, promote general awareness and provide tips for its customers. Pick n Pay does provide mechanisms for product take-back to help customers responsibly manage end-of-life product impacts. The researcher has seen bins in-store for customers to drop off old used batteries, an activity that is part of leading practice. Since Woolworths does educate and provide water-saving tips for its customers, initial steps was selected for the company.

4.7.4 Disclosure

The Gauge™ encourages companies to disclosure their water-related information, both qualitative and quantitative, as this is a way for a company to communicate to its various stakeholders and to show transparency. The last step in this section is to ask whether the water-related information has been verified by an independent third party. Below are the findings of the disclosure activities for the four food retailer companies, Pick n Pay, Shoprite, Spar and Woolworths.

4.1 Does the company make water-related information publicly available?

No evidence was selected for Pick n Pay, Shoprite and Spar as these companies do not report anything on water and if they have, in Pick n Pay's case it is so little it does not meet even the initial steps criteria. Since Woolworths discloses comprehensive and forward-looking qualitative and quantitative information relating to water, leading practice was selected.

4.2 Does the company include water data and analysis in published financial filings/reports?

There is no evidence of this activity in the reports of Pick n Pay, Shoprite or Spar for 2011 and 2013. Initial steps was selected for Woolworths because the company complies with minimum financial disclosure requirements relevant to water.

4.3	Does the company provide third-party assurance or audit water-related information?

There is no evidence in the reports for 2011 and 2013 that Pick n Pay, Shoprite and Spar provide third-party assurance or audit water-related information. Woolworths does have third-party assurances for its Farming for the Future programme.

Woolworths: Our farming for the future programme is audited by an independent body – Enviroscientific. (***Source:*** *Woolworths Holdings Limited, 2011:22)*

4.7.5 Summary of the food retailers sector

Considering that agriculture uses the greatest amount of water of all the sectors, and that food retailers have significant leverage and influence over their suppliers, it can be seen from the companies' reports that Shoprite and Spar mention nothing about water in their reports, and in Pick n Pay's reports, very little is mentioned about its contribution to water-related issues. The information in table 4.4 indicates that Pick n Pay, Shoprite and Spar are weak performers and have shown in their reports that they are doing nothing or very little about water stewardship. These three selected companies do not regard water as important in their business.

Woolworths, however, shows leading practice in many of the activities. Woolworths sets the example for the others to follow, and has clearly shown that the company has a competitive advantage over the other food retailers when it comes to water sustainability.

Overall, this industry, except for Woolworths, has shown no commitment to water scarcity, or that it recognises the significance of water for its business. The 2013 CDP Water Programme has grouped beverage, food producers and food retailers together in its findings. The 2008 Global Study only surveyed food producers, and food retailers were excluded.

4.8 FORESTRY AND PAPER SECTOR

The forestry and paper sector includes Mondi and Sappi.

LP = leading practice **AP = advanced progress**

IS = initial steps **NE = no evidence of action**

Table 4.5: Key areas of corporate water-risk management identified in the Ceres Aqua Gauge™ – forestry and paper sector: 2011 and 2013

	Company	Mondi		Sappi	
	Years	2011	2013	2011	2013
1. MEASUREMENT					
Data gathering					
1.1	Its own regulatory compliance, water use and discharge	LP	LP	LP	LP
1.2	Its own environmental and social impacts on direct water sources	LP	LP	LP	LP
1.3	External factors – such as economic and social development, impacts of other users, climate change and public policy – affecting direct water sources	LP	LP	AP	AP
1.4	Stakeholder perceptions and concerns relating to water issues	AP	AP	IS	IS
1.5	The effectiveness of suppliers' water management practices	NE	IS	NE	NE

	Company	Mondi		Sappi	
	Years	**2011**	**2013**	**2011**	**2013**
Risk assessment					
1.6	Water-related risks in direct operations	AP	AP	AP	AP
1.7	Water-related risks in the supply chain	IS	IS	NE	NE
2. MANAGEMENT					
Governance and accountability					
2.1	Clarifies board responsibilities for oversight of water	IS	IS	IS	IS
2.2	Involves senior executives directly in management of water-related issues	IS	IS	IS	IS
2.3	Aligns public policy positions and lobbying with water stewardship goals	AP	AP	AP	AP
Policies and standards					
2.4	Has a publicly available water policy and recognises the importance of water to the business	AP	AP	AP	AP
2.5	Sets performance standards and goals on water withdrawals/consumption for direct operations	AP	AP	AP	AP
2.6	Sets performance standards and goals on wastewater discharge for direct operations	AP	AP	AP	AP
2.7	Requires direct operations to develop plans to address local watershed risks	LP	LP	NE	NE

	Company	Mondi		Sappi	
	Years	**2011**	**2013**	**2011**	**2013**
2.8	Addresses sustainable water management in supplier standards and codes, and in procurement and contracting practices	NE	LP	NE	NE
Business planning					
2.9	Considers water in business planning and investment decision making	AP	AP	NE	IS
2.10	Considers water in product design and development	LP	LP	AP	AP
2.11	Identifies water-related business opportunities	AP	AP	NE	AP
3. STAKEHOLDER ENGAGEMENT					
3.1	Requires engagement with local communities on water-related issues at existing or potential new operations	IS	IS	NE	IS
3.2	Engages with employees on water issues	NE	NE	NE	NE
3.3	Works with suppliers to help them improve water management	NE	IS	NE	NE
3.4	Engages openly with local, regional and national governments or regulators to advance sustainable water policies and management	AP	AP	IS	IS
3.5	Engages with NGOs and community organisations on water issues	LP	LP	IS	IS
3.6	Engages with other industries/companies/water users	AP	AP	NE	NE
3.7	Educates customers to help them minimise product impacts	NE	NE	NE	NE

	Company	Mondi		Sappi	
	Years	**2011**	**2013**	**2011**	**2013**
4. DISCLOSURE					
4.1	Makes water-related information publicly available	AP	AP	AP	AP
4.2	Includes water data and analysis in published financial filings/reports	IS	IS	IS	IS
4.3	Provides third-party assurance or audits water-related information	NE	IS	IS	IS

4.8.1 Measurement

Measurement entails the collection and monitoring of data on a number of key areas in the business. Below are the findings of the measurement activities for the two forestry companies, Mondi and Sappi.

4.8.1.1 Data gathering

This subsection assesses whether the company is collecting and monitoring information on water consumption and discharge, and if and how the company's production processes are affecting water sources. What external factors could affect the current and future water supply for the company? Then stakeholders' perceptions and the reputation of the company are monitored, and finally, how its water-intensive suppliers are managing water-related issues, are also examined.

1.1	Does the company collect and monitor data on the company's own regulatory compliance, water use and discharge?

Since both Mondi and Sappi report on water withdrawals, water consumption, water reuse/recycling and wastewater discharge for all direct operations, leading practice was selected for both companies.

Mondi: The water we discharge after production is thoroughly treated before being released into the natural environment. This is important, as impurities in water discharges and changes in water temperature can harm the prevailing natural ecosystems. We ensure that the water we release is ecologically safe and meets regulatory requirements. In 2013, 280 million m^3 (2012:288 million m^3) of water was discharged by Mondi's operations. (***Source:*** *Mondi Group Limited, 2013:42)*

Sappi: Specific water drawn and water returned

The amount of water drawn is relatively high but the actual water consumption averages 8.5% of the amount drawn. (***Source****: Sappi Limited, 2011:78)*

Water and effluent testing is conducted routinely at all mill sites. Water management is included in our operational environmental management plans, which are reviewed and updated annually.

(***Source****: Sappi Limited, 2013:108)*

1.2	Does the company collect and monitor data on the company's environmental and social impacts on direct water sources?

Leading practice was selected for Mondi and Sappi as both companies do identify all sources of water for all direct operations and do track a range of data relating to the company's environmental and social impacts on these sources.

Mondi: The water we discharge after production is treated and then released back into the natural environment. Treating water is important, as impurities in water discharges as well as changes in water temperature can harm ecosystems linked with natural water bodies. Our water systems ensure that the water we release is treated, ecologically safe and meets regulatory requirements.

(***Source:*** *Mondi Group Limited, 2011:37)*

Sappi: While we use a significant amount of water in our production processes, it is recycled many times before being treated and returned to the environment. Unlike most other industries, we return approximately 91.5% of the water we extract back into the watershed, mostly into the same rivers from which it was extracted or into agricultural irrigation systems. All effluent is carefully treated before being returned to the environment, and complies with the highest environmental standards.

(***Source:*** *Sappi Limited, 2011:76)*

There is a general perception that forestry in South Africa uses excessive amounts of water. The fact is, however, that commercial forestry accounts for a little less than 3% of total use by reducing runoff into rivers and streams. This compares favourably with irrigated agriculture which uses 62% of the total water use in South Africa.

(***Source:*** *Sappi Limited, 2011:22)*

Silvicultural activities in forestry plantations seldom use chemicals that cause pollution. Fertiliser is only used once in each rotation. In addition, only pesticides that are short-lived and have little or no impact on downstream ecosystems are used, which means that forestry operations very seldom pollute water. Where this does occasionally occur, it is usually from a point source, a fuel or chemical spill, or sewage or leachate from inappropriately sited domestic waste sites of village sewage facilities such as septic tanks. Water flowing from afforested catchments is largely unpolluted our most significant impact lies in the fact that the trees on our plantations forests reduce water flow to rivers which run through areas of high biodiversity.

(***Source:*** *Sappi Limited, 2011:80)*

1.3	Does the company collect and monitor data on external factors affecting direct waters sources?

Leading practice was selected for Mondi for this activity as the company stated in its reports that a detailed water impact assessment was conducted for all its operations, and this impact assessment covered a wide range of external factors.

Mondi carried out detailed water impact assessments (WIAs) in 2011 for our forestry operations to assess any medium or long-term threats to the business. Mondi's South African plantations were of greatest concern with regard to water availability. South Africa is a water-stressed country and the impact of climate change could exacerbate the water shortage in the country and increase the water supply risk to the business. However, the WIAs established that there is no significant threat due mainly to the plantations' location on the wetter, eastern side of the country. The conclusions of the WIAs have been discussed with third parties, including the WWF, to ensure they are comprehensive and appropriately benchmarked to assess materiality. (***Source:*** *Mondi Group Limited, 2011:39)*

Advanced progress was selected for Sappi as the company identifies and tracks a wide range of external factors affecting current and future sustainability of water sources for key facilities.

Sappi: We continuously monitor and review forest best practices in the light of changing practices and environmental factors, including climate change which could increase the threat of water shortages, drought, fire and pest infestations.

(***Source:*** *Sappi Limited, 2011:79)*

1.4	Does the company collect and monitor data on stakeholder perceptions and concerns relating to water issues?

Advanced progress was selected for Mondi for this activity as the company shows in its reports that it works with some key stakeholders on a proactive and systematic basis. Mondi works with a number of NGOs on projects, which is proactive and on a systematic basis.

Initial steps was selected for Sappi, as the company's reports do not divulge a lot of information about its stakeholders. However, one can deduce from the excerpt below

that the company does monitor the attitudes and concerns of some key stakeholders on a proactive, but ad hoc basis.

Sappi: In South Africa, some of our stakeholders have expressed concern that forestry uses large amounts of water. However, unlike most other forms of agriculture, our plantations are not irrigated and use comparatively little water as shown in the water use comparison graph. (***Source:*** *Sappi Limited, 2013:35)*

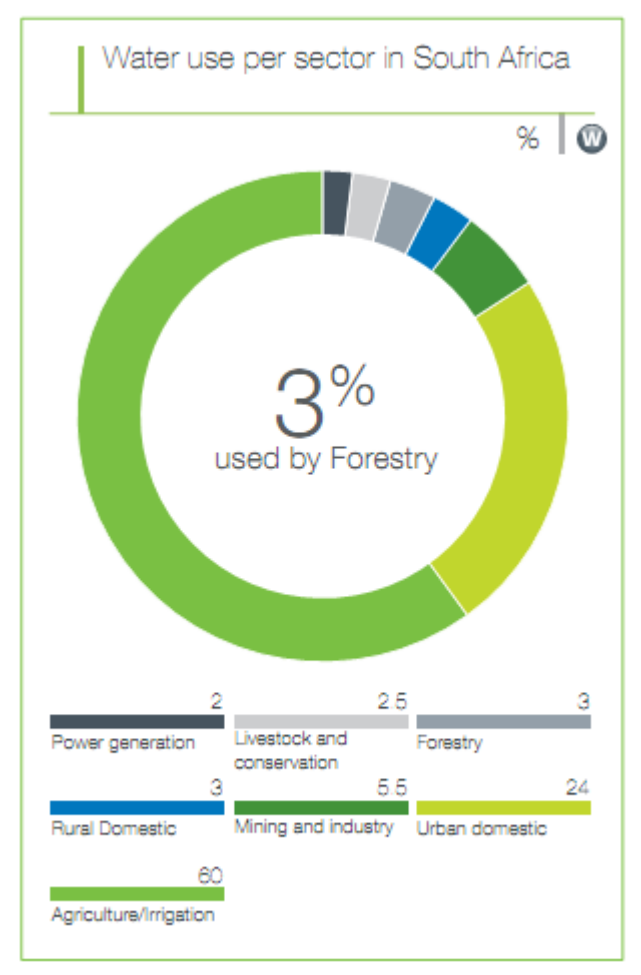

Figure 4.2: Water use per sector in South Africa

(**Source**: Sappi Limited, 2013:35)

1.5	Does the company collect and monitor data on the effectiveness of its supplier's water management practices?

There was no evidence of this activity in Mondi's reports for 2011, but in 2013, Mondi was working with some of its suppliers, sharing sustainability performance – hence the selection of initial steps.

Mondi: In 2013 we piloted a revised procedure within our chemicals procurement team inviting strategic suppliers to share their sustainability performance. The objective of this exercise is to develop deeper understanding of our suppliers' sustainability performance and to work together to improve transparency and responsible business conduct throughout our supply chain. The areas of our suppliers' performance that we place emphasis on include management and certification systems; carbon emissions; water discharges; waste to landfill; transport fuel efficiency; employee safety; human rights; child labour; and corruption.

(***Source:*** *Mondi Group Limited, 2013:66)*

There is no evidence of this activity in Sappi's reports for 2011 and 2013.

4.8.1.2 Risk assessment

Once the company has gathered all the necessary data as per the previous section, it is time to assess the company's risk exposure in both direct operations and the supply chain.

1.6	Does the company identify and quantify water-related risks in direct operations?

Advanced progress was selected for Mondi as the company shows in its reports that it does identify water-related risks in all direct operations, and is using the water footprint method to establish this.

Mondi: Most significant impact of climate change on our operations is likely to arise from changes in water availability, particularly the incidence and duration of droughts, which may have an impact on our fibre supply.

A detailed water footprint has been conducted at South African operations taking into consideration natural cycles in river flow changes. (***Source:*** *Mondi Group Limited, 2011:40)*

Advanced progress was also selected for Sappi as the company does identify water-related risks, including scarcity, quality, regulations, and so on, in all direct operations.

Sappi: Climate change is expected to have a profound impact on the world's rainfall patterns, river flows, and freshwater reserves. Any decrease in available water supplies could significantly affect our fibre supply and production processes.

(***Source:*** *Sappi Limited, 2013:35)*

Water issues have been identified as one of the most serious sustainability challenges facing the Planet, partly due to the impacts of climate change. Increasing population, urbanisation, per capita demand, and pollution damage to supplies, will put even greater pressure on this limited resource going forward.

(***Source:*** *Sappi Limited, 2013:106)*

1.7 Does the company identify and quantify water-related risks in the supply chain?

Initial steps was selected for Mondi, because it is evident in the excerpt below that Mondi uses the indirect water footprint to identify direct suppliers and key raw materials.

Mondi is convinced that water has to be considered in its environmental strategy and sets concrete actions to reduce its direct water consumption as well as taking this into account throughout the company's supply chain.

(***Source:*** *Mondi Group Limited, 2011:39)*

The indirect water footprint takes into account pulp, recovered paper, and fibre from third parties and is calculated using original data from our suppliers, data from literature, or comparable data from Mondi production, if data is not available from suppliers.

(***Source:*** *Mondi Group Limited, 2011:38)*

There is no evidence in Sappi's reports that the company identifies water-related risks in its supply chain.

4.8.2 Management

Management consists of three subcategories of activities, namely governance and accountability, policies and standards, and business planning, which a company should use to manage water-related issues. Below are the findings of the management activities for the two forestry companies, Mondi and Sappi.

4.8.2.1 Governance and accountability

For a company to take water-related issues seriously, there must be board-level commitment and senior management involvement, and even financial incentives may be linked to senior executives' sustainability scorecards. The last point in this subsection is ensuring that the company does "walk the talk" on water-related issues.

2.1	Does the company clarify board responsibility for oversight of water?

There is no mention of this in both Mondi's and Sappi's reports. However, in terms of the initiatives undertaken and money invested, there should be a board oversight of water. Initial steps was thus selected for both companies.

2.2	Are senior executives directly involved in the management of water-related issues?

There is no evidence of this in both Mondi's and Sappi's reports. However, as stated in the above point, on the strength of the initiatives undertaken and the amount of money being invested, there must be senior executive involvement in water-related issues. Hence initial steps were selected for both companies.

2.3	Does the company align public policy positions and lobbying with water stewardship goals – in other words, does the company "walk the talk".

Advanced steps was selected for both Mondi and Sappi as their public policy position and lobbying are consistent with their own stated water stewardship goals and with internationally recognised water stewardship goals. In other words, it is evident from their reports that they are "walking the talk."

4.8.2.2 Policies and standards

Setting policies, performance standards and goals helps guide the company on water issues, raises awareness and helps measure and drive performance. The

company needs to look further than its own facilities – that is, take into account its water sources and who it shares this water with. Lastly, the company's supply chain performance standards and goal setting are addressed in this subsection.

2.4	Does the company have a publicly available water policy and recognise the importance of water in the business?

Advanced progress was selected for Mondi and Sappi as both companies do show in their reports that they have an easily identifiable publicly available policy on water. Mondi and Sappi do set clear goals and guidelines and do publicly demonstrate a commitment to water.

2.5	Does the company set performance standards and goals on water withdrawals/ consumption for direct operations?

Advanced progress was selected for Mondi and Sappi because the companies do set business-wide targets for the reductions in water consumptions for all facilities. Leading practice was not selected as there was no mention of more aggressive targets being set for facilities that are deemed high risk.

Mondi: We will promote conservation, reuse, and recycling practices to reduce specific contact water consumption by 10% by 2015, against a 2010 base year. We will reduce our effluent load to the environment, either directly or indirectly discharged, by 10% against a 2010 base year. A 9% reduction of COD emissions was achieved by the end of 2013, mainly by modernisation projects at our mills involving the modernisation of our waste water treatment plants.

(***Source:*** *Mondi Group Limited, 2013:21)*

The STEP investment between 2008 and 2010 resulted in a reduction in water consumption for production and an increase in recycled water usage for energy production. As a consequence, the volume of water intake from the Vychegda River decreased by 16.7 million m^3 or 14.9% in 2013, compared with 2008. In pulp production, the specific fresh water consumption decreased by a significant 32%.

(***Source:*** *Mondi Group Limited, 2013:51)*

2.6	Does the company set performance standards and goals on wastewater discharge for direct operations?

Advanced progress was selected for Mondi, because as indicated in the excerpt above under point 2.5, the company also conducted a detailed water impact assessment (WIA) in 2011 on all its facilities. According to Mondi's reports: "The assessment also highlights the potential for water saving and recycling/reuse of process water."

Advanced progress was selected for Sappi, because the excerpt below mentions that Sappi complies with environmental standards.

Sappi: All effluent is carefully treated before being returned to the environment and complies with the highest environmental standards. (***Source:*** *Sappi Limited, 2011:16)*

2.7	Does the company's direct operations develop plans to address local watershed risks?

Leading practice was selected for Mondi, and as indicated in the excerpt below, all facilities have developed source water protection plans, and projects will be conducted to improve conditions for the watersheds supplying or affected by each facility.

Mondi: It is important that Mondi manages direct impacts on local water resources in relation to local watersheds. Using the Global Water Tool, all Mondi mills have assessed their water use relative to local water availability. A detailed water footprint has been conducted at South African operations, taking into consideration natural cycles in river flow, changes in lake or aquifer levels and violations of water quality standards. Further WIAs will be undertaken for operations in water-stressed countries in 2012. Mondi is working to reduce its blue water usage by carefully examining the production process for any inefficiencies. This includes identifying where any blue water can be recycled: taking water from a production stage and, instead of sending it to the waste water treatment plant, trying to use it in another stage. Mondi also seeks to harness the economic and environmental value of the energy content of warm and hot water. (***Source:*** *Mondi Group Limited, 2011:40)*

In Sappi's report for 2011 there is no evidence that the company is addressing local watershed risk, and in 2013, it only mentions how the company is restoring major rivers and watersheds in the United States. Because this study was only concerned with South Africa, no evidence was selected for this activity for Sappi.

2.8	Does the company address sustainable water management in supplier standards and codes, and in procurement and contracting practices?

In 2011, there was no evidence of this activity in Mondi's reports, but in 2013, leading practice was selected for the company. In Mondi's sustainability report for 2013, it mentions that the company has a Group Code of Conduct for its Suppliers. In the code it states the following:

> **Mondi:** The supplier will comply with environmental regulations and standards applicable to their operations, and will observe environmentally conscious practices in all locations where they operate. Environmental pollution shall be minimised and environmental protection shall be improved continuously. An environmental management system according to ISO 14001 or any equal system has to be implemented. (***Source:*** *Mondi Group Limited, 2009:2)*

There is no evidence of this activity in Sappi's reports for either 2011 or 2013.

4.8.2.3 Business planning

This subsection evaluates whether a company incorporates water into its long-term planning by including water risks and opportunities in investment decision making, budgeting, product design and development.

2.9	Does the company consider water in business planning and investment decision making?

Because Mondi does consider water issues in all major investments, advanced progress was selected.

> **Mondi:** Our business approach ensures that we incorporate social and environmental considerations into our decision making and commits us to land and freshwater stewardship. (***Source:*** *Mondi Group Limited, 2011:26)*

There is no mention of this activity in Sappi's reports for 2011, and initial steps was selected in 2013, as the report mentions that water management is part of the company's operational environmental management plans.

Sappi: Water management is included in our operational environmental management plans, which are reviewed and updated annually (***Source:*** *Sappi Limited 2013:1*

2.10 Does the company consider water in product design and development?

Leading practice was selected for Mondi as the company calculates its water footprint at each operation. The company therefore does have a programme to assess the life cycle water impacts of all significant products and has systematic programmes to reduce the life cycle water impacts of all significant products.

Mondi wanted to better understand its water footprint in order to manage it more effectively and efficiently. The company therefore calculated its water footprint, as a Group and at each operation, using the methodology described in the Water Footprint Assessment Manual published by the Water Footprint Network.

(***Source:*** *Mondi Group Limited, 2011:39)*

Because Sappi does consider water impacts in all its products and does try to reduce water impacts of its products, advanced progress was selected.

2.11 Does the company identify water-related business opportunities?

According to the Gauge™: "*Business opportunities can include new products and processes, as well as the benefits from better stewardship of water either in reduced costs, enhanced brand equity, improved stakeholder relations or other business benefits."*

Since Mondi is working on a number of projects to reduce water consumption, reducing water-related costs and showing publicly that the company is a good water steward, advanced progress was selected.

Mondi: To further meet our Group-wide commitment to reducing water consumption and minimising the volume of COD discharged to the aquatic environment, our Syktyvkar mill is upgrading its Waste Water Treatment Plant (WWTP). This project, which is due for completion in 2016, will introduce improvements at four different

stages of waste water treatment: mechanical treatment; biological treatment; treatment in lagoons; and finally the control of waste water treatment. Sergey Tsyganov, Syktyvkar mill's environmental manager, explains, "We have worked together with the local authorities for the project's implementation. Mondi Syktyvkar accepts and treats storm and municipal waste waters as well as waste water from other industries in the Syktyvkar area where there are inadequate treatment facilities." (***Source:*** *Mondi Group Limited,2013:51)*

As a means of further reducing our reliance on potable water, Veolia Water Solutions and Technologies was commissioned to install a reverse osmosis (RO) plant at the mill in 2013. This RO plant treats the second class water to a standard required for the production of steam. The RO water has now substituted potable water fed to Mondi boilers and hence further reduced potable water usage in the mill. The benefits of this venture will continue to deliver positive environmental outcomes.

(***Source:*** *Mondi Group Limited, 2013:51)*

There was no evidence of this activity for Sappi for 2011, but advanced progress was selected for 2013, as Sappi is demonstrating potential water cost savings by using more than 50% recycled water in two of the company's mills. As indicated in the excerpt below, Sappi is treating waste water that can be used to generate steam and power, among other things, in Russia, and hopefully this can be done in South Africa too.

Sappi: In 2013 in South Africa, our Enstra and Cape Kraft Mills used 63% and 56% recycled water respectively. (***Source:*** *Sappi Limited, 2013:108)*

The waste water at some of our mills in Europe goes through an anaerobic digestion process. The methane generated during this process is used to generate steam and power. Sludge generated in the waste water treatment process is dried and then, recycled, burnt or used as fertiliser. Alfeld, Ehingen, Gratkorn, Lanaken, and Stockstadt Mills generate their own biogas reducing our need for fossil fuels.

(***Source:*** *Sappi Limited, 2013:98)*

4.8.3 Stakeholder engagement

Engaging with stakeholders can help a company identify water-related risks and the impacts the company could have on water sources. It is necessary to understand what level of interest and power the company's stakeholders have, because this will help the company to decide how to deal with the different types of stakeholders. The Gauge™ has identified a number of stakeholders that should be engaged with in managing water issues, and these are discussed below.

3.1	Does the company engage with local communities on water-related issues at existing or potential new direct operations?

Initial steps was selected for Mondi because it has a number of projects underway to reduce water consumption and wastewater discharge. However, there is no mention in the reports of specific interaction with the community.

There is no evidence of community engagement in Sappi's 2011 report. However, initial steps was selected for 2013 because the company does report on external water projects that benefit local communities, but there is no mention of Sappi personnel consulting with local communities in advance of expanding operations.

Sappi: Social projects are reviewed on a case-by case basis and we encourage projects which facilitate partnerships and collaboration between communities, government, and the private sector. Areas of mutual interest and key issues discussed on a regular basis include water usage and quality, effluent quality and air emissions, employment and business opportunities, and community support.

(***Source:*** *Sappi Limited, 2013:76)*

3.2	Does the company engage with employees on water issues?

Since there is no specific mention of this activity in Mondi's or Sappi's reports, no evidence was selected for 2011 and 2013.

3.3	Does the company work with suppliers to help them improve water management?

There is no evidence of this activity in Mondi's report for 2011, but in 2013, initial steps was selected as the company mentioned in its reports that it is working with and advising some direct suppliers to improve their water management. In Sappi's reports there is no evidence of this activity for 2011 and 2013.

3.4	Does the company engage openly with local, regional and national governments to advance sustainable water policies and management?

Advanced progress was selected for Mondi, as it is seen from the company's reports to be engaging on water-related public policy on watershed issues, and the company is fully transparent and aims to promote sustainable water management. Because Sappi does engage with government in order to promote sustainable water management, initial steps was selected.

3.5	Does the company engage with NGOs and community organisations on water issues?

Mondi engages formally by means of specific projects with NGOs on water issues relevant to the company's core business/areas of operation – hence leading practice was selected for Mondi for this activity.

Mondi: University of the Free State and the Council for Scientific and Industrial Research have all made an important contribution to improve our understanding of plantation water issues through projects carried out on Mondi land. In 2013, the conclusion of Phase II of the WRC's "Working for Water" backed hydrological research on Mondi's Two Streams catchment has delivered practical research findings on the impacts of forestry on riparian areas. Mondi remains the principle sponsor of the Mondi Wetlands Programme (MWP). The MWP has been recognised as the most successful non-governmental wetland conservation programme in South Africa and a pioneering force for wetland conservation outside reserves in the country. The programme has achieved international recognition for its success in supporting social change that encourages wetland users and owners to manage their wetland resources in a more environmentally relevant manner.

(***Source:*** *Mondi Group Limited, 2013:36)*

Initial steps was selected for Sappi as it is evident from the company's reports that it engages with NGOs on an ad hoc basis. Sappi might be engaging with NGOs a lot more, but there is no mention of this in its reports.

Sappi: In South Africa we provided support to key NGOs including Birdlife South Africa, WWF-SA and the Wildlife and Environment Society of South Africa (WESSA).

(***Source:*** *Sappi Limited, 2011:14)*

3.6	Does the company engage with other industries/companies/water users?

Mondi has shown in its reports that it supports and participates in efforts to work within or across industries to address water risks and impacts in some areas of the business and engages with other users on an ad hoc basis. Advanced progress was therefore selected for Mondi for this activity.

The **Mondi** Wetlands Programme (MWP) has been working tirelessly for over 20 years to protect one of South Africa's most endangered ecosystems, and has succeeded in:

- initiating the rehabilitation of degraded wetlands in South Africa,
- investing many millions of Rands in the process;
- assessing the condition of over 19,500 hectares of wetlands and initiating rehabilitation in many of these;
- starting wetland conservation activities in 21 core areas around South Africa outside declared reserves;
- training over 1,050 people from 60 organisations in wetland assessment and functioning; and
- sparking interest and enthusiasm in wetland preservation throughout the country.

(***Source:*** *Mondi Group Limited, 2011:40)*

No evidence of this activity could be found in Sappi's reports.

3.7	Does the company educate customers to help them minimise product impacts?

There is no mention in either Mondi's or Sappi's reports that they educate customers on water-intensive products.

4.8.4 Disclosure

The Gauge™ encourages companies to disclose their water-related information, both qualitative and quantitative, as this is a way for a company to communicate to its various stakeholders and to show transparency. The last step in this section is to ask whether the water-related information has been verified by an independent third party. Below are the findings of the disclosure activities for the two forestry companies, Mondi and Sappi.

4.1	Does the company make water-related information publicly available?

Mondi and Sappi do disclose comprehensive qualitative and quantitative information relating to water, and these include water risks, opportunities, water use, discharge, impacts, and so on. Advanced progress was therefore selected.

4.2	Does the company include water data and analysis in published financial filings/reports?

Advanced progress could not be selected for Mondi or Sappi as there is no evidence that the companies assess the materiality of all water-related risks in developing their securities filings or annual reports. Initial steps was therefore selected as the companies comply with minimum financial disclosure requirements relevant to water.

4.3	Does the company provide third-party assurance or audits water-related information?

For Mondi, there was no evidence of this activity in 2011, but in 2013, it was mentioned in the company's report that 100% of Mondi's mills have received the ISO 14001 certification. In order for the company to obtain this certification, a third-party external company would have to perform an audit. Hence initial steps was selected, as assurance on some data relating to the company's direct water use/discharge and impacts is provided by an appropriate and independent third party. The researcher

was not sure what elements of water would be audited as part of the ISO 14001 standard, and it was beyond the scope of this study to investigate this matter.

Mondi: 100% of our mills have been certified to ISO 14001 standards

(***Source:*** *Mondi Group Limited, 2013:71).*

Since all of Sappi's mills are also ISO 14001 accredited, initial steps was selected.

Sappi: All our mills and plantations are currently certified to ISO 14001 and ISO 9001

(***Source:*** *Sappi Limited, 2011:64).*

4.8.5 Summary of the forestry and paper sector

Leading practice was selected for both Mondi and Sappi for the measurement of water consumption and discharge and what impacts the companies have on their direct water sources. Mondi is one of a few companies in this study that is working with its suppliers on water-related matters. There is no indication in both Mondi's and Sappi's reports if there is board or senior management involvement, but it can be assumed that there is because of the importance of water in this industry. Both companies have shown in their reports to be "walking the talk" with regard to water-related issues.

Leading practice was selected for Mondi because it is addressing local watershed risks and considering water in its product design. The company has also undertaken to conduct a water footprinting exercise. Mondi has a group code of conduct for its suppliers with an environmental element to it. There is no evidence that Mondi or Sappi engage with their employees, but because of the importance of water in the forestry sector, this may not be true. Mondi and Sappi do not report many community engagement activities.

Overall, a study of table 4.5 shows more leading practice selections for Mondi. However, both Mondi and Sappi do show in their reports that they are good water stewards. Issues that came to light about this industry from evaluating the two selected companies' reports is that the forestry and paper industry uses 3% of South Africa's water, and that approximately 91.5% of the water used is extracted back into the watersheds from which the water was taken. On the whole, the two companies

in this industry have shown a good commitment to water scarcity, and do recognise the significance of water in their respective businesses.

The 2013 CDP Water Programme combines the forestry sector with chemicals, energy, mining and oil and gas, and it was therefore difficult to compare the two studies. Sappi declined to participate in 2011, 2012 and 2013. The 2008 Global Study did not include the forestry sector.

4.9 MINING SECTOR

The mining sector includes African Rainbow Minerals, Assore Mining, Anglo Platinum (Amplats), Anglo Gold Ashanti, Exxaro, Gold Fields, Implats, Kumba Iron Ore and Northam Platinum.

LP = leading practice **AP = advanced progress**

IS = initial steps **NE = no evidence of action**

Table 4.6: Key areas of corporate water risk management identified in the Ceres Aqua Gauge™ – mining sector: 2011 and 2013

	Company	African Rainbow		Amplats		Ashanti		Assore		Exxaro		Gold Fields		Implats		Kumba		Northam	
	Years	'11	'13	'11	'13	'11	'13	'11	'13	'11	'13	'11	'13	'11	'13	'11	'13	'11	'13
1. MEASUREMENT																			
Data gathering																			
1.1	Its own regulatory compliance, water use and discharge	AP	AP	LP	LP	AP	AP	IS	IS	IS	AP	LP	LP	AP	AP	AP	LP	AP	AP
1.2	Its own environmental and social impacts on direct water sources	AP	AP	LP	LP	AP	AP	IS	IS	IS	IS	AP	AP	IS	IS	AP	LP	AP	AP
1.3	External factors – such as economic and social development, impacts of other users, climate change and public policy – affecting direct water sources	AP	AP	LP	LP	AP	AP	IS	IS	IS	IS	LP	LP	IS	IS	AP	AP	AP	AP
1.4	Stakeholder perceptions and concerns relating to water issues	AP	AP	AP	AP	IS	IS	NE	IS	AP	AP	LP	LP	NE	IS	AP	AP	AP	AP

	Company	African Rainbow		Amplats		Ashanti		Assore		Exxaro		Gold Fields		Implats		Kumba		Northam	
	Years	**'11**	**'13**	**'11**	**'13**	**'11**	**'13**	**'11**	**'13**	**'11**	**'13**	**'11**	**'13**	**'11**	**'13**	**'11**	**'13**	**'11**	**'13**
1.5	The effectiveness of suppliers' water management practices	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
	Risk assessment																		
1.6	Water-related risks in direct operations	AP	AP	LP	LP	AP	AP	IS	IS	IS	IS	AP	AP	IS	IS	IS	IS	IS	IS
1.7	Water-related risks in the supply chain	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
	2. MANAGEMENT																		
	Governance and accountability																		
2.1	Clarifies board responsibilities for oversight of water	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS
2.2	Involves senior executives directly in management of water-related issues	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS
2.3	Aligns public policy positions and lobbying with water stewardship goals	IS	IS	AP	AP	IS	IS	NE	NE	NE	IS	AP	AP	NE	IS	AP	AP	IS	IS
	Policies and standards																		
2.4	Has a publicly available water policy and recognises the importance of water to the business	AP	AP	LP	LP	AP	AP	IS	IS	IS	IS	LP	LP	IS	IS	AP	AP	AP	AP

	Company	African Rainbow		Amplats		Ashanti		Assore		Exxaro		Gold Fields		Implats		Kumba		Northam	
	Years	**‘11**	**‘13**	**‘11**	**‘13**	**‘11**	**‘13**	**‘11**	**‘13**	**‘11**	**‘13**	**‘11**	**‘13**	**‘11**	**‘13**	**‘11**	**‘13**	**‘11**	**‘13**
2.5	Sets performance standards and goals on water withdrawals/consumption for direct operations	NE	NE	AP	AP	AP	AP	NE	NE	IS	AP	AP	AP	AP	AP	AP	AP	AP	AP
2.6	Sets performance standards and goals on wastewater discharge for direct operations	NE	NE	IS	IS	IS	IS	NE	NE	NE	IS	AP	AP	NE	NE	AP	AP	AP	AP
2.7	Requires direct operations to develop plans to address local watershed risks	AP	AP	AP	AP	AP	AP	NE	IS	IS	AP	AP	AP	NE	IS	AP	AP	AP	AP
2.8	Addresses sustainable water management in supplier standards and codes, and in procurement and contracting practices.	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Business planning																			
2.9	Considers water in business planning and investment decision making	AP	AP	AP	AP	AP	AP	NE	NE	NE	IS	AP	AP	IS	IS	IS	IS	IS	IS
2.10	Considers water in product design and development	IS	IS	AP	AP	AP	AP	NE	NE	IS	IS	AP	AP	IS	IS	IS	IS	IS	IS
2.11	Identifies water-related business opportunities	IS	IS	AP	AP	NE	NE	NE	NE	IS	AP	LP	LP	NE	AP	AP	AP	NE	NE

	Company	African Rainbow		Amplats		Ashanti		Assore		Exxaro		Gold Fields		Implats		Kumba		Northam	
	Years	'11	'13	'11	'13	'11	'13	'11	'13	'11	'13	'11	'13	'11	'13	'11	'13	'11	'13
3. STAKEHOLDER ENGAGEMENT																			
3.1	Requires engagement with local communities on water-related issues at existing or potential new operations	AP	AP	AP	AP	AP	AP	NE	IS	NE	AP	AP	AP	NE	NE	AP	AP	IS	S
3.2	Engages with employees on water issues	NE	NE	AP	AP	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	AP
3.3	Works with suppliers to help them improve water management	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
3.4	Engages openly with local, regional and national governments or regulators to advance sustainable water policies and management	AP	AP	LP	LP	AP	AP	NE	IS	IS	AP	AP	AP	IS	IS	LP	LP	IS	AP
3.5	Engages with NGOs and community organisations on water issues	AP	AP	LP	LP	AP	AP	NE	NE	IS	AP	LP	LP	NE	IS	LP	LP	IS	IS
3.6	Engages with other industries/companies/water users	NE	NE	LP	LP	AP	AP	NE	NE	IS	AP	AP	AP	NE	NE	IS	IS	NE	IS
3.7	Educates customers to help them minimise product impacts	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

	Company	African Rainbow		Amplats		Ashanti		Assore		Exxaro		Gold Fields		Implats		Kumba		Northam	
	Years	**‘11**	**‘13**	**‘11**	**‘13**	**‘11**	**‘13**	**‘11**	**‘13**	**‘11**	**‘13**	**‘11**	**‘13**	**‘11**	**‘13**	**‘11**	**‘13**	**‘11**	**‘13**
4. DISCLOSURE																			
4.1	Makes water-related information publicly available	IS	IS	LP	LP	IS	IS	IS	IS	IS	IS	LP	LP	IS	IS	AP	AP	IS	IS
4.2	Includes water data and analysis in published financial filings/reports	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS
4.3	Provides third-party assurance or audits water-related information	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	IS	IS	NE	NE	IS	IS	NE	NE

4.9.1 Measurement

Measurement entails the collection and monitoring of data on a number of key areas in the business. Below are the findings of the measurement activities for the nine mining companies, namely African Rainbow Minerals, Amplats, Ashanti, Assore, Anglo Gold Ashanti, Exxaro, Gold Fields, Implats, Kumba and Northam.

4.9.1.1 Data gathering

This subsection assesses whether the company is collecting and monitoring information on water consumption and discharge, and if and how the company's production processes are affecting water sources. What external factors could affect the current and future water supply for the company? Then stakeholders' perceptions and the reputation of the company are monitored, and finally, how its water-intensive suppliers are managing water-related issues, are also examined.

1.1	Does the company collect and monitor data on the company's own regulatory compliance, water use and discharge?

As indicated in table 4.6, all mining companies are measuring their water consumption. However, Assore, for both 2011 and 2013, and Exxaro for 2011, did not mention their water discharge figures – hence initial steps was selected for these two companies. Advanced progress was selected for African Rainbow, Anglo Gold Ashanti, Exxaro in 2013, Implats and Kumba in 2011 and Northam Platinum, as these companies reported on water consumption and wastewater discharge for all their operations. Leading practice was selected for Amplats and Gold Fields for both 2011 and 2013, and Kumba for 2013, because these companies reported on water consumption, water reuse/recycle and waste water discharge for all their direct operations.

1.2	Does the company collect and monitor data on its environmental and social impacts on direct water sources?

All the selected mining companies are collecting and monitoring data on their own environmental and social impacts.

If the company identifies *key sources* of water for *some* direct operations, then initial steps was selected. If a company identifies *key sources* of water for *all* direct operations, then advanced progress was selected. Leading practice was selected

for Amplats and Kumba in 2013, as the companies identified *all sources* of water for all direct operations.

Amplats: There was protest action at their Twickenham Platinum mine due to loss of water and access to land and the mine is working with the community and local authorities to ensure that the communities around the mine have access to water.

(***Source:*** *Anglo American Platinum Limited, 2011:126)*

Northam Platinum: In April 2013 a drainpipe malfunction on the storage tailings facility (TSF) resulted in a relatively small quantity of tailings being released into the upper reaches of a watercourse in the area. (***Source:*** *Northam Platinum Limited, 2013:49)*

Goldfields: South Deep – 4 November 2013: There was a discharge of water from the sewage plant into the environment (allowable under our Water Use Licence) which showed elevated levels of sulphates total dissolved solids and conductivity. It is unclear why these parameters were found in elevated levels in the sewage water as these are typical of mine process water. Sample analysis records are being checked to determine the reasons for this possible anomaly. A follow-up sample taken on 11 November 2013 showed that these parameters were no longer above the discharge limits. (***Source:*** *Goldfields Limited, 2013:85)*

Goldfields is taking a leadership role in efforts to address the long-term impact of Acid Mine drainage (AMD) by investigating an integrated regional water strategy the Liquid Gold project which seeks to proactively mitigate AMD in the West Rand. The Liquid Gold project aims to treat Gold Fields water discharges from the dolomitic aquifers in the West Wits area to a potable standard. This water would be used to supply clean water to communities on the West Rand. This would be achieved in cooperation with local municipalities who would deliver the water through their water infrastructure. (***Source:*** *Goldfields Limited, 2011:65)*

1.3	Does the company collect and monitor data on external factors affecting direct water sources?

According to the Gauge™, potential external factors include, but are not limited to, climate change, economic and social development, public policy and the impacts of other users. All mining companies are aware of the threat that climate change has on water availability, and the legacy issues of acid mine drainage, as this is an issue that specifically concerns the mining industry.

All mining companies are encountering problems with obtaining their water use licences from the Department of Water Affairs. The companies for which initial steps was selected were those that identify and track *some* external factors currently affecting the quality and availability of water, while the companies for which advanced progress was selected, were those that identify a *wide range* of factors affecting the current and future water sources for *key facilities*. Leading practice was selected for Amplats and Goldfields as these companies identify and track a *wide range* of factors affecting the current and future water sources for *all water* sources.

African Rainbow: Water availability is likely to be affected by climate change and is a particular concern for our operations in the water stressed regions of the Northern Cape. (***Source:*** *African Rainbow Minerals Limited, 2013:11)*

Anglo Gold Ashanti: "Potential physical risks to our operations as a result of climate change include changes in rainfall rates or reduced water availability, higher temperatures and extreme weather events. In addition, the communities around our mines could be exposed to an increased risk of food insecurity, water scarcity, and adverse health impacts." (***Source:*** *AngloGold Ashanti Limited, 2011:50)*

Assore: At its Cato Ridge works has undertaken a major programme to construct a series of three (3) retention dams and one water storage dam to optimise the reuse of process water and prevent the release of contaminated water from site.

(***Source:*** *Assore Limited, 2011:63)*

Water Use licences applied for as far back as 2006 sites in North West waiting for new licence sites continue to operate on old permits. Management continues to liaise with DWA. (***Source:*** *Assore Limited, 2013:61)*

Anglo Gold Ashanti: "We are developing strategies in areas of climate change and water security. Water is a key input for the mining industry."

(***Source:*** *AngloGold Ashanti Limited, 2011:48)*

Amplats: A particular challenge in recent years has been the delays in water use licence applications, environmental impact assessment and environmental management programmes by the authorities.

(***Source:*** *Anglo American Platinum Limited, 2013:86)*

1.4 Does the company collect and monitor data on stakeholder perceptions and concerns relating to water issues?

All mining companies engage with their stakeholders, except for Assore and Implats for 2011, and these companies should therefore be aware of their stakeholder perceptions and concerns relating to water scarcity.

The choice of initial steps indicates that the company monitors the attitudes and concerns of *some* key stakeholders on a proactive but *ad hoc* basis. If advanced progress was selected, this means that monitoring occurs on a *systematic basis.*

Leading practice was selected for Gold Fields as it monitors all its key stakeholders' attitudes and concerns on a *proactive* and systematic basis.

African Rainbow: Our operations engage with the Department of Water Affairs, local communities, local authorities, irrigation boards, catchment management agencies, and other industry users to ensure the sustainability of water resources for all stakeholders. (***Source:*** *African Rainbow Minerals Limited, 2011:61)*

Gold Fields is the founder of Mining Interest Group. The company engages with farmers' water consumers and other interested parties enhanced engagement with environmental monitoring groups Federation for sustainable Environment.

(***Source:*** *Goldfields Limited, 2011:64)*

1.5	Does the company collect and monitor data on the effectiveness of its suppliers' water management practices?

As indicated in table 4.6 there is no evidence that the mining companies are collecting and monitoring data on their suppliers' water management practices. This is an area that needs improvement.

4.9.1.2 Risk assessment

Once the company has gathered all the necessary data as per the previous section, then it is time to assess its risk exposure in both direct operations and the supply chain.

1.6	Does the company identify and quantify water-related risks in its direct operations?

As indicated in table 4.6, all the mining companies identified water-related risks in their direct operations, but they did not quantify them. Another risk that all the selected mining companies mention in their reports is the difficulty obtaining their water use licences from the DWA. The researcher chose initial steps if the company mentioned that all direct operations are located in areas of water scarcity.

Advanced progress was selected if the company identified water-related risks, including scarcity, quality, regulations, and so on, in all its direct operations. Leading practice was selected for Amplats as the company has introduced a new water tool called the Water Efficiency Target Tool (WETT). This tool will not only help the company identify water-related risks in its direct operations, but also foster an in-depth understanding of current and potential future water risks.

African Rainbow: The risk of water scarcity impeding our growth plans and the physical risk of major storm events and flooding.

(***Source:*** *African Rainbow Minerals Limited 2013:107)*

Amplats: The threat of water scarcity is very real for Amplats, given that more than 90% of our operations are located in South Africa, a country that is water stressed.

(***Source:*** *Anglo American Platinum Limited 2011:7)*

Another material risk related to water is that three of our water use licences have not yet been approved by the Department of Water Affairs, despite significant efforts by the operations to obtain these licences. (***Source:*** *Anglo American Platinum Limited, 2011:43)*

Assore: Virtually all of the group's mines are located in water scare regions and so priority is placed on water efficiency and the prevention of pollution that could compromise the suitability of the water resource and future water uses.

(***Source:*** *Assore Limited, 2011:63)*

Exxaro: Water is a key strategic natural resource for South Africa. Exxaro recognises this and understands that it is also key to our business and must be managed as such. Initiatives to conserve water are considered at all sites to ensure water use is optimised. (***Source:*** *Exxaro Resources Limited, 2013b:48)*

Implats: Arguably our most significant environmental issue relates to managing and maintaining access to water a vital input for our mining processing and refining operations." (***Source:*** *Impala Platinum Holdings Limited, 2013:12)*

1.7 Does the company identify and quantify water related risk in its supply chain?

For risks in the supply chain, as indicated in table 4.6, there is no evidence that any of the mining companies have identified or quantified risks in their supply chains.

4.9.2 Management

Management consists of three subcategories of activities, namely governance and accountability, policies and standards, and business planning, which a company should use to manage water-related issues. Below are the findings of the management activities for the nine mining companies, African Rainbow Minerals, Amplats, Assore, Anglo Gold Ashanti, Exxaro, Gold Fields, Implats, Kumba and Northam.

4.9.2.1 Governance and accountability

For a company to take water-related issues seriously, there must be board-level commitment and senior management involvement, and even financial incentives could be linked to senior executives' sustainability scorecards. The last point in this subsection is to ensure that the company does "walk the talk" on water-related issues.

2.1	Does the company clarify board responsibility for oversight of water?

For all the mining companies there is no evidence in their reports that there is board responsibility for oversight of water. However, from the initiatives undertaken and money invested, there must be board oversight at the mining companies – hence the selection of initial steps for all the companies.

2.2	Are senior executives directly involved in the management of water-related issues?

There is no evidence in the mining companies' reports that senior executives are directly involved in the management of water-related issues. However, as stated in the above point, from the initiatives undertaken and the amount of money being invested, there must be senior executive involvement. Initial steps was therefore selected for all the companies.

2.3	Does the company align public policy positions and lobbying with water stewardship goals – in other words, does the company "walk the talk"?

In simple terms, this activity refers to whether the company is "walking the talk". The researcher therefore looked for evidence of the mining companies making a difference with regard to water scarcity in South Africa. In 2011, there was no evidence of this for Assore. However, there was evidence of this for Exxaro and Implats in 2013, but not in 2011. If the option, initial steps, was selected, the company's public policy position is seen to be consistent with its own stated water stewardship goals. The criteria for advanced progress is that the company's public policy positions are consistent with both its own water stewardship goals and with internationally recognised water stewardship goals.

Implats: On recycling, initiatives has over the year resulted in 15 271 mega litres of water being recycled which equates to 38% of all the water consumed improving from 37% in 2012 and 35% in 2011. (***Source:*** *Impala Platinum Holdings Limited, 2013:63)*

Kumba: We recycled 53% of the water used at our operations in 2013.

(***Source:*** *Kumba Iron Ore Limited, 2013:24)*

Anglo Gold Ashanti: $14 million spent in 2011 on reverse osmosis additional equipment was commissioned to increase the volume of water that can be recycled into the production process. (***Source:*** *AngloGold Ashanti Limited, 2011:23)*

4.9.2.2 Policies and standards

Setting policies, performance standards and goals helps guide the company on water issues, raises awareness, and helps measure and drive performance. The company needs to look further than its own facilities, and take into account its water sources and who it shares this water with. Lastly, the company's supply chain performance standards and goal setting are addressed in this subsection.

2.4	Does the company have a publicly available water policy and recognise the importance of water in the business?

All the selected mining companies have a policy on water and, to a lesser or greater extent, are recognising the importance of water to the business.

If initial steps was selected, it was found that the company has an easily identifiable, publicly available policy on water and sets out clear goals and guidelines for actions. Advanced progress was then selected if the company has publicly demonstrated a commitment to water. Leading practice goes further by stating that the company recognises its responsibility to respect the human right to water and sanitation.

2.5	Does the company set performance standards and goals on water withdrawals/consumption for direct operations?

All the selected mining companies, except for African Rainbow Minerals and Assore, show that they set performance standards and goals on water withdrawals for direct operations. The option of initial steps was selected if the company sets targets for reductions in water consumption at some facilities. Advanced progress was selected if the company sets business-wide targets for reductions in water consumption for all facilities.

Amplats: The platform created by the target setting programme encouraged several operations to identify further water saving measures over and above those of the mainstream water projects. (***Source:*** *Anglo American Platinum Limited, 2011:55)*

2.6	Does the company set performance standards and goals on wastewater discharge for direct operations?

African Rainbow Minerals, Assore and Exxaro in did not mention in their 2011 reports that they set performance standards and goals on wastewater discharge in their direct operations. The option of initial steps was selected if a company had set wastewater discharge figures for *some* of its facilities.

Advanced progress was selected if the company had set wastewater discharge figures for *all* its sites. Advanced progress was selected for Amplats because of its WETT programme which helps it set water targets.

Ashanti: The development of an integrated water management strategy which addresses issues such as potential mine flooding, groundwater, and storm water management, as well as the potential impact of mining activities on water supply to neighbouring areas. (***Source:*** *AngloGold Ashanti Limited, 2011:21)*

2.7	Does the company's direct operations develop plans to address local watershed risks?

The option of initial steps referred to *some* company's facilities, which are operating in areas that are deemed high risk, being required to develop source water protection, and this would include engaging with key local stakeholders and supporting projects that improve conditions in the watershed(s) supplying or affected by each facility. Advanced progress included *all major* facilities and not only some facilities, while leading practice included *all facilities* in the description.

Since the researcher could not ascertain in the mining companies' reports if the companies were including all major or all facilities, advanced progress was chosen, and not leading practice. No evidence was selected for Assore in 2011, and initial steps in 2013, while advanced progress was selected for all the other mining companies.

Amplats: Construction of De Hoop dam on the Steelpoort River a tributary of the Olifants River to supply water to mines and communities on the northern and eastern limbs of the Bushveld Complex. Water storage will only start in 2015. DWA is managing the operation. In 2013 through the River Joint Water Forum (JWF) the Lebalelo Water User's Association (LWUA) plans were submitted the DWA for a pipeline to carry water 25 km from the Flag Boshielo dam to Mogalakwena. Amplats with other mining companies will fund 58% of this project = R1.1 billion reducing the government's exposure to the project of R770 million.

(***Source:*** *Anglo American Platinum Limited, 2013:93)*

2.8	Does the company address sustainable water management in supplier standards and codes, and in procurement and contracting practices?

It was found that none of the selected mining companies showed any evidence in their reports that they are addressing sustainable water management in supplier standards and codes, and in procurement and contracting practices. This is an area that needs improvement.

4.9.2.3 Business planning

This subsection evaluates whether a company incorporates water in its long-term planning by way of including water risks and opportunities in investment decision making, budgeting, and product design and development.

2.9	Does the company consider water issues in major investments?

The option of initial steps relates to whether the company considers water issues in *major* investments in areas identified as high water risk. Advanced progress refers to a company considering water issues in *all* major investments.

Leading practice relates to a company taking full consideration of water risks and opportunities, including well-founded values for water, in all major decisions, as well as systematic planning and budgeting. Water risks are integrated into the company's enterprise risk management system. There was no evidence of this for Assore or Exxaro in 2011. Initial steps was selected for Exxaro in 2013, and for Implats, Kumba and Northam. Advanced progress was chosen for African Rainbow Minerals, Amplats, Anglo Gold Ashanti, and Gold Fields.

African Rainbow: The availability of water is a key consideration when we plan the expansion or construction of an operation.

(***Source:*** *African Rainbow Minerals Limited, 2011:61)*

2.10 Does the company consider water in product design and developments?

The option of initial steps refers to a company assessing the life cycle water impacts of *some* products and having stated goals to reduce the life cycle use of water for selected products. Advanced progress relates to taking this activity a step further and considering *key* products, and whether or not the company has a systematic programme to reduce the life cycle water impacts of products with high impact or with significant use in water-stressed areas. Leading practice goes even further by asking if the company has a programme to assess the life cycle water impacts of *all* significant products and a systematic programme to reduce the life cycle water impacts of all significant products.

In Assore's company reports, there was no evidence of this activity. The option of initial steps was selected for African Rainbow Minerals, Exxaro, Implats, Kumba and Northam, while advanced progress was selected for Amplats, Anglo Gold Ashanti, and Gold Fields. All the mining companies except for Assore do consider water in their products.

2.11 Does the company identify water-related business opportunities?

According to the Gauge™: "*Business opportunities can include new products and processes, as well as the benefits from better stewardship of water either in reduced costs, enhanced brand equity, improved stakeholder relations or other business benefits."* African Rainbow Minerals is addressing acid mine drainage issues from the past, which shows improved water stewardship – hence the selection of initial steps.

African Rainbow: Some of our operations have had to address legacy issues of groundwater contamination and rehabilitate historically contaminated land that impacted on surface groundwater. (***Source:*** *African Rainbow Minerals Limited, 2011:61)*

Implats improved its stakeholder relations in 2013 by completing a water infrastructure project for 4,000 people in the Greater Tubatse area at a cost of R12 million.

In 2011, at its Sishen mine, Kumba commissioned a state-of-the-art bioremediation facility at a cost of R23 million. This facility uses bacteria to “eat’ soil contaminated by diesel. All sludge produced at Sishen mine now goes through this new bioremediation facility. Contaminated soil is taken from separation pits, where the soil settles and the water and oil separate. The oil is recycled and the water is reused in the plant. In 2013, through its water management initiatives, Kumba saved 7.7 million m^3, against its water-saving target of 2.5 million m^3.

Kumba is using an environmentally friendly product for dust suppression at its mines. After this product has been applied to the mine’s roads, it creates a dust-free road for two to three months. At Kumba’s Kolomela mine it uses approximately 120l/m2 of water on treated roads, compared to 1 500l/m2 needed on untreated roads annually.

The option of initial steps was selected for Exxaro in 2011 as per the Gauge™, as the company has publicly acknowledged the potential for water-related opportunities and has credible plans for the future. Exxaro mentions in its reports that there is a joint venture with national, provisional government, Eskom and coal producers to provide an adequate water supply to the Waterberg region, and in 2011, various systems were being examined. In another initiative in 2011, studies were underway to mitigate the risk of excess water, and viable plans were being developed to treat used water.

In 2013, Exxaro reduced its water withdrawals by 33%. Innovative passive water treatment systems are being evaluated by Exxaro’s Research and Development department in collaboration with the University of the Free State to find a long-term solution to water management. Exxaro is also working on a project with other mining companies to develop appropriate technology to deal with waste from water treatment plants.

In 2011, Amplats introduced a new water tool (WETT) in the company, aimed at aligning water targets across the Group. Amplats has set a medium-term water use target up to the year 2020. Advanced progress was selected for Amplats, because in terms of the Gauge™ definition, a company should publicly acknowledge the potential for water-related opportunities and work to develop new business opportunities that address water issues.

Amplats has worked with a number of interested parties on a number of projects, one of the largest being the construction of the De Hoop dam on the Steelpoort River to supply water to mines and communities in the area, which will improve stakeholder relations.

Amplats (WETT), which is the framework the company now employs to set water targets. Vinesh has also been responsible for the entire target-setting process at Amplats. To date this has:

- developed and implemented robust and consistent water balances at all operations;
- raised awareness of water conservation throughout the Company;
- ensured alignment between operations;
- guaranteed Company alignment with Anglo American's water programme;
- helped to reduce Amplats' water-use intensity by 10% overall (well above the target of 2.2% set for 2010);
- and assisted in decreasing the use of new water by 16% during 2010, from 40.5 million m^3 in 2009 to 33.8 million m^3 in 2010.

These savings were equivalent to reducing water consumption from 11.0 m^3 per refined ounce of precious metal in 2009 to 9.9 m^3 per refined ounce of precious metal in 2010. In 2010, water used for primary activities decreased by 15%, to 28.9 million m^3, while water used for non-primary activities decreased by 23%, to 4.9 million $m^{3.}$ (***Source:*** *Anglo American Platinum Limited, 2011:55)*

For Gold Fields, its Liquid Gold project is a long-term strategy for developing and implementing sustainable business solutions for water management. In 2014, as part of its Liquid Gold project, the plan was to commission two new reverse osmosis plants at its South Deep facility to treat process water. It would then be possible to use this water in its facilities, which would reduce the use of potable water from 250,000 KL per month to 160,000 KL per month.

Gold Fields

Liquid Gold: Mitigating future liabilities and enhancing water security

Liquid Gold is Gold Fields long-term strategy for developing and implementing a sustainable business solution for water management in the South Africa region. It aims to establish a sustainable revenue stream to fund the on-going management of key water issues at the KDC and South Deep mines in the Far West Rand area of South Africa – whilst at the same time delivering potable water to local communities that face potential water shortages in the future. These issues include the long-term de-watering of Gold Fields mines in the Wonderfonteinspruit river catchment area – as well as the mitigation of any potential future Acid Mine Drainage (AMD) risks. It is envisaged that potable water will be produced from fissure water (as well as process water) discharged by KDC and South Deep. This will be processed using leading-edge, customised treatment technology, and robust monitoring systems that will ensure high levels of water quality. The technology used includes:

A Crystalactor® to reduce calcium levels and produce mine usable lime as a side-product. This is a pellet reactor that softens water and enables the crystallisation of a variety of (heavy metal) carbonates, phosphates, halides, sulphates and sulphides. A cationic ion exchange to reduce residual calcium and magnesium. A de-gassing tower to remove carbon dioxide. Gold Fields is collaborating with an independent water services provider to ensure these technical processes fully satisfy relevant quality standards for potable water. Gold Fields also plans to establish a water treatment agreement. It is envisaged that the water will then be delivered by local municipalities, or other agreed service providers, using established infrastructure. This will help ensure that dewatering continues at economically and environmentally sustainable levels – even after the closure of Gold Fields mines on the West Rand. It is envisaged that the sustainability of the Liquid Gold project will be further augmented through the production of marketable chemicals – such as calcium magnesium nitrate (used to make fertiliser) – as a by-product of the water treatment processes. Gold Fields is investigating the establishment of third-party off-take agreements for these by-products.

(***Source:*** *Goldfields Limited, 2011:65)*

4.9.3 Stakeholder engagement

Engaging with stakeholders can help a company identify water-related risks and the impacts the company could have on water sources. It is necessary to understand what level of interest and power the company's stakeholders have, because this will help decide how to deal with the different types of stakeholders. The Gauge™ has identified a number of stakeholders that should be engaged with in managing water issues, and these will be discussed below.

3.1	Does the company engage with local communities on water-related issues at existing or potential new direct operations?

In this activity, the researcher looked at what external water projects had been undertaken that benefited the local communities in which the company operated, which is the second part of the required activity in the Gauge™. African Rainbow Minerals, Amplats, Ashanti, Gold Fields and Kumba all scored advanced progress as these companies have reported a number of projects where they help the local community.

Gold Fields: We are investigating an advanced water management project that will not only reduce our mine closure costs and enhance our operational efficiency, but which will (in partnership with other private sector participants and the government) test innovative and cost efficient approaches for treating contaminated water and offer communities increased access to potable water (***Source:*** *Goldfields Limited, 2013:56)*

Implats: In 2013 we spent R12 million on a water supply and reticulation project to provide water infrastructure to almost 4,000 people in the Greater Tubatse Municipality. The infrastructure was completed in March 2013. However, the district municipality has not supplied any water since then and as a result the communities still have no water. This will be addressed in the coming year.

(***Source:*** *Impala Platinum Holdings Limited, 2013:56)*

Kumba: A pipeline had been constructed for Sedibeng Water to provide communities with water from the Vaal River some 200 km away.

(***Source:*** *Kumba Iron Ore Limited, 2013:32)*

Kumba: In 2000 Sishen mine started receiving landowners' complaints about falling water levels. An environmental forum was established that comprises affected farmers, Sishen mine representatives, Tshiping Water Users' Association, consultants and provincial government representatives. In 2002, water level studies were undertaken with the aim of delineating the affected area. Further studies continued until 2008, when it was concluded that dewatering had indeed affected water levels. Following the findings, Sishen mine has put in place a comprehensive compensation system. Affected farmers are awarded grasing subsidies with which they purchase livestock feed. Water is also provided to those affected in one of three ways: by offering access to the Vaal Gamagara pipeline, by drilling deeper boreholes or, for those with no productive boreholes, by delivering supplies using water trucks.

The Sishen mine has appointed a full-time liaison officer to deal with farmers' issues and quarterly ad hoc meetings are held. A technical subcommittee has also been established, as a means of communication between farmers and the mine before issues are tabled at the environmental forum. Three people work on the ground to manage the water delivery system, while another staff member works internally to log complaints. (***Source:*** *Kumba Iron Ore Limited, 2011:80)*

Northam: The Zondereinde mine in conjunction with Anglo Platinum the Thabazimbi municipality and the Waterberg district municipality has embarked on a project to build and develop a new sewerage system in the town of Northam

(***Source:*** *Northam Platinum Limited, 2013:43).*

3.2 Does the company engage with employees on water issues?

Amplats and Northam are the only companies that mention in their reports that they engage with their employees on water issues. Advanced progress was selected for Amplats and Northam in 2013 as the companies have business-wide programmes designed to engage and educate employees. Amplats does this through its WETT programme, which has raised awareness of water conservation throughout the company.

Northam: "Water awareness campaigns and training sessions ensure that employees are made aware of the need to conserve water."

(***Source:*** *Northam Platinum Limited, 2013:52)*

3.3	Does the company work with its suppliers to help them improve water management?

There is no evidence in the selected companies' reports that they work with their suppliers to help them improve water management. This area would need to be looked into by each company. From the reports evaluated for this research, mining companies show that they are effective with water sustainability, but they need to pass on this knowledge to their suppliers.

3.4	Does the company engage openly with local, regional and national governments or regulators to advance sustainable water policies and management?

During her analysis of the selected mining companies' reports, the researcher ascertained that there are problems obtaining new water use licences, which means that the companies have to consult with the DWA on a regular basis. It was also evident that the mining companies are working with municipalities to provide water to communities in their area.

3.5	Does the company engage with NGOs and community organisations on water issues?

Only Assore did not report on whether it engages with NGOs in 2011 and 2013. If the option of initial steps was selected, then the company was engaging with NGOs and community organisations on an *ad hoc* basis to perform specific actions on water. Where advanced progress was selected, engagement with these stakeholders was on a more regular basis or the company formed partnerships to execute specific actions on water. Leading practice was selected if the engagement was more formal, or there was evidence of a partnership or a specific project on water issues that would be relevant to the company's core business of operation.

Amplats: In 2013 through JWF and LWUA submitted plans to the DWA for a pipeline to carry water 25km from the Boshielo dam to Mogalakwena.

(***Source:*** *Anglo American Platinum Limited, 2013:95)*

3.6	Does the company engage with other industries/companies/water users?

In the selected mining companies' reports, there was no or limited mention of this activity. The researcher selected initial steps if there was mention of the company engaging with other companies, users or industry on an *ad hoc* basis in order to address water risks and impacts. Advanced progress was selected if the company participated or supported efforts to work within or across industries. Leading practice entailed actively leading efforts to work within or across industries to address water risks and impacts.

AngloGold Ashanti has taken a transparent approach to the discussion of water issues, holding seminars, distributing written information on the issue, and seeking out open dialogue with opposition groups. (***Source:*** *AngloGold Ashanti Limited, 2011:53)*

3.7	Does the company educate its customers to help them minimise product impacts?

None of the selected companies mentioned in their reports that they educate customers to help them minimise the water impacts associated with the use of highly water-intensive products. This may not be relevant to the mining industry.

4.9.4 Disclosure

The Gauge™ encourages companies to disclose their water-related information, both qualitative and quantitative, as this is a way for a company to communicate with its various stakeholders and to show transparency. The last step in this section is to ask whether the water-related information has been verified by an independent third party. Below are the findings of the disclosure activities for the nine mining companies, African Rainbow Minerals, Amplats, Anglo Gold Ashanti, Assore, Exxaro, Gold Fields, Implats, Kumba and Northam.

4.1	Does the company make water-related information publicly available?

It was found that all the select mining companies report on water in either their sustainability reports or integrated reports. The option of initial steps indicates that the company discloses some qualitative and quantitative information relating to water. Advanced progress was selected for Kumba because it discloses comprehensive qualitative and quantitative information on water. Leading practice

was chosen for Amplats and Gold Fields as these companies disclose comprehensive forward-looking qualitative and quantitative information relating to water.

4.2	Does the company include water data and analysis in its published financial filings/reports?

All the selected companies provide water information in their integrated annual reports – hence the selection of initial steps. Advanced progress entails that the company assesses the materiality of all water-related risks in developing its securities filings or annual report, but the researcher could not verify this. Leading practice related to whether the company integrates the discussion of material water risks and opportunities and demonstrates the linkages to strategy, governance and financial performance. None of the selected companies were found to be doing this.

4.3	Does the company provide third-party assurance or audit water-related information?

Except for Gold Fields and Kumba, there was no evidence for the other companies of third-party assurance or audits being conducted on water-related information.

4.9.5 Summary of the mining sector

All the mining companies chosen for this study were shown to be aware of how important water is to the continued existence of their business, and that South Africa is a water scarce country – these being the main objectives of this study. They all reported on their water use, another key objective of this study. While conducting this study, another risk came to the attention of the researcher, namely that all the mining companies are experiencing problems obtaining their new water use licences.

Another water-related issue that emerged in this study is that the selected mining companies are involved with the clean-up of AMD. Overall, it is evident from investigating their various reports that the mining companies are trying to make an impact in South Africa with regard to water scarcity. One area that is not being reported on is whether mining companies are engaging with suppliers on water scarcity. This is a crucial activity that contributes to good water stewardship. As mentioned, the selected mining companies appear to have effective initiatives to deal with water scarcity and should share this knowledge with their suppliers, either by

working with them or by forcing suppliers by way of procurement selection criteria. On the whole, the mining sector appears to be the best sector when it comes to water disclosure.

African Rainbow Minerals and Assore declined to participate in the 2013 CDP Water Programme. Since the programme combines chemicals, energy, forestry, mining, and oil and gas, it could not be used as a benchmark in this study. The 2008 Global Study found that the mining sector showed the strongest water risk disclosure of all the sectors surveyed. This correlates with the researcher's findings. Thirteen mining companies were selected for the 2008 Global Study, but none of these companies were included in the current study. In the 2008 Global Study, only one company mentions that is evaluates its suppliers frequently on environmental performance. In this research, it was found that none of the selected companies engage with their suppliers.

4.10 OIL AND GAS SECTOR

The oil and gas sector includes SacOil and Sasol.

LP = leading practice **AP = advanced progress**

IS = initial steps **NE = no evidence of action**

Table 4.7: Key areas of corporate water risk management identified in the Ceres Aqua Gauge™ – oil and gas sector: 2011 and 2013

	Company	SacOil		Sasol	
	Years	2011	2013	2011	2013
1. MEASUREMENT					
Data gathering					
1.1	Its own regulatory compliance, water use and discharge	NE	NE	LP	LP
1.2	Its own environmental and social impacts on direct water sources	NE	NE	LP	LP
1.3	External factors – such as economic and social development, impacts of other users, climate change and public policy – affecting direct water sources	NE	NE	LP	LP
1.4	Stakeholder perceptions and concerns relating to water issues	NE	NE	LP	LP
1.5	The effectiveness of suppliers' water management practices	NE	NE	NE	NE
Risk assessment					
1.6	Water-related risks in direct operations	NE	NE	AP	AP
1.7	Water-related risks in the supply chain	NE	NE	NE	NE

	Company	SacOil		Sasol	
	Years	2011	2013	2011	2013
2. MANAGEMENT					
Governance and accountability					
2.1	Clarifies board responsibilities for oversight of water	NE	NE	AP	AP
2.2	Involves senior executives directly in management of water-related issues	NE	NE	IS	IS
2.3	Aligns public policy positions and lobbying with water stewardship goals	NE	NE	AP	AP
Policies and standards					
2.4	Has a publicly available water policy and recognises the importance of water to the business	NE	NE	AP	LP
2.5	Sets performance standards and goals on water withdrawals/consumption for direct operations	NE	NE	AP	AP
2.6	Sets performance standards and goals on wastewater discharge for direct operations	NE	NE	AP	AP
2.7	Requires direct operations to develop plans to address local watershed risks	NE	NE	AP	AP
2.8	Addresses sustainable water management in supplier standards and codes, and in procurement and contracting practices	NE	NE	NE	NE
Business planning					
2.9	Considers water in business planning and investment decision making	NE	NE	AP	AP
2.10	Considers water in product design and development	NE	NE	AP	AP
2.11	Identifies water-related business opportunities	NE	NE	AP	AP

3. STAKEHOLDER ENGAGEMENT					
	Company	**SacOil**		**Sasol**	
	Years	**2011**	**2013**	**2011**	**2013**
3.1	Requires engagement with local communities on water-related issues at existing or potential new operations	NE	NE	LP	LP
3.2	Engages with employees on water issues	NE	NE	AP	AP
3.3	Works with suppliers to help them improve water management	NE	NE	NE	IS
3.4	Engages openly with local, regional and national governments or regulators to advance sustainable water policies and management.	NE	NE	LP	LP
3.5	Engages with NGOs and community organisations on water issues	NE	NE	LP	LP
3.6	Engages with other industries/companies/water users	NE	NE	LP	LP
3.7	Educates customers to help them minimise product impacts	NE	NE	NE	NE
4. DISCLOSURE					
4.1	Makes water-related information publicly available	NE	NE	AP	AP
4.2	Includes water data and analysis in published financial filings/reports	NE	NE	IS	IS
4.3	Provides third-party assurance or audits water-related information	NE	NE	IS	IS

4.10.1 Measurement

Measurement entails the collection and monitoring of data on a number of key areas in the business. Below are the findings of the measurement activities for the two oil and gas companies, SacOil and Sasol.

4.10.1.1 Data gathering

This subsection assesses whether the company is collecting and monitoring information on water consumption and discharge, and if and how the company's production processes are affecting water sources. What external factors could affect the current and future water supply for the company? Then stakeholders' perceptions and the reputation of the company are monitored, and finally, how its water-intensive suppliers are managing water-related issues, are also examined.

1.1	Does the company collect and monitor data on the company's own regulatory compliance, water use and discharge?

As indicated in table 4.7, there was no evidence in SacOil's reports of collecting and monitoring data on the company's water use and discharge. Leading practice was selected for Sasol because the company monitors data on water consumption, water recycling and wastewater discharge for all direct operations.

Sasol: Our total quantity of water recycled for the 2011 financial year was 128,7 million m^3. (***Source:*** *Sasol Limited, 2011:53)*

The total quantity of water recycled was 145,4 million m^3, in 2013 compared to 142,7 million m^3 in 2012. Our total water use for 2013 decreased to 147.2 million m^3 from 148.3 million m^3. (***Source:*** *Sasol Limited, 2013:51)*

1.2	Does the company collect and monitor data on its environmental and social impacts on direct water sources?

Owing to the fact that Sasol identifies all sources of water for all direct operations and tracks a range of data relating to the company's environmental and social impacts on these sources, leading practice was selected. However, there was no evidence of this activity in SacOil's reports.

Sasol: Promoting effective catchment management and water conservation beyond our direct operations. Approximately 80% of our total water requirement comes from the Vaal River system in South Africa where studies by the Department of Water Affairs (DWA) have identified the likelihood of future water shortages. While Sasol's total water demand from the Vaal River system is high (about 3.5% of the total supply) it is much lower than the other main water users – urban homes and agriculture. (***Source:*** *Sasol Limited, 2011:54)*

1.3	Does the company collect and monitor data on external factors affecting direct water sources?

Sasol identifies and tracks a wide range of external factors affecting the current and future sustainability of all water sources upon which it relies – hence leading practice was selected. However, there was no evidence of this activity in SacOil's reports.

1.4	Does the company collect and monitor data on stakeholder perceptions and concerns relating to water issues?

Leading practice was selected for Sasol for this activity as it monitors the attitudes and concerns of all key stakeholders on a proactive and systematic basis. However, there was no evidence of this in SacOil's reports.

1.5	Does the company collect and monitor data on the effectiveness of its suppliers' water management practices?

There was no evidence in SacOil's and Sasol's reports that they collect and monitor data on the effectiveness of their suppliers' water management practices. This is an area that needs to improvement.

4.10.1.2 Risk assessment

Once the company has gathered all the necessary data as per the previous section, it is time to assess its risk exposure in both direct operations and the supply chain.

1.6	Does the company identify and quantify water-related risks in direct operations?

Advanced progress was selected for Sasol as the company identifies all water-related risks in direct operations in areas of potential water risk, including scarcity, quality, regulations or other factors. However, there was no evidence of this activity in SacOil's reports.

Sasol: We operate facilities or are planning projects in regions of the world where there are site-specific challenges relating to the supply, quality, and reliability of water resources. Water management has therefore been identified as a material issue in terms of Sasol's governance matrix. A dedicated sustainable water function has been established within Sasol New Energy to respond to these challenges

(***Source:*** *Sasol Limited, 2011:53).*

While our engagement with the South African Department of Water Affairs (DWA) remains good, we face challenges in shortening the delays in the issuing of water-use licences. Although systems are in place to ensure that we are compliant and adhere to water licence conditions imposed by the DWA, we are concerned with the continuing delays in issuing the licences.

The role of shale gas in delivering on Sasol's growth plans. Natural shale gas is becoming an increasingly important feedstock for Sasol. Not only will it help us deliver on our growth plans to expand outside South Africa, but also help lower the company's carbon footprint. To access shale gas requires drilling and extraction process called hydraulic fracturing (or "fracking"). Fracturing liquids (comprised mainly of water, sand and less than 1% chemical additives) are pumped at high pressure into the shale rock to create fractures that increase the rock permeability and allow the gas to flow back up the well bore. While it can be a safe process when managed responsibly, the risks associated with hydraulic fracturing have recently been brought to the attention of South Africans through the public's response to another company's application to explore for shale gas in the Karoo Basin of South Africa (Karoo Basin). Concerns have been raised around water: accessing water for hydraulic fracturing, potential contamination of drinking water and the safe disposal and treatment of water used in this process. Sasol currently only has the rights to study the potential of shale gas exploitation in the Karoo Basin. We do not conduct any activities in this area, such as drilling or hydraulic fracturing. We would only consider doing so if it could be done in an environmentally responsible manner and within a regulatory framework. We are committed to ensuring that our growth plans, which include growth through monetising Canada's shale gas reserves, are undertaken in a manner that contributes to socioeconomic development, addresses challenges relating to energy security, and mitigates risks to the environment. We

currently source shale gas from Canada, where we own a 50% stake in two shale gas assets. Our partner, Talisman Energy Inc. (Talisman), owns the remaining half of the assets and as the operator of the venture is responsible for ensuring the hydraulic fracturing process is conducted safely and in an environmentally responsible way. Sasol supports Talisman in ensuring the operations at our shale reserves are safe, follow industry best practice and within a regulated environment.

(***Source:*** *Sasol Limited, 2011:21)*

1.7 Does the company identify and quantify water-related risks in the supply chain?

SacOil and Sasol show no evidence in their reports of identifying and quantifying water-related risk in their supply chain.

4.10.2 Management

Management consists of three subcategories of activities, namely governance and accountability, policies and standards, and business planning that a company should use to manage water-related issues. Below are the findings of the management activities for the two oil and gas companies, SacOil and Sasol.

4.10.2.1 Governance and accountability

For a company to take water-related issues seriously, there must be board-level commitment and senior management involvement, and even financial incentives could be linked to senior executives' sustainability scorecards. The last point in this subsection is to ensure that the company does "walk the talk" on water-related issues.

2.1 Does the company clarify board responsibility for oversight of water?

Sasol shows that its board or board committee has formal and explicit oversight of all significant water-related issues, but its reports do not mention how often the board or board committee are briefed on these issues. Advanced progress means that the board or board committee is occasionally briefed and leading practice states that the briefing should be on a regularly basis. Prudence was applied and advanced progress was selected. However, there was no evidence of this activity in SacOil's reports.

Sasol: Our greenhouse gas management committee (established in 2007) is chaired by Riaan Rademan, the group executive responsible for the safety, health, and environment policy (SHE). The committee addresses the linkages between air quality, water stewardship, waste management, biodiversity and ecosystem services, climate change and other environment related issues.

(***Source:*** *Sasol Limited, 2011:22)*

2.2	Does the company involve senior executives directly in the management of water-related issues?

The option of initial steps was selected for Sasol for this activity as the executive management committee or committee members have explicit oversight over strategic water management. Advanced progress was not selected for Sasol as there was no mention in the company's reports if there are clear lines of responsibility between the committee and responsible site-level personnel. Leading practice entails that water is explicitly part of sustainability scorecarding for pay or incentive compensation of senior executives and key managers, and there was no mention of this in Sasol's reports. There was also no evidence of this activity in SacOil's reports.

Sasol: Management of onsite water-related issues is coordinated by the various SHE structures. In addition, a dedicated sustainable water function was established in 2010 within Sasol New Energy. A water stewardship steering committee was established in the year, bringing together senior functional and business unit representatives to govern group wide actions in respect of water stewardship.

(***Source:*** *Sasol Limited, 2013:50)*

2.3	Does the company align public policy positions and lobbying with water stewardship goals – in other words, does the company "walk the talk".

Advanced progress was selected for Sasol in 2011 and 2013 because there was evidence in its reports that its public policy position and lobbying were consistent with both its own water stewardship goals and with internationally recognised water stewardship goals. However, there was no evidence of this activity for SacOil.

Sasol: Accountability for water stewardship, the United Nations Global Compact CEO Water mandate, disclosure, and adaptation remain with the SHE centre. Sasol New Energy is accountable for water sourcing for the group, water availability, and business unit water. (***Source:*** *Sasol Limited, 2011:22-23)*

4.10.2.2 Policies and standards

Setting policies, performance standards and goals, helps guide the company on water issues, raises awareness and helps measure and drive performance. The company needs to look further than its own facilities, and take into account its water sources and who it shares this water with. Lastly, the company's supply chain performance standards and goal setting are addressed in this subsection.

2.4	Does the company have a publicly available water policy and recognise the importance of water in the business?

Sasol has an easily identifiable publicly available policy on water and sets out clear goals and guidelines for action and has publicly demonstrated a commitment to water – hence advanced progress was selected. Leading practice was selected for 2013, because in Sasol's 2013 report, there is evidence of this activity being taken a step further by the company recognising its responsibility to respect the human right to water and sanitation. However, there was no evidence of this activity in SacOil's reports.

2.5	Does the company set performance standards and goals on water withdrawals/consumption for direct operations?

Advanced progress was selected for Sasol as the company sets business-wide targets for reductions in water withdrawals/consumption for all its facilities. Once again, there was no evidence of this activity in SacOil's reports.

2.6	Does the company set performance standards and goals on wastewater discharge for direct operations?

Sasol's report indicates that the company systematically meets or exceeds wastewater compliance requirements at all its sites, and has set a global wastewater standard that exceeds local regulatory compliance requirements – hence the

selection of advanced progress. Once again, there was no evidence of this activity in SacOil's reports.

2.7	Does the company's direct operations develop plans to address local watershed risks?

Because Sasol does address local watershed risks, advanced progress was selected. It is evident from Sasol's reports that all major facilities in areas deemed high risk are developing source water protection plans that address critical external water risks.

There is also evidence in Sasol's reports that the company engages with key local stakeholders and that there are projects that improve conditions for the watersheds supplying or affected by each facility. However, there was no evidence of this activity in SacOil's reports.

2.8	Does the company address sustainable water management in supplier standards and codes, and in procurement and contracting practices?

SacOil and Sasol both showed no evidence in their reports of addressing sustainable water management in supplier standards and codes, and in procurement and contracting practices. This is an area that would need to be addressed.

4.10.2.3 Business planning

This subsection evaluates whether a company incorporates water in its long-term planning by including water risks and opportunities in investment decision making, budgeting, product design and development.

2.9	Does the company consider water in business planning and investment decision making?

Because Sasol does consider water issues in all major investments, advanced progress was selected. However, there was no evidence of this activity in SacOil's reports.

2.10	Does the company consider water in product design and development?

Advanced progress was selected for Sasol as its reports indicate that it does asses the life cycle water impacts of key products and does have a programme to reduce

these impacts in water-stressed areas. However, there was no evidence of this activity in SacOil's reports.

2.11 Does the company identify water-related business opportunities?

According to the Gauge™: "*Business opportunities can include new products and processes, as well as the benefits from better stewardship of water either in reduced costs, enhanced brand equity, improved stakeholder relations or other business benefits."*

SacOil's reports included no evidence of this activity. Advanced progress was selected for Sasol as the company has shown in its reports that it publicly acknowledges the potential for water-related opportunities and demonstrates working towards providing new business opportunities that address water issues.

Sasol: Technology has a portfolio of water research and technology development projects that support our operations in Sasolburg and Secunda, as well as our new GTL ventures. The main research activities at our South African operations focus on the reduction and management of wastewater-borne salts. This employs an innovative process developed for sustainable salt disposal using waste fly ash. Sasol Synfuels in Secunda is in the final construction stages of a large anaerobic wastewater treatment plant based on technology developed by Sasol Technology. The new technology will treat approximately 3,4 million m^3 per annum of wastewater or about 7% of the total wastewater recycled by Sasol Synfuels. It further provides a much needed way to reduce both the organic and hydraulic load on the existing biological wastewater treatment works and provides capacity to accommodate growth.

In 2012, we initiated Sasol Water Sense, a group-wide initiative to align water stewardship practices. Sasol Water Sense has created a common identity for our water response strategy, coupled with a focused communication plan. Sasol Water Sense won the water management category in this year's Mail and Guardian Greening the Future awards in South Africa. (***Source:*** *Sasol Limited, 2013:50)*

4.10.3 Stakeholder engagement

Engaging with stakeholders can help a company identify water-related risks and the impacts the company could have on water sources. It is necessary to understand

what level of interest and power the company's stakeholders have because that will help decide how to deal with the different types of stakeholders. The Gauge™ has identified a number of stakeholders that should be engaged with in managing water issues, and these are discussed below.

3.1	Does the company engage with local communities on water-related issues at existing or potential new direct operations?

Leading practice was selected for Sasol for engagement with local communities on water-related issues. The company engages with communities on a systematic basis and is involved in external projects that contribute to local sustainable water management and/or access to water and sanitation. However, there was no evidence of this activity in SacOil's reports.

Sasol: We have committed R8 million to support community water conservation partnerships.

We have also launched a comprehensive water education and awareness raising campaign in partnership with the schools in Metsimaholo in the greater Sasolburg region. We funded the production and rollout of curriculum support material, developed by the DWA. More than 19,000 learner and teacher "Water is Life" booklets have been provided to the participating schools, with accompanying educator training. Following a successful rollout in Sasolburg, the intention is to also focus on the Govan Mbeki and Emfuleni Municipalities. (***Source:*** *Sasol Limited, 2013:51)*

3.2	Does the company engage with employees on water issues?

Sasol does not report specifically on how it engages with employees in its reports. However, because of the number of committees and initiatives the company is involved in, for this activity, the researcher selected advanced progress. Advanced progress is described as the company having a business-wide programme designed to engage and educate employees, and encouraging them to take ownership of water issues. There was no evidence of this activity in SacOil's reports.

3.3	Does the company work with suppliers to help them improve water management?

There was no mention in Sasol's reports for 2011 of the company working with suppliers, but in the reports for 2013, as indicated in the excerpt below, mention was made of its value chain – hence the selection of initial steps. The definition of initial steps for this activity is that the company advises and works with some direct suppliers to improve its water management. There was no evidence of this activity in SacOil's reports.

Sasol: Water is a critical feedstock for our business, with several of our current or planned facilities located in water stressed areas. Our activities in coal mining, upstream oil and gas development, chemicals and fuels production, and supply chain logistics, all have the potential to impact on water resources and ecosystems. Ensuring responsible water stewardship throughout our value chain remains essential. (***Source:*** *Sasol Limited, 2013:50)*

3.4	Does the company engage openly with local, regional and national governments to advance sustainable water policies and management?

Sasol does engage openly with local, regional, and national government to advance sustainable water policies and management. Leading practice was selected as Sasol engages on water-related public policy issues in areas deemed high risk, as well as at a national or global level. Overall, engagement is fully transparent and is aimed at promoting sustainable water management. However, there is no evidence of this activity in SacOil's reports.

Sasol: We are also transparent and accountable about our water usage and stewardship initiatives. Sasol is partnering with three South African municipalities to save water beyond our factory fence to the benefit of all users of the Vaal River catchment area in which we operate (***Source:*** *Sasol Limited, 2013:6).*

We are represented on the DWA Water Sector Leadership Group as well as the DWA Vaal River Strategy Steering Committee. Both of these groups provide a high level platform for engagement between the water sector and the South African government. We have also contributed with comments to the DWA's Water for

Growth and Development Framework document and the National Water Resource Strategy. (***Source:*** *Sasol Limited, 2011:54)*

3.5	Does the company engage with NGOs and community organisations on water issues?

Sasol engages with NGOs and community organisations on water issues. Leading practice was selected for Sasol for this activity as the company engages formally, for example, in partnerships on specific projects with NGOs on water issues relevant to the company's core business/areas of operation. There was no evidence of this activity in SacOil's reports.

Sasol: Our flagship partnership is with Emfuleni municipality and the German development agency Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). Through this partnership, we committed R5 million, and leveraged an additional R5 million, for the Boloka Metsi project. The project seeks to achieve a 15% water saving in the Emfuleni municipality, one of the four larger municipalities in Gauteng. Currently between 44% and 50% of water used in the municipal area cannot be accounted for. If successful, this project will help Emfuleni reduce its annual water expenses by approximately R62 million, a portion of which will be reinvested in sustaining the project. By the end of phase 1 of the project (June 2013), water leaks have been repaired in approximately 60,000 households. Measured water savings in the project area have amounted to approximately 2,1 million m^3 (the equivalent of 1,000 Olympic sized swimming pools) to the value of R10,5 million, as well as creating some 75 local employment opportunities.

(***Source:*** *Sasol Limited, 2013:53)*

3.6	Does the company engage with other industries/companies/water users?

Sasol does engage with other industries/companies/water users. Leading practice was selected, as Sasol actively leads efforts to work within or across industries to address water risks and impacts. Sasol shares water-related tools and non-commercially sensitive information with others in the industry or watershed. There was no evidence of this activity in SacOil's reports.

Sasol: Participates in various international sustainable development initiatives. Since 2001, we have been a signatory to the United Nations Global Compact (UNGC). In March 2008, we endorsed the UN Global Compact CEO Water Mandate. We participate in the Global Product Strategy (GPS) initiative of the International Council of Chemical Associations (ICCA) to help to improve the global chemical industries' product stewardship performance. We support the principles of the Extractive Industries Transparency Initiative (EITI) and are considering publicly endorsing it. Sasol participates in the annual Carbon Disclosure Project (CDP). We are corporate members of numerous local and international businesses, engineering, scientific and other organisations. We play an active role in developing and implementing the global chemical industry's Responsible Care® initiatives. We participate in working groups of the European Chemical Industries' Council (CEFIC), and South African Chemical and Allied Industries' Association (CAIA).

(***Source:*** *Sasol Limited, 2011:30)*

Significant progress has been made towards concluding multi-stakeholder partnerships to implement water conservation projects beyond our direct operations with the aim of addressing physical losses from public water supply systems in the catchments where we operate. (***Source:*** *Sasol Limited, 2011:7)*

3.7	Does the company educate customers to help them minimise product impacts?

There was no evidence in both SacOil's and Sasol's reports that they educate their customers to help them to minimise product impacts.

4.10.4 Disclosure

The Gauge™ encourages companies to disclose their water-related information, both qualitative and quantitative, as this is a way for a company to communicate to its various stakeholders and to show transparency. The last step in this section is to ask whether the water-related information has been verified by an independent third party. Below are the findings of the disclosure activities for the two oil and gas companies, SacOil and Sasol.

4.1	Does the company make water-related information publicly available?

Because Sasol does disclose comprehensive qualitative and quantitative information relating to water, advanced progress was selected. SacOil does not make water-related information publicly available.

Sasol: Fostering transparency. Sasol has long supported transparent disclosure on our water-related activities, having been one of the first companies in South Africa to issue a public environmental report in 1996. We have once again participated in the annual Water Disclosure Questionnaire of the Carbon Disclosure Project.

(***Source:*** *Sasol Limited, 2011:54)*

4.2	Does the company include water data and analysis in published financial filings/reports?

Sasol does include water data and analysis in published financial filings/reports. Initial steps was selected because Sasol does comply with minimum financial disclosure requirement relevant to water as the next stage. Advanced progress is described as the company assessing the materiality of all water-related risks. This stage could not be selected as there is no indication of it in Sasol's reports.

Sasol: Quantitative data on the water usage and effluent levels at each of Sasol's separate business units is provided in our integrated annual review.

(***Source:*** *Sasol Limited, 2011:53)*

SacOil does not report on any water issues in its financial filings/reports.

4.3	Does the company provide third-party assurance or audit water-related information?

As indicated in the excerpt below, Sasol does provide third-party assurance or audit's water-related information, but the criterion for selecting advanced progress is that assurance should be provided on all data relating to the company's direct water use/discharge and impacts, to be provided by an appropriate and independent third party. This could not be verified in Sasol's reports.

Hence initial steps was selected for Sasol, as this entails an appropriate and independent third party providing assurance on some data relating to water. SacOil did not report on any water issues in its financial filings/reports.

Sasol: Our internal reporting and auditing process is enhanced by external verification audits undertaken as part of our sustainable development reporting process. This includes the International Organisation for Standardisation (ISO) ISO 14001 and Occupational Health and Safety Assessment Series OHSAS 18001 (or equivalent) certification audits, regulatory compliance audits and third party responsible care verification audits. Most sites will be moving to an integrated management system currently being developed. (***Source:*** *Sasol Limited, 2011:23)*

4.10.5 Summary of oil and gas sector

Since SacOil did not mention anything about water in its reports, according to the Gauge™, SacOil would be identified as a weak performer, and because the company operates in a water-intensive industry, this indicates poor water stewardship in a water-stressed country. SacOil does not show that water is important to its business, and does not appear to be committed to dealing with water scarcity.

Sasol has a number of activities selected as leading practice in the Gauge™ which can be seen in table 4.7, these areas involve the measurement activities and stakeholder engagement activities. Sasol is another company in this study to mention in its reports that obtaining water use licences from the DWA is a problem. Sasol does show commitment to dealing with water scarcity issues in South Africa and that water is important to its business.

Sasol also mentions in its reports to have a 50% stake in two shale gas assets in Canada, of which Talisman Energy owns the other 50%. According to Sasol, the hydraulic fracturing process is conducted safely and in an environmentally responsible way. This investment was the largest of its kind made after its initial investment in its facilities at Sasolburg and Secunda many years ago. Fracking is a contentious issue, but this topic and its pros and cons were not within the ambit of this research study. Owing to the fact that the CDP Water Programme combines chemicals, energy, forestry, mining, and oil and gas, it could not be used to as a benchmark for this research.

The 2008 Global Study found that this sector showed weak water risk disclosure. Thirteen companies were included in this study, but Sasol and SacOil were excluded.

4.11 PHARMACEUTICALS AND BIOTECHNOLOGY SECTOR

The pharmaceutical and biotechnology sector includes Adcock Ingram and Aspen.

LP = leading practice **AP = advanced progress**

IS = initial steps **NE = no evidence of action**

Table 4.8: Key areas of corporate water-risk management identified in the Ceres Aqua Gauge™ – pharmaceuticals and biotechnology sector: 2011 and 2013

	Company	Adcock		Aspen	
	Years	2011	2013	2011	2013
1. MEASUREMENT					
Data gathering					
1.1	Its own regulatory compliance, water use and discharge	IS	IS	AP	AP
1.2	Its own environmental and social impacts on direct water sources	NE	NE	IS	IS
1.3	External factors – such as economic and social development, impacts of other users, climate change and public policy – affecting direct water sources	IS	IS	NE	NE
1.4	Stakeholder perceptions and concerns relating to water issues	NE	NE	NE	NE
1.5	The effectiveness of suppliers' water management practices	NE	NE	NE	NE
Risk assessment					
1.6	Water-related risks in direct operations	IS	IS	NE	NE
1.7	Water-related risks in the supply chain	NE	NE	NE	NE

	Company	Adcock		Aspen	
	Years	2011	2013	2011	2013
2. MANAGEMENT					
Governance and accountability					
2.1	Clarifies board responsibilities for oversight of water	NE	NE	NE	NE
2.2	Involves senior executives directly in management of water-related issues	NE	NE	NE	NE
2.3	Aligns public policy positions and lobbying with water stewardship goals	IS	IS	NE	NE
Policies and standards					
2.4	Has a publicly available water policy and recognises the importance of water to the business	NE	NE	NE	NE
2.5	Sets performance standards and goals on water withdrawals/consumption for direct operations	NE	NE	IS	IS
2.6	Sets performance standards and goals on wastewater discharge for direct operations	NE	NE	NE	NE
2.7	Requires direct operations to develop plans to address local watershed risks	NE	NE	NE	NE
2.8	Addresses sustainable water management in supplier standards and codes, and in procurement and contracting practices	NE	NE	NE	NE
Business planning					
2.9	Considers water in business planning and investment decision making	NE	IS	NE	NE
2.10	Considers water in product design and development	NE	NE	NE	NE
2.11	Identifies water-related business opportunities	NE	AP	AP	AP

	Company	Adcock		Aspen	
	Years	2011	2013	2011	2013
3. STAKEHOLDER ENGAGEMENT					
3.1	Requires engagement with local communities on water-related issues at existing or potential new operations	NE	NE	NE	NE
3.2	Engages with employees on water issues	NE	NE	NE	NE
3.3	Works with suppliers to help them improve water management	NE	NE	NE	NE
3.4	Engages openly with local, regional and national governments or regulators to advance sustainable water policies and management	NE	IS	NE	NE
3.5	Engages with NGOs and community organisations on water issues	NE	NE	NE	NE
3.6	Engages with other industries/companies/water users	NE	NE	NE	NE
3.7	Educates customers to help them minimise product impacts	NE	NE	NE	NE
4. DISCLOSURE					
4.1	Makes water-related information publicly available	IS	IS	IS	IS
4.2	Includes water data and analysis in published financial filings/reports	IS	IS	IS	IS
4.3	Provides third-party assurance or audit water-related information	NE	IS	NE	NE

4.11.1 Measurement

Measurement entails the collection and monitoring of data on a number of key areas in the business. Below are the findings of the measurement activities for the two pharmaceutical companies, Adcock Ingram and Aspen.

4.11.1.1 Data gathering

This subsection assesses whether the company is collecting and monitoring information on water consumption and discharge, and if and how the company's production processes are affecting water sources. What external factors could affect the current and future water supply for the company? Then stakeholders' perceptions and the reputation of the company are monitored, and finally, how its water-intensive suppliers are managing water-related issues, are evaluated.

1.1	Does the company collect and monitor data on its own regulatory compliance, water use and discharge?

As indicated in table 4.8 above, the option of initial steps was selected for Adcock Ingram with regard to collecting and monitoring data on water use and discharge.

Initial steps was selected as a water usage figure was reported, but no water discharge figure. There is also no mention whether this figure is applicable to all or only some of Adcock's facilities.

Advanced progress was selected for Aspen as the company does show in its reports that it collects and monitors data on water consumption and discharge for all direct operations.

1.2	Does the company collect and monitor data on its environmental and social impacts on direct water sources?

There is no evidence in Adcock Ingram reports that it collects and monitors data on the company's environmental and social impacts on direct water sources. Aspen does mention in its reports that all its water is obtained from municipal sources, and that there were no incidents of effluent discharge into storm water drains – hence the selection of initial steps.

1.3	Does the company collect and monitor data on external factors affecting direct waters sources?

Initial steps was selected for Adcock Ingram, as a wide range of external factors is mentioned in its reports. However, there is no mention of how these factors affect the company or its key sources of water.

Adcock Ingram has once again participated in the Carbon Disclosure Project and the Water Disclosure Project. These have been invaluable to our own understanding of the impact of our business activities and propelled us to consider risks and opportunities with regard to climate change. (***Source:*** *Adcock Ingram Holdings Limited, 2011:28)*

The Group, involved in Chemicals and Pharmaceuticals, has been classified as having an overall high environmental impact, by EIRIS (Experts in Responsible Investment Solutions) as "the manufacture of pharmaceuticals has significant impacts which include climate change, air and water pollution, water consumption and hazardous waste. In addition to these direct manufacturing impacts, the sector's products may be persistent organic pollutants or endocrine disruptors, or otherwise cause downstream environmental damage. The sector is classified as high impact."

(***Source:*** *Adcock Ingram Holdings Limited, 2011:28)*

There is no evidence of this activity in Aspen's reports for 2011 and 2013.

1.4	Does the company collect and monitor data on stakeholder perceptions and concerns relating to water issues?

There is no evidence of this activity in either Adcock Ingram's or Aspen's reports.

1.5	Does the company collect and monitor data on the effectiveness of its suppliers' water management practices?

There is no evidence of this activity in both Adcock Ingram's and Aspen's reports.

4.11.1.2 Risk assessment

Once the company has gathered all the necessary data as per the previous section, it is time to assess its risk exposure in both direct operations and the supply chain.

1.6 Does the company identify and quantify water-related risks in direct operations?

Initial steps was selected for Adcock Ingram for this activity, as the company does identify water-related risks. However, the company does not quantify these risks.

Adcock Ingram undertakes an independent environmental audit as part of its risk management audit. Environmental elements that are measured include the management of water quality, waste, hazardous waste materials, packaging energy, air quality and land quality management (***Source:*** *Adcock Ingram Holdings Limited, 2013:46).*

No evidence was selected for Aspen as the company does not identify or quantify any specific water-related risk. A general statement regarding water scarcity is made, with no mention of how water scarcity will affect the company.

Aspen: Water is essential for the manufacture of Aspen's products, as an energy source (steam), as a lubricant in manufacture, as a delivery medium in liquid medicines, as a cooling agent in temperature control and as a cleaning material. As a limited resource in scarce supply, it is recognised that initiatives to curtail water utilisation will allow for more sustainable water availability.

(***Source:*** *Aspen Pharmacare Holdings Limited, 2011:11)*

1.7 Does the company identify and quantify water-related risk in its supply chain?

Adcock Ingram and Aspen show no evidence in their reports of identifying and quantifying water-related risk in their supply chains.

4.11.2 Management

Management consists of three subcategories of activities, namely governance and accountability, policies and standards, and business planning, which a company should use to manage water-related issues. Below are the findings of the management activities for the two pharmaceutical companies, Adcock Ingram and Aspen.

4.11.2.1 Governance and accountability

For a company to take water-related issues seriously, there must be board-level commitment and senior management involvement, and even financial incentives could be linked to senior executives' sustainability scorecards. The last point in this subsection is to ensure that the company does "walk the talk" on water-related issues.

2.1 Does the company clarify board responsibility for oversight of water?

There is no evidence of this in both Adcock Ingram's and Aspen's reports.

2.2 Are senior executives directly involved in the management of water-related issues?

There is no evidence of this in both Adcock Ingram's and Aspen's reports.

2.3 Does the company align public policy positions and lobbying with water stewardship goals – in order words, does the company "walk the talk."

Initial steps was selected for Adcock Ingram as the company does report that its public policy position and lobbying are consistent with its own stated goals. However, there is no evidence of this in Aspen's reports.

Adcock Ingram: The Aeroton facility uses water as an ingredient (distilled and purified) in most hospital products and in many of the production processes such as sterilisation, cooling and heating. Several projects have been initiated to recover and re-use water in the sterilisation process, distillation water plant and other areas. These activities are expected to yield significant annual savings of up to 20 000 kL.

(***Source:*** *Adcock Ingram Holdings Limited, 2013:46)*

4.11.2.2 Policies and standards

Setting policies, performance standards and goals, helps guide the company on water issues, raises awareness and helps measure and drive performance. The company needs to look further than its own facilities, and take into account its water sources and who it shares this water with. Lastly, the company's supply chain performance standards and goal setting are addressed in this subsection.

2.4	Does the company have a publicly available water policy and recognise the importance of water in the business?

From Adcock Ingram's reports in 2011 and 2013, it is not clear what its water policy is, but it does mention that its industry is classified as having a high environmental impact. However, the company does not show in its reports that water is important to its business. In Aspen's 2011 and 2013 reports, there is no clear indication that it has a water policy, and the company also does not mention in its reports that it recognises the importance of water to the business.

2.5	Does the company set performance standards and goals on water withdrawals/ consumption for direct operations?

There is no evidence of this activity in Adcock Ingram reports. Initial steps was selected for Aspen for this activity as goals are set for water consumption, but not for all the company's sites.

Aspen: Water usage has been reduced by 8% as a result of planned reduction in production at FCC and benefits realised from water conservation initiatives at the Port Elizabeth site. (***Source:*** *Aspen Pharmacare Holdings Limited, 2013:39)*

The South African sites have targeted a 5% reduction in water usage. Progress towards this target has been satisfactory.

(***Source:*** *Aspen Pharmacare Holdings Limited, 2011:120)*

2.6	Does the company set performance standards and goals on wastewater discharge for direct operations?

There is no evidence of this activity in both Adcock Ingram's and Aspen's reports.

2.7	Does the company's direct operations develop plans to address local watershed risks?

There is no evidence of this activity in both Adcock Ingram's and Aspen's reports.

2.8	Does the company address sustainable water management in supplier standards and codes, and in procurement and contracting practices?

There is no evidence of this activity in both Adcock Ingram's and Aspen's reports.

4.11.2.3 Business planning

This subsection evaluates whether a company incorporates water in its long-term planning by including water risks and opportunities in investment decision making, budgeting, product design and development.

2.9	Does the company consider water in business planning and investment decision making?

Initial steps was selected for Adcock Ingram in 2013, as this description of this stage is that the company considers water issues in major investment in areas identified as high water risks. Advanced progress was not selected as there is no evidence that Adcock Ingram considers water issues in all major investments.

Adcock Ingram: The recent factory upgrades included a significant investment towards reducing the Group's carbon footprint in terms of energy and water conservation measures. (***Source:*** *Adcock Ingram Holdings Limited, 2013:46)*

There is no evidence of this activity in Aspen's reports.

2.10	Does the company consider water in product design and development?

There is no evidence of this activity in either Adcock Ingram's or Aspen reports for 2011 and 2013.

2.11	Does the company identify water-related business opportunities?

According to the Gauge™: "*Business opportunities can include new products and processes, as well as the benefits from better stewardship of water either in reduced costs, enhanced brand equity, improved stakeholder relations or other business benefits."*

As indicated in the excerpt below, in 2013, Adcock Ingram reported the use of reverse osmosis to reduce water consumption. Aspen has also reported using reverse osmosis in parts of its business, which has yielded a 6% saving in water consumption. Since both companies are not only planning for future reductions in water consumption, but are also demonstrating a new business opportunity that shows better water stewardship, advanced progress was selected for both companies.

Adcock Ingram: In addition to strides made with utilisation of waste water for domestic use, several initiatives are being implemented to reduce water usage. These include expansion of the reverse osmosis water run-off for domestic applications, the utilisation of run-off water from the reverse osmosis plant for chillers as well as validation of optimised cleaning-in-process (CIP) steps for all product recipes to minimise water usage at each step.

(***Source:*** *Adcock Ingram Holdings Limited, 2013:46)*

Aspen: The Port Elizabeth site has two Reverse Osmosis plants for water purification. On average, the plants reject up to 30% of in-feed water which was previously discarded. As a result of the Reverse Osmosis project, the rejected water is now recycled and used to supply the cooling towers and ablution facilities. This project has yielded a 6% saving in water consumption from the municipal feed. A third Reverse Osmosis plant will be fully operational during 2012 and is expected to reduce the amount of water obtained from the municipality by a further 1%.

(***Source:*** *Aspen Pharmacare Holdings Limited, 2011:120)*

4.11.3 Stakeholder engagement

Engaging with stakeholders can help a company identify water-related risks and the impacts the company could have on water sources. It is necessary to understand what level of interest and power the company's stakeholders have, because that will help decide how to deal with the different types of stakeholders. The Gauge™ has identified a number of stakeholders that should be engaged with in managing water issues, and these will be discussed below.

3.1 Does the company engage with local communities on water-related issues at existing or potential new direct operations?

There is no evidence of this activity in either Adcock Ingram's or Aspen's reports for 2011 or 2013.

3.2 Does the company engage with employees on water issues?

There is no evidence of this activity in either Adcock Ingram's or Aspen's reports for 2011 or 2013.

3.3	Does the company work with suppliers to help them improve water management?

There is no evidence of this activity in either Adcock Ingram's or Aspen's reports for 2011 or 2013.

3.4	Does the company engage openly with local, regional and national governments to advance sustainable water policies and management?

Initial steps was selected for Adcock Ingram in 2013, as steps have been taken by the company to plan a coherent engagement strategy on water policy that is fully transparent and is aimed at promoting sustainable water management. It is evident from the excerpt below that Adcock Ingram is working towards performing this activity.

Adcock Ingram: The Group responded to the Department of Trade and Industry's (DTI) initiative towards greener production in South Africa, driven by the Council for Scientific and Industrial Research's (CSIR) National Cleaner Production Centre initiative. The CSIR-appointed international consultants conducted audits of Adcock Ingram's sites during 2013. The recommendations from these audits which would further enhance energy and water conservations and reduce waste are currently being assessed based on a cost-benefit analysis.

(***Source:*** *Adcock Ingram Holdings Limited, 2013:46)*

There is no evidence of this activity in Aspen's reports for both 2011 and 2013.

3.5	Does the company engage with NGOs and community organisations on water issues?

There is no evidence of this in either Adcock Ingram's or Aspen's reports for 2011 or 2013.

3.6	Does the company engage with other industries/companies/water users?

There is no evidence of this activity in either Adcock Ingram's or Aspen's reports for 2011 or 2013.

3.7 Does the company educate customers to help them minimise product impacts?

Adcock Ingram and Aspen show no evidence in their reports that they educate their customers to help them minimise product impacts.

4.11.4 Disclosure

The Gauge™ encourages companies to disclose their water-related information, both qualitative and quantitative, as this is a way for a company to communicate to its various stakeholders and to show transparency. The last step in this section is to ask whether the water-related information has been verified by an independent third party. Below are the findings of the disclosure activities for the two pharmaceutical companies, Adcock Ingram and Aspen.

4.1 Does the company make water-related information publicly available?

The option, initial steps, was chosen for both Adcock Ingram and Aspen, as they disclose some qualitative and quantitative information on water.

4.2 Does the company include water data and analysis in published financial filings/reports?

Both Adcock Ingram and Aspen include water data and analysis in published financial filings/reports

Since both companies comply with the minimum financial disclosure requirements relevant to water, the researcher selected initials steps.

4.3 Does the company provide third-party assurance or audit's water-related information?

There is no evidence in 2011 for Adcock Ingram and both years for Aspen, that third-party assurance is provided or audit water-related information.

In 2013, Adcock Ingram mentions in its report that the CSIR appointed international consultants to conduct audits on Adcock Ingram's sites, and water conservation is one of the areas that would have been audited.

4.11.5 Summary of pharmaceuticals and biotechnology sector

In Adcock Ingram's reports it mentions that the sector in which it operates is considered to have a high overall environmental impact, and this study also classifies this sector as being highly water intensive. However, from the information in table 4.8, it is evident that there are many activities for which no evidence was selected, and nowhere was leading practice selected. Advanced progress was only selected twice for Aspen, in points 1.1 and 2.11, and once for Adcock Ingram, in point 2.11, for 2013. Both of these companies are simply not reporting on all aspects of water, or they are merely poor water stewards and do not consider water to be important to their businesses. Also, they do not appear to show any commitment to water scarcity issues.

The 2013 CDP Water Program combines the pharmaceuticals and health-care sectors. Both Adcock Ingram and Aspen participated in the programme. The 2008 Global Study did not include the pharmaceutical and biotechnology sector.

4.12 OVERALL FINDINGS FOR ALL SECTORS

The findings for all the sectors are discussed below.

Table 4.9: A comparison of studies by the key areas of corporate water risk management identified in the Ceres Aqua Gauge™

		This study	CDP 2013	Global 2008
1. MEASUREMENT				
Data gathering				
1.1	Its own regulatory compliance, water use and discharge	90%	97%	63%
1.2	Its own environmental and social impacts on direct water sources	73%	14%	-
1.3	External factors	80%	-	-
1.4	Stakeholder perceptions and concerns relating to water issues	50%	-	-
1.5	The effectiveness of suppliers' water management practices	10%	-	-

		This study	CDP 2013	Global 2008
Risk assessment				
1.6	Water-related risks in direct operations	77%	86%	73%
1.7	Water-related risks in the supply chain	13%	21%	-
2. MANAGEMENT				
Governance and accountability				
2.1	Clarifies board responsibilities for oversight of water	57%	72%	-
2.2	Involves senior executives directly in management of water-related issues	53%	-	-
2.3	Aligns public policy positions and lobbying with water stewardship goals	63%	100%	-
Policies and standards				
2.4	Has a publicly available water policy and recognises the importance of water to the business	70%	83%	24%
2.5	Sets performance standards and goals on water withdrawals/consumption for direct operations	60%	59%	21%
2.6	Sets performance standards and goals on wastewater discharge for direct operations	43%	-	15%
2.7	Requires direct operations to develop plans to address local watershed risks	57%	-	-
2.8	Addresses sustainable water management in supplier standards and codes, and in procurement and contracting practices	10%	-	-
Business planning				
2.9	Considers water in business planning and investment decision making	63%	-	-
2.10	Considers water in product design and development	53%	-	-
2.11	Identifies water-related business opportunities	67%	83%	-

		This study	CDP 2013	Global 2008
3. STAKEHOLDER ENGAGEMENT				
3.1	Requires engagement with local communities on water-related issues at existing or potential new operations	47%	-	5%
3.2	Engages with employees on water issues	33%	-	-
3.3	Works with suppliers to help them improve water management	20%	-	12%
3.4	Engages openly with local, regional and national governments or regulators to advance sustainable water policies and management	67%	-	-
3.5	Engages with NGOs and community organisations on water issues	63%	-	-
3.6	Engages with other industries/companies/water users	40%	-	-
3.7	Educates customers to help them minimise product impacts	13%	-	-
4. DISCLOSURE				
4.1	Makes water-related information publicly available	80%	-	-
4.2	Includes water data and analysis in published financial filings/reports	80%	-	-
4.3	Provides third-party assurance or audits water-related information	27%	-	-

4.12.1 Measurement

The first step in corporate water management is that of measuring water use and discharges in direct operations. Of the companies in this study, 90% disclosed that they are performing this activity to a greater or lesser extent. The beverage, mining and forestry sectors were the better performers of this activity, and the food retailers the weakest performers. In the South African CDP Water Programme for 2013, 97% of respondents disclosed water withdrawal figures, and in the 2008 Global Study, which used 2008 company reports, 63% of companies disclosed their water use. Hence an improvement is evident from 2008 to 2013 in the various studies.

The next two activities – 1.2 the disclosure of the company's environmental and social impacts on direct water sources, and 1.3 the collecting and monitoring of external factors affecting direct water sources – produced similar findings per sector. In total, 73% and 80% respectively of the companies disclosed to a greater or lesser extent that they perform these two activities. The food producers and food retailers were the weakest performers for this activity, and half of the food producers and 75% of the food retailers showed no evidence of this in their reports. The beverage, mining and forestry industries were again the best performers, with some companies scoring leading practice for these activities. Most companies mention that climate change will or is already having an impact on water levels. The results of the South African 2013 CDP Water Programme indicate that only 14% of companies report that water sources have been affected by water withdrawals, and 7% of companies report that water bodies have been affected by discharges. The reason for the huge discrepancy between this study and the CDP Water Programme might be that companies that take part in the CDP Water Programme do not want to disclose in that study that their operations have negatively affected water sources. Companies that want to be seen as good water stewards participate in the CDP Water Programme and would not want to be seen in a bad light when compared with their peers. Activity 1.3 was not part of the CDP questionnaire, and activities 1.2 and 1.3 were not part of the 2008 Global Study.

Of the companies selected, 50% monitor their stakeholders' perceptions and concerns relating to water issues. Mining companies disclosed the most for this activity. Forestry also collect and monitor their stakeholders' perceptions. Leading practice for this activity was selected for a number of individual companies, but other companies in their sectors showed no evidence of this activity. Hence the sector as a whole was rated poorly. The chemical, food producers, retailers and pharmaceutical sectors had no disclosure for this activity.

Activity 1.5, does the company collect and monitor data on suppliers' water management practices? All sectors performed badly in this activity, with only 10% of companies, namely SAB, Woolworths and Mondi, were found to perform this activity.

For activity 1.6, 77% of companies identify water-related risks in their direct operations. The chemical, food retailers and pharmaceutical sector were the worst performers in this activity. A number of the mining companies identify obtaining a

water use licence as a risk for their business. The beverage, food producers, mining and forestry sectors all disclosed water-related risks in their operations. Of the companies in the 2013 CDP Water Programme, 86% reported risk exposure in direct operations, and 73% of the companies in the 2008 Global Study reported water-related physical risk exposure. These are positive figures in the sense that they show that companies are aware of water-related risks in the business. According to Orr *et al*. (2009), the type of business will determine the level and type of risks and the appropriate response. Water-intensive businesses with well-known brands encounter the greatest reputational challenges. However, many other businesses also experience changes and uncertainty because of water shortages. Hence 77% is a positive figure, and leading practice for this activity was chosen for a number of companies, which shows that companies are aware of water-related risks in the business.

For activity 1.7, 13% of the companies disclosed that they identify and quantify water-related risks in the supply chain. The results of the 2013 CDP Water Programme indicated that only 21% of the companies require suppliers to report on their water risks.

According to Morrison *et al*. (2009), supply chains will be impacted because water risks embedded in the supply chain are often not addressed by organisation's traditional water use estimates. Water supply risks are regularly hidden in an organisation's raw material inputs or intermediate suppliers. They also indicated that if companies have operations or suppliers in regions with water shortages, as in India or China, this can have far-reaching effects. The identification of supply chain risks is an area that companies need to address. The findings of this study and those of the CDP Water Programme for 2013 have revealed that this is an area that all South African companies need to urgently address.

4.12.2 Management

Once companies start measuring their water-related activities, they have the information needed to start managing the water-related risks. For any strategy to be successfully implemented, senior management commitment is essential.

As reported in 2010, water risk management at a strategic corporate level had only occurred in the past five years (Pegram, 2010). Conventionally, most companies

have managed water risks at an operational level. This may show that companies have not realised the impact the impending water crises could have on their business. This brings us to the next two activities.

Activity 2.1 asks whether the board or board committee has oversight of water-related issues.

Activity 2.2 asks whether senior executives are directly involved in the management of water-related activities. In the limitations of this study discussed in chapter 3, it was mentioned that unless the company specifically disclosed that its board and senior managers perform these activities, it was difficult to determine. However, in terms of what the company was disclosing and the amount of money being invested in water-related activities, the researcher could safely assume that the company's board had oversight over water-related issues and senior management was directly involved in water-related issues. However, the Gauge™ includes three steps, namely initial steps, advanced progress and leading practice, or no evidence. To remain on the side of prudence, no evidence was selected if there was no specific disclosure of these two activities. In this study, 57% was scored for activity 2.1 and 53% for activity 2.2. In the 2013 CDP Water Programme, 72% of the companies had board-level oversight, but this issue was not raised in the 2008 Global Study.

Activity 2.3 involved determining whether the company is "walking the talk". Of the companies in this study, 63% were found to be good water stewards. These activities include water-saving initiatives, reductions in waste water, new business opportunities, investment in helping the community obtain water and so on. The 2013 CDP Water Programme referred to this activity as "taking actions (beyond the policy) to manage water", and 100% was scored. This issue was not surveyed in the 2008 Global Study.

Activity 2.4: Does the company have a water policy and recognise the importance of water in the business? Of the companies in this study, 70% were found to have a water policy, while in the 2013 CDP Water Programme, the result was 83%. However, in the 2008 Global Study, the result was only 24%.

Activity 2.5: Does the company set goals on water withdrawals/consumption for direct operations? Of the companies in this study, 60% were found to have targets on water consumption, while in the 2013 CDP Water Programme the result was

59%, which is close to this study's findings. The 2008 Global Study reported only 21% of companies with quantitative water reduction targets.

Activity 2.6: Does the company set goals and standards on wastewater discharge for direct operations? Less than half of the companies (43%) in this study performed this activity. The 2013 CDP Water Programme did not disclose figures on this activity, and it is unclear if this activity was part of the survey. The 2008 Global Study only had 15% of the companies report goals on wastewater discharges.

Activity 2.7: Does the company's direct operations have plans to address local watershed risks? It was found that 57% of the companies in this study performed this activity. This issue was not surveyed in the other two studies.

Activity 2.8: Does the company address sustainable water management in suppliers' codes, and procurement and contracting practices? This study shows that only 10% of the companies performed this activity. The three companies, SAB, Woolworths and Mondi were the only ones that performed this activity, and all three had suppliers' codes of conduct. This issue was not surveyed in the other two studies.

According to Morrison *et al*. (2009), supply chains are affected as water risks embedded in the supply chain are often not addressed by an organisation's traditional water use estimates. Water supply risks are regularly hidden in an organisation's raw material inputs or intermediate suppliers.

It is evident from the findings for this activity that Morrison *et al*.'s (2009) comments still apply in 2013. This is an area that needs serious consideration and improvement by companies. This is especially true for the food producers and mining sector, where there was no evidence of this activity in either of these companies in these sectors.

Activity 2.9: Does the company consider water in business planning and investment decision making? Of the companies in this study, 63% do perform this activity. None of the food producers were shown to perform this activity, but almost all the mining companies do. This issue was not surveyed in the other two studies.

Activity 2.10**:** Does the company consider water in product design and development? It was found that just a little over half (53%) of the companies do consider water in their product design and development. SAB and Tongaat Hulett have both

conducted water footprint exercises in order to measure the amount of water it takes to manufacture a product. This issue was not surveyed in the other two studies.

Activity 2.11**:** Does the company identify water-related business opportunities? Of the companies in this research study, 67% were found to perform this activity, but mostly all opportunities were to reduce costs, forge better stakeholder relationships or show better stewardship of water. AECI, Omnia, Pick n Pay, Woolworths and Kumba disclosed real business opportunities relating to water. For example, the two chemical companies are expanding their water treatment business, thus confirming what Grossman *et al.* (2013) highlighted, namely that there will be an increased demand for the chemical sector to produce products that sterilise, purify and desalinate water as water quality and scarcity challenges increase. The development of drought-resistant seeds and crop protection products will also increase.

Pick n Pay has developed a green range of products and Woolworths is also developing environmentally friendly clothing and products.

The 2013 CDP Water Programme found that 83% of the respondents disclosed recognising opportunities in their businesses, but it is not clear if the companies only recognise or actually make something of these business opportunities. The Global Study did not survey this element.

4.12.3 Stakeholder engagement

Companies' water practices are subjected to greater scrutiny as public interest in the impacts of water withdrawal and wastewater discharge on ecosystems and local communities grows (Morrison *et al*., 2009). This study investigated whether the selected companies were engaging with a whole variety of stakeholders on water issues. The Gauge™ includes a number of stakeholders with which a company needs to engage on water-related matters, namely local communities, employees, suppliers, local, regional and national governments or regulators, NGOs and community organisations, other industries/companies/water users and customers. Next the findings for each individual stakeholder will be discussed.

Activity 3.1: For local communities, it was found that 47% of the companies in this study do engage with the local communities on water-related issues for existing or potentially new direct operations. The chemical, food producers and food retailers,

including Woolworths, and pharmaceutical sectors, were the worst performers for this activity. The mining sector was the best performer. In the 2008 Global Study, only 5% of the companies were found to engage with stakeholders on water-related impacts when expanding their operations.

Activity 3.2: For employees, 33% of the companies report that they are engaging with their employees on water issues. Two companies namely, Illovo Sugar and Tiger Brands, in the food producer sector, scored leading practice as these two companies have incentive schemes for their employees to reduce their own water footprint. The chemical, forestry, mining and pharmaceutical sectors were the worst performers for this activity. Only Amplats and Northam engage with their employees on water issues. This issue was not surveyed in the other two studies.

Activity 3.3: Regarding suppliers, 20% of the companies engage with their suppliers to help them improve water management. This is a poor score, as with all the other activities relating to suppliers. The 2008 Global Study indicated that only 12% of companies report working with their suppliers to help them reduce water use or wastewater discharge. As Barton (2010) mentioned in the 2008 Global Study, for companies that have a significant percentage of their corporate water footprint in their supply chain, there was hardly any discussion of working with suppliers to manage water risks.

Activity 3.4: Regarding local, regional and national governments or regulators, 67% of the companies in this study disclosed that they engage with governmental departments. The beverage and mining sectors were the best performers here, with the chemical sector, food producers, food retailers (except Woolworths) and pharmaceuticals being the worst performers.

According to Amis and Nel (2011), the nature and cost of doing business is at risk because of possible changes to water policy, laws and regulations. In addition, new businesses or businesses wanting to grow their operations in water-scarce areas may find it more difficult to access legal water allocations (Amis & Nel 2011). This statement shows that it is imperative for business continuity that businesses engage with government. This issue was not surveyed in the other two studies.

Activity 3.5: Regarding NGOs and community organisations, 63% of the companies disclosed that they engage with NGOs. The mining sector was again the best

performer, with three companies having leading practice selected on the Gauge™. The chemical and pharmaceutical sectors were the worst performers. The food producers did disclose that they were engaging with NGOs, but for the companies where evidence was found, only initial steps could be selected. Leading practice was selected for Woolworths, with the other retailers showing no evidence of this activity. For SAB, Mondi and Sasol, leading practice was selected. This issue was not surveyed in the other two studies.

Activity 3.6: Regarding other industries/companies/water users, 40% of companies disclosed in their reports that they were working with other industries/companies/ water users. The beverage sector was the best performer in this activity, but the other sectors did not perform well here. This issue was not surveyed in the other two studies.

Activity 3.7: Regarding customers, 13% of the companies disclosed that they were engaging with their customers on water issues, and these companies included SAB, Omnia, Pick n Pay and Woolworths. The mining sector, food producers, forestry, oil and gas, and pharmaceuticals, showed no evidence in their reports that they educate their customers on water issues. This issue was not surveyed in the other two studies.

4.12.4 Disclosure

Are companies communicating water-related risks to their stakeholders?

Activity 4.1: Does the company make water-related information publicly available? Of the companies in this study, 80% make water-related information publicly available. Afrox, AVI, Pick n Pay, Shoprite, Spar and SacOil, appear to make no water information publicly available or such a limited amount of information, that no evidence was selected for these companies. The other two studies did not include this element in their studies, so no comparison or contrast could be made against them.

Activity 4.2: Does the company include water data and analysis in published financial filings/reports? Of the 30 selected companies in this study, 80% included water-related information in their published financial reports, mostly as initial steps. As mentioned in the point above, the other two studies did not include this activity as part of their evaluation.

Activity 4.3: Does the company provide third-party assurance or audit water-related information? Of the companies, 27% disclosed having third-party assurance on water-related information, but this was difficult to verify, because only if the company mentioned that it was ISO 14001 certified or environmental impact assessments were conducted, could a stage be selected for this activity. This issue was not surveyed in the other two studies.

4.13 SUMMARY

From the above findings, it can be deduced that the mining sector was the best performing sector, and that the mining companies are working on the acid mine drainage problem, which is deemed a primary water risk in South Africa. Furthermore, mining companies are working with government and helping communities with water scarcity, and they are experiencing problems with obtaining or renewing their water use licences. The 2008 Global Study also found the mining sector to have the strongest water risk disclosure of all the sectors surveyed.

Many of the activities on the Gauge™ for SAB and Woolworths were selected as leading practice, but because of other companies included in their sectors that did not show good water stewardship, the beverage and food retailers sectors were rated as poor performers – in fact, the food retailers sector was rated as one of the worst performers with regard to water stewardship in this study.

The food producers sector performed the worst, which is unacceptable, as the agricultural sector uses the most water of all the sectors. The 2008 Global Study found this sector to present limited risk disclosure overall.

In the oil and gas sector, as there were only two companies in this sector and because SacOil did not report on any water issues, this sector was classified as a poor performer, even though Sasol shows good water stewardship, and the company does show a commitment to water scarcity issues in South Africa, and recognises that water is important to its business. However, the company is involved in fracking, where the effects of this method of gas extraction on groundwater are still not clear.

The chemical sector did not prove to be good performer. The chemical sector uses a lot of water in the production process and could have significant impacts on water sources through chemical spills, wastewater discharges and chemical products

being used at the end of the supply chain contaminating surface and ground water. This sector therefore needs to show better water stewardship. However, the chemical sector has opportunities available to it, because of water scarcity and poor water quality to develop and introduce products that can purify water, and develop drought-resistant seeds for the agricultural sector. Examples of this were cited in AECI and Omnia's reports. The 2008 Global Study found that the chemical sector showed weak water risk disclosure as a whole. The study reported that ten out of the 15 companies did disclose market opportunities relating to products that save or improve water quality.

The forestry sector proved to be one of the better performers, scoring leading practice in some of the activities in the measurement, management and stakeholder engagement categories. The pharmaceutical and biotechnology sector was shown to be a weak performer in this study, and in many areas, no evidence was selected.

The main issue for all the sectors, including the mining sector, is that of supplier water-related risks, and this is a neglected area with regard to corporate water management. According to KPMG International (2012), suppliers are the hidden water users. The business risk of water scarcity spreads well beyond a company's own operations and deep into its supply chains. Much more water is used in the supply chain than in direct operations. Hence this issue should be a concern for all companies.

The 2008 Global Study found that none of the companies reported any engagement with their suppliers. The 2013 CDP Water Programme reported that only 21% of companies required suppliers to report on water risk. All three studies thus reported weak performance in this area.

The next chapter reviews the objectives and summarises the findings of this research study. It makes recommendations to the companies on how to improve the management of their water risks and the disclosure thereof, and how investors can drive better water management practices and disclosure. In conclusion, suggestions are made for possible future research in this area.

CHAPTER 5: CONCLUSION

5.1 INTRODUCTION

The previous chapter contained a detailed discussion of the findings of this study. This chapter provides a summary of the research findings and makes recommendations on how companies could improve their water disclosure practices. The premise of this study was that South African companies have failed to grasp the seriousness of the looming water crisis or the effects this could have on their businesses in the future, and that corporate water management was either non-existent or limited.

In order to prove or disprove this theory, this research endeavoured to assess the corporate water management practices of 30 JSE listed highly water-intensive companies in South Africa for the years 2011 and 2013. The following objectives were formulated for the study:

> The main objectives of this study were to determine if these 30 companies recognised the importance of water in their businesses and if they were showing a commitment to the issue of water scarcity in South Africa. In order to establish if these two main objectives were being met, the Gauge™'s four categories with their activities were used as specific objectives.

The specific objectives of this study were to determine whether companies are

- gathering data that measures water-related risks in the business. A business cannot manage what it does not measure (Barton & Adrio, 2011).
- managing water-related risks. This would include governance, policies and standards, and business planning.
- engaging with their internal and external stakeholders regarding water-related issues. For example, are companies engaging with their suppliers to help them improve water management?
- disclosing water-related information.

However, the research first had to provide evidence of how severe the global and South African water crisis is, and show best practice examples of how companies in highly water-intensive sectors are mitigating and dealing with their water risks. This was done in chapter 2, the literature review.

The information was collected from the internet in the form of the company's various reports, either sustainability reports, annual reports or integrated reports. Atlas.ti was used to find anything in the company's reports relating to water. These water disclosures were categorised according to the Gauge™'s categories and activities, and once this had been done, outputs were downloaded from Atlas.ti by company, in order to complete the Gauge™ by company, for 2011 and 2013. In section 5.3, these findings are presented in a summary format. In section 5.4, recommendations are formulated for companies on how to improve the management of water-related risks and the disclosure thereof, and for investors on how to drive better water disclosure. Lastly, in section 5.5, suggestions are made for possible future research.

5.2 CHAPTER LAYOUT

An illustration of the chapter layout is provided in figure 5.1.

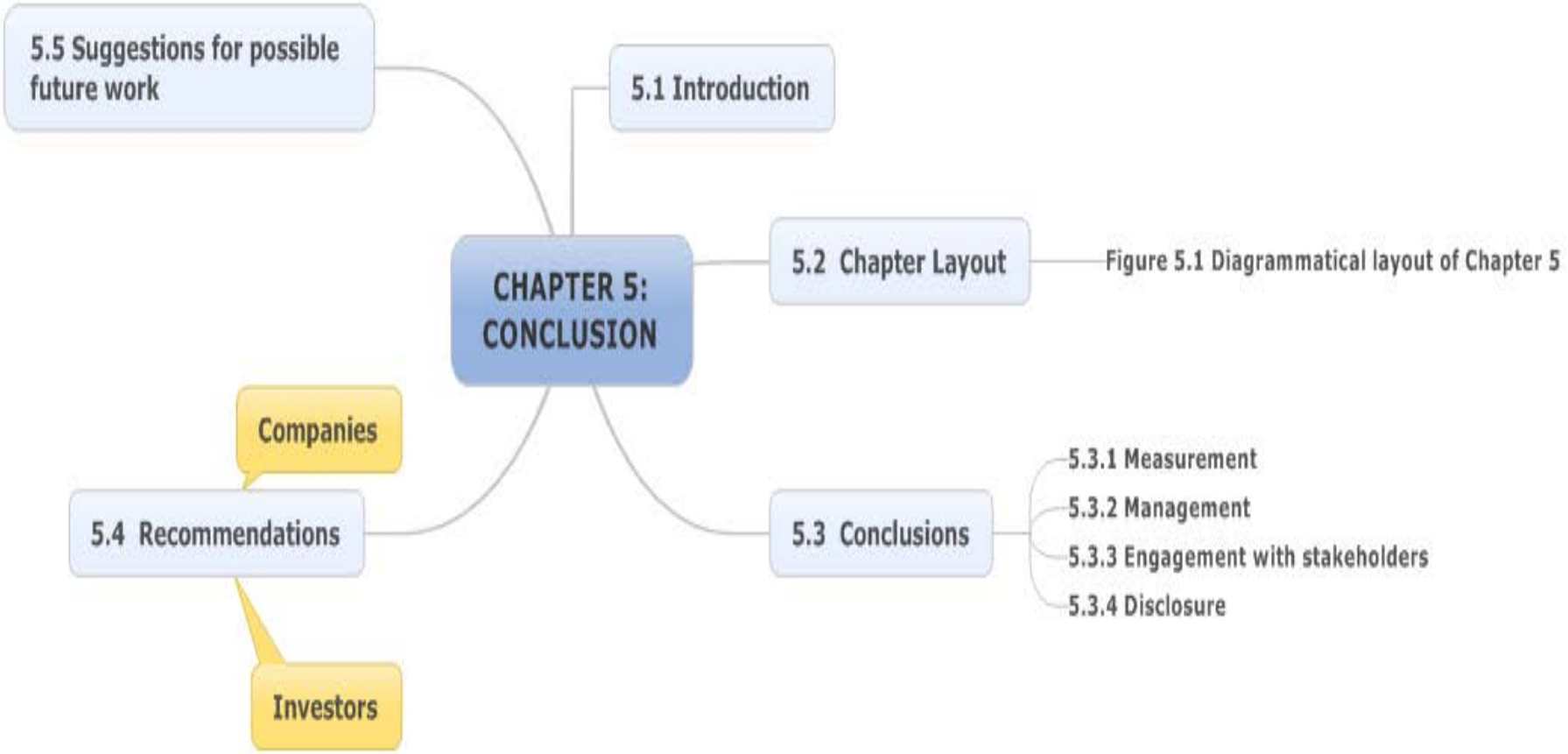

Figure 5.1: Diagrammatic layout of chapter 5

5.3 CONCLUSIONS

The study drew the conclusions as set out below with regard to measurement, management, engagement with stakeholders and disclosure.

5.3.1 Measurement

Of the companies in this study, 90% were found to have disclosed their water consumption. For the disclosure of the company's environmental and social impacts on direct sources, 73% of the companies were found to have performed this activity. A total of 80% of the companies reported that they monitor external factors like climate change that could affect direct water sources. Half (50%) of the companies reported that they monitor stakeholder perceptions relating to water issues. Of the companies, 77% were found to be identifying water-related risks in their direct operations. However, the activities of collecting and monitoring suppliers' water management practices and identifying and quantifying water related-risks in the supply chain scored very low percentages, 10% and 13% respectively.

5.3.2 Management

The two activities regarding board-level oversight of water-related issues, and whether senior executives are directly involved in the management of water-related activities, were difficult to verify. For the next activity regarding whether the company "walks the talk", 60% of the companies were shown to be doing this, either by saving water, implementing wastewater reductions, helping the community and so on. A total of 70% of the companies were found to have a water policy and to be recognising the importance of water, some to a greater extent than others. Of the companies, 60% had set reduction targets for water consumption, but the figure for target setting for wastewater discharge reductions was much lower at 43%.

A total of 57% of the companies had plans to address local watershed risks. The next activity of whether companies were addressing sustainable water management in their suppliers' codes of conduct, scored a very low 10%. Regarding the question of whether companies consider water in business planning and investment decisions, 63% of them do, to a lesser or greater extent. A total of 53% of the companies do consider water in product design and development and 67% of the selected companies do identify water-related business opportunities, but these were

mostly related to reducing costs and improved stakeholder relationships, and not new business opportunities.

5.3.3 Engagement with stakeholders

The stakeholders that were selected by the Gauge™ included local communities, employees, suppliers, local, regional and national government or regulators, NGOs, other industries/companies/water users and customers.

Engagement by the companies with the local community was 47%; with employees, 33%; with suppliers, 20%; with local, regional and national government, the highest score at 67%; with NGOs also good at 63%; with other industries/companies/water users at 37%; and lastly, with customers very low at 13%.

5.3.4 Disclosure

For the first and second activities in this category, namely whether the company makes water-related information publicly available, and whether the company includes water data in published financial reports, 80% was scored for both by the selected companies. The third and last activity, namely whether the company provides third-party assurance or audits water-related information, this was difficult to verify, but 40% of the companies were found to perform this activity.

It is evident from the above that the premise of this study that the selected South African companies had not grasped the seriousness of the looming water crisis or the effects it would have on their businesses in the future, was refuted. Sectors like the food producers and food retailers were found to be weak performers in this study, the mining sector was found to be the best performer, while companies like SAB and Woolworths also proved to be the best performers. Most concerning was the activities relating to supply chain water management, and in all the companies in this study, this area needs to be addressed.

5.4 RECOMMENDATIONS

The above findings highlight a number of areas that require significant improvements.

Companies

- Addressing water risks in the supply chain. Companies need to be aware of how much water is embedded in their supply chain, and this can be done by

conducting a water footprint exercise. Only then will companies realise the enormity of the water risk in the supply chain. Companies need to engage with their suppliers and stipulate water-related requirements in their supplier contracts.

- Improving on stakeholder engagement. Companies need to engage with, educate and train their stakeholders. For employees, linking performance appraisals to water-related goals and targets could drive improvements as incentives/bonuses/salary increases will be affected.
- Making the most of opportunities. Companies need to not only direct their attentions to becoming better water stewards, but to also develop new products or services either by way of organic growth or mergers and acquisitions. Investors will put pressure on companies too, in order to maintain a competitive advantage in an ever-increasing water-stressed world.
- Quantifying water risks. Companies are identifying their water risks but not quantifying them. If an amount can be calculated for a certain water risk, this will drive performance to mitigate this risk, and can also be accounted for as a contingent liability in the balance sheet.

Investors

- Investors need to engage with and put pressure on the companies they own in high water-intensive sectors with regard to their water management practices, and expect improvement results so that environmental issues like water and climate change can receive the necessary attention.
- Investors could support initiatives like the CDP Water Programme and CEO Water Mandate and drive companies they own to participate in these, which would increase water reporting.

5.5 SUGGESTIONS FOR POSSIBLE FUTURE RESEARCH

Many of the companies evaluated in this research mentioned in their reports that obtaining or renewing a new water use licence from the DWA was extremely difficult and took a long time. This is a risk for the continued operation of companies and could hamper foreign companies from expanding and investing in South Africa. This could be an area for possible future research.

Research on other environmental elements could also be researched, for example, climate change, carbon emissions and so on.

Another problem that came to light in this study was the lack of information companies are disclosing on suppliers' water-related risks. This is another area that merits future research.

Besides industry being categorised into high, medium and low water intensity, countries and their watersheds are also categorised in this way, and a future study could investigate where companies' suppliers are situated and how this could pose a risk. This is another area for possible future study.

BIBLIOGRAPHY

2030 Water Resources Group (WRG). 2013. *Strategic water partners network South Africa: creating shared value through innovative partnerships*. Johannesburg: NEPAD Business Foundation.

2030 Water Resources Group (WRG). [Online]. Available: http://www.2030wrg.org/about/ [Accessed: 9 October 2013].

Adcock Ingram Holdings Limited. 2011. Integrated report. [Online] Available: http://www.adcock.co.za/Content/FinReports/2011%20Annual%20Report%202011%20(33).pdf [Accessed: 18 December 2014].

Adcock Ingram Holdings Limited. 2013. Integrated report. [Online]. Available: http://www.adcock.co.za/Content/IntReports/Adcock_final_IAR_2013_Final.pdf [Accessed: 23 June 2014].

AECI Limited. 2011. Integrated report. [Online]. Available: http://www.aeci.co.za/Financial/2011_annual_report/pdf/full.pdf [Accessed: 12 December 2013].

AECI Limited. 2013. Integrated report. [Online]. Available: http://www.aeci.co.za/pdf/annual_reports/2013_annual_report.pdf [Accessed: 24 June 2014].

African Oxygen Limited. 2011. Annual report. [Online]. Available: http://www.afrox.co.za/internet.global.corp.zaf/en/images/Afrox_Annual_Result_2011266_56628.pdf [Accessed: 13 December 2013].

African Oxygen Limited. 2013. Sustainability report. [Online]. Available: http://www.afrox.co.za/internet.global.corp.zaf/en/images/Sustainability_Report_2013266_118581.pdf [Accessed: 20 June 2014].

African Rainbow Minerals Limited. 2011. Sustainability report. [Online]. Available: http://www.arm.co.za/im/files/annual/2011/download/ARM-sustainable-development-report-2011.pdf [Accessed: 8 January 2014].

African Rainbow Minerals Limited. 2013. Sustainability report. [Online]. Available: http://arm.integrated-report.com/2013/download/ARM-SD13.pdf [Accessed: 20 June 2014].

Alliance for Water Stewardship (AWS). N.d. [Online]. Available: http://allianceforwaterstewardship.org/about-aws.html#about-aws [Accessed: 9 October 2013].

Amis, M. & Nel, D. 2011. *Managing water risk: business response to the risk of climate change in South Africa – a synthesis*. Cape Town: WWF South Africa.

Anglo American Platinum Limited. 2011. Sustainable development report. A precious metal for a precious planet. [Online]. Available: http://www.angloamerican.com/~/media/Files/A/Anglo-American-PLC-V2/investors/reports/csreports/platinum_sustainabledevelopment_report.pdf [Accessed: 8 January 2014].

Anglo American Platinum Limited. 2013. Sustainable development report. Focused on delivery changing for sustainability. [Online]. Available: http://www.angloamerican.com/~/media/Files/A/Anglo-American-PLC-V2/investors/reports/aa-platinum-sdr-2013.pdf [Accessed: 23 June 2014].

Anglo American PLC. 2012. *Creating value with the future in mind: Sustainability Report for 2012*. London: Anglo American PLC.

AngloGold Ashanti Limited. 2011. Sustainability report: Sustainable gold. [Online]. Available: http://www.aga-reports.com/11/download/AGA-sustainability-report-2011.pdf [Accessed: 8 January 2014].

AngloGold Ashanti Limited. 2013. Annual sustainability report. [Online]. Available: http://www.anglogoldashanti.com/en/Media/Reports/Sustainability%20Reports/Sustainability%20Report%202013.pdf [Accessed: 23 June 2014].

Aspen Pharmacare Holdings Limited. 2011. Annual report. [Online]. Available: http://financialresults.co.za/2011/aspen_ar2011/downloads/aspen_ar2011.pdf [Accessed: 18 December 2013].

Aspen Pharmacare Holdings Limited. 2013. Sustainability report. [Online]. Available: http://static.globalreporting.org/report-pdfs/2013/4dd7d4eafdcf9c37500c2a8513845c51.pdf [Accessed: 23 June 2014].

Assore Limited. 2011. Integrated annual report. [Online]. Available: http://www.assore.com/wp-content/themes/twentyeleven_child/pdf/Assore_AR_complete_2011.pdf [Accessed: 8 January 2014].

Assore Limited. 2013. Integrated annual report. [Online]. Available: http://www.assore.com/wp-content/uploads/2013/10/Assore-Lo-Res.pdf [Accessed: 8 October 2014].

AVI Limited. 2011. Annual report. [Online]. Available: http://www.avi.co.za/system/presentations/attachments/75/original/AVI_Annual_Report_2011.pdf?1317623078 [Accessed: 13 December 2013].

AVI Limited. 2013. Integrated annual report. [Online]. Available: http://www.avi.co.za/system/presentations/attachments/93/original/AVI_AR_2013_Lo-Res.pdf?1380547249 [Accessed: 20 June 2014].

Baird, H., 2012. Water-related issues could threaten business models. *Financial Management Magazine*, CIMA, April.

Bakker, P. 2013. *Accountants will save the world* [Homepage of World Business Council for Sustainable Development (WBCSD)]. [Online]. Available: http://www.ceres.org/about-us/our-history [Accessed: 3 October 2013].

Barton, B. 2010. *Murky waters? Corporate reporting on water risk: a benchmarking study of 100 companies*. Boston, MA: Ceres.

Barton, B. & Adrio, B. 2011. *The Ceres Aqua Gauge™: a framework for 21st century water risk management*. San Francisco, CA: Creative Commons.

Black, M. & King, J. 2009. *The atlas of water: mapping the world's most critical resource*. 2nd edition. London: Earthscan.

Bless, C. 1995. *Fundamentals of social research methods: an African perspective.* 2nd edition. Kenwyn, Cape Town: Juta.

Biggam, J. 2008. *Succeeding with your master's dissertation: a step-by-step handbook*. Maidenhead, Berkshire, UK: McGraw-Hill Education.

British Columbia Ministry of Forests. N.d. *Forest practices branch*. [Online]. Available: https://www.for.gov.bc.ca/hfd/pubs/ssintroworkbook/meansilv.htm [Accessed: 28 November 2015].

Capevin Ltd. 2012. Homepage of Capevin Ltd. [Online]. Available: http://www.capevin.com/ [Accessed: 28 October 2012].

Carbon Disclosure Project (CDP). N.d. [Online]. Available: https://www.cdproject.net/en-US/Pages/About-Us.aspx [Accessed: 9 October 2013].

CDP Water Programme. 2012. *South African Report 2012: recognising the strategic value of water*. London: Carbon Disclosure Programme (CDP).

CDP Water Programme. 2013. *CDP South Africa Water Report 2013: rising water risks – businesses facing a new reality*. London: Carbon Disclosure Program (CDP).

Chapagain, A. & Tickner, D. 2012. Water footprint: help or hindrance. *Water Alternatives*, 5(3): 563.

Chartered Institute of Management Accountants (CIMA). 2010. *Accounting for climate change: how management accountants can help organisations mitigate and adapt to climate change*. London: CIMA.

Chartered Institute of Management Accountants (CIMA). 2011. Apocalypse H2O: accounting for the true value of water. *Insight* (*e-magazine),* July.

Collins, S. (collins@ceres.org) 2015. Discussion of activity 2.3 of *Ceres Aqua Gauge™.* [E-mail to:] Askham, T.M. (askhat@unisa.ac.za) 21 April.

Deloitte. 2012. *Collective responses to rising water challenges*. CDP global water report.

De Wit, M.J. 2011. The great shale debate in the Karoo. *South African Journal of Science*, 107(7/8): 1–5.

Distell Group Limited. 2011. Sustainable development report. [Online]. Available: http://distell.investoreports.com/distell_sdr_2011/environment/water-usage-to-sustainsupply/ [Accessed: 12 December 2013].

Distell Group Limited. 2013. Sustainable development report. [Online]. Available: https://www.distell.co.za/knowledge/pkdownloaddocument.aspx?docid=1028 [Accessed: 20 June 2014.

Donnelly, K., Dorau, T., Koslow, M. & Lorenz, S. 2008. *Valuing water: a globally sustainable approach for the pharmaceutical industry.* Ann Arbor, MI: University of Michigan, School of Natural Resources and Environment.

Exxaro Resources Limited. 2011. Integrated annual report. [Online]. Available: http://www.exxaro-reports.co.za/reports/ar_2011/integrated/pdf/integrated_annual_report.pdf [Accessed: 9 January 2014].

Exxaro Resources Limited. 2013a. Integrated annual report. [Online]. Available: http://www.exxaro.com/wp-content/uploads/2012/11/Exxaro_IR_2014-final_web.pdf [Accessed: 8 October 2014].

Exxaro Resources Limited. 2013b. Integrated annual report. [Online]. Available: http://www.exxaro.com/wp-content/uploads/2012/11/Exxaro_WEB_2014_web1.pdf [Accessed: 8 October 2014].

Fridson, M. & Alvarez, F. 2002. *Financial statement analysis: a practitioner's guide*. 3rd edition. New York: Wiley.

Global Reporting Initiative (GRI). 2013. *G4 sustainability reporting guidelines*. Amsterdam: GRI.

Global Reporting Initiative. N.d. *What is GRI?* [Homepage of GRI]. [Online]. Available: https://www.globalreporting.org/information/about-gri/what-is-GRI/Pages/default.aspx [Accessed: 28 October 2012].

Global Reporting Initiative (GRI). [Online]. Available: https://www.globalreporting.org/information/about-gri/what-is-GRI/Pages/default.aspx [Accessed: 9 October 2013].

Global Reporting Initiative (GRI). 2015. G4 sustainability reporting guidelines. [Online]. Available: https://www.globalreporting.org/resourcelibrary/GRIG4-Part1-Reporting-Principles-and-Standard-Disclosures.pdf [Accessed: 4 December 2015].

Goldfields Limited. 2011. Integrated report. [Online]. Available: https://www.goldfields.co.za/reports/ar_dec_2011/pdf/integrated_ann_rev_2011.pdf [Accessed: 9 January 2014].

Goldfields Limited. 2013. Integrated report. [Online]. Available: https:www.goldfields.co.za/reports/ annual_report_2013/pdf/annual-review-2013.pdf [Accessed: 9 January 2014].

Grossman, D., Erikson, J. & Patel, N. 2013. *GEO 5 for business: impacts of a changing environment on the corporate sector*. Nairobi: United Nations Environmental Programme.

Hoekstra, A. 2008. Measuring your water footprint. What's next in water strategy? *Leading Perspectives*, Summer:12–19.

Hoekstra, A., 2010. The water footprint: water in the supply chain. *The Environmentalist*, 1(93), March:12–13.

Hoekstra, A., 2012. Water footprint accounting. In J.M. Godfrey & K. Chalmers (Eds.). *Water accounting: international approaches to policy and decision making*. Cheltenham, UK: Edward Elgar:58–70.

Hoekstra, A., Chapagain, A., Aldaya, M. & Mekonnen, M. 2011. *The water footprint assessment manual: setting the global standard*. Washington DC: Earthscan.

Impala Platinum Holdings Limited. 2011. Sustainable development report. [Online]. Available: http://www.implats.co.za/implats/downloads/2011/annual%20reports/Implats%20SD%20Combined_LoRes.pdf [Accessed: 9 January 2014].

Impala Platinum Holdings Limited. 2013. Sustainable development report. [Online]. Available: http://financialresults.co.za/2013/implats_reports/downloads/Implats_sustainable_development_2013.pdf [Accessed: 23 June 2014].

Illovo Sugar Limited. 2011. Annual report. [Online]. Available: http://www.illovosugar.co.za/Investors/Integrated-Annual-Reports/2011 [Accessed: 17 December 2013].

Illovo Sugar Limited. 2013. Integrated report. [Online]. Available: http://www.illovosugar.co.za/Investors/Integrated-Annual-Reports/2013 [Accessed: 20 June 2014].

International Federation of Accountants (IFAC). 2013. *Special edition of the Professional Accountants in Business* (*PAIB) Committee eNews - Accounting for Natural Capital*. New York: International Federation of Accountants (IFAC) Communications Department.

International Organisation for Standardisation (ISO). N.d.a. Homepage of ISO. [Online]. Available: http://www.iso.org/iso/home/about.htm [Accessed: 7 October 2013].

International Organisation for Standardisation (ISO). N.d.b. Management standards. [Online]. Available: http://www.iso.org/iso/home/standards/management-standards/iso14000.htm [Accessed: 17 November 2015].

Johannesburg Stock Exchange (JSE). N.d. Dual-listed companies. [Homepage of the JSE]. [Online]. Available: http://www.jse.co.za/How-To-List/Main-Board/Dual-listed-companies.aspx [Accessed: 11 August 2012].

King, M. & Lessidrenska, T. 2009. *Transient caretakers: making life on earth sustainable*. Johannesburg: Pan Macmillan.

KPMG International. 2012. *Sustainable insight water scarcity: A dive into global reporting trends*. Amstelveen, The Netherlands: KPMG International.

Kumar, R. 2011. *Research methodology: a step-by-step guide for beginners.* 3rd edition. London: Sage.

Kumba Iron Ore Limited. 2011. Sustainable development report. [Online]. Available: http://www.angloamericankumba.com/~/media/Files/A/Anglo-American-Kumba/Annual%20Reports/2011/sustainability.pdf [Accessed: 12 March 2014].

Kumba Iron Ore Limited. 2013. Sustainable development report. [Online] Available: http://www.angloamericankumba.com/~/media/Files/A/Anglo-American-Kumba/documents/sustainability-report.pdf [Accessed: 23 June 2014].

Larson, W., Freedman, P., Passinsky, V., Grubb, E. & Adriaens, P. 2012. Mitigating corporate water risk: financial market tools and supply management strategies. *Water Alternatives,* 5(3):582–602. [Online]. Available: http://www.water-alternatives.org/index.php?option=com_content&task=view&id=224&Itemid=1. [Accessed: 06 June 2013].

Lusher, L. 2012. What is the accounting profession's role in accountability of economic, social, and environmental issues? *International Journal of Business and Social Science*, 3(15):13.

Manders, P., Godfrey, L. & Hobbs, P. 2009. *Acid mine drainage in South Africa* (2009/2). Pretoria: CSIR.

Meadows, D.H., Meadows, DL., Randers, R. & Behrens III, WW. 1974. *The limits to growth: a report for the Club of Rome's project on the predicament of mankind*. 2nd edition. London, UK & Sydney Australia: Pan Books.

Mondi Group Limited. 2009. Code of conduct for suppliers of the Mondi Group. [Online]. Available: http://www.mondigroup.com/PortalData/1/Resources/microsites/procurement/downloads/EN_Code_of_Conduct_for_Suppliers_-_Mondi_-_19_10_09.pdf [Accessed: 28 November 2015].

Mondi Group Limited. 2011. Sustainable development review. [Online]. Available: http://www.mondigroup.com/PortalData/1/Resources/sustainability_2012/Mondi-sustainable-development-review-2011.pdf [Accessed: 17 December 2013].

Mondi Group Limited. 2013. Sharing our sustainable future. [Online]. Available: http://www.mondigroup.com/ssf13 [Accessed: 20 June 2013].

Morrison, J., Schulte, P. & Schenck, R. 2009. *Corporate water accounting: an analysis of methods and tools for measuring water use and its impacts*. Oakland, CA: Pacific Institute.

Morrison, J., Schulte, P., Koopman, L., Allan, N., Norton, M., de Souza, K., Iceland, C., Shiao, T., Rieg, P. & Otto, B. 2012. *The CEO water mandate: corporate water disclosure guidelines. Toward a common approach to reporting water issues*. Oakland, CA: Pacific Institute.

Morrison, J., Morikawa, M., Murphy, M. & Schulte, P. 2009. *Water scarcity and climate change: growing risks for businesses and investors*. Boston, MA: Ceres.

Nestlé. 2011. Nestlé *creating shared value report 2011*. Vevey, Switzerland: Nestlé.

Nestlé. 2012. *Creating shared value and meeting our commitments 2012*. Vevey, Switzerland: Nestlé.

Nestlé Waters North America. 2009. *Nestlé Waters in McCloud* [Homepage of Nestlé Waters North America]. [Online]. Available: http://mccloud.nestlewatersca.com/ [Accessed: 7 October 2013].

Northam Platinum Limited. 2011. Sustainable development report. [Online]. Available: http://www.northam.co.za/images/sd/reports/2011/downloads/NORTHAM-SD2011.pdf [Accessed: 10 January 2014].

Northam Platinum Limited. 2011. Sustainable development report. [Online]. Available: http://northam.integrated-report.com/2013/sd/download/NHM-SD13.pdf [Accessed: 23 June 2014].

Oceana Group Limited. 2011. Integrated report. [Online]. Available: http://www.oceana.co.za/investors/annual-reports [Accessed: 17 December 2013].

Oceana Group Limited. 2013. Shared value sustainability report. [Online]. Available: http://oceana-integratedreport.co.za/ir_2013/sites/default/files/2013/sus/Sustainability_Report_13Dec.pdf [Accessed: 20 June 2014].

Omnia Holdings Limited. 2011. Annual report. [Online]. Available: http://www.omnia.co.za/component/jdownloads/send/17-2011/28-omnia-ar-2011 [Accessed: 13 December 2013].

Omnia Holdings Limited. 2013. Integrated annual report. [Online]. Available: http://www.omnia.co.za/reports-and-results/annual-reports/2013 [Accessed: 20 June 2014].

Orr, S., Cartwright, A. & Tickner, D. 2009, *Understanding water risks: a primer on the consequences of water scarcity for government and business.* Surrey, UK: WWF-UK.

Orr, S., Sanchez-Navarro, R., Schmidt, G., Seiz-Puyuelo, R., Smith, K. & Verberne, J. 2011. *Assessing water risk: a practical approach for financial institutions.* Berlin: WWF-Germany.

Pacific Institute, Price Waterhouse Coopers, Carbon Disclosure Project and World Resources Institute. 2012. *The CEO water mandate. Corporate water disclosure guidelines. Toward a common approach to reporting water issues.* Public exposure draft. Melbourne: United Nations Global Compact.

Parkinson, C. & Ogilvie, J. 2000. *CIMA's official study system. Management Accounting - Financial Strategy.* Relevant for May & November 2004 examinations. Oxford, UK: CIMA Publishing.

Pegram, G. 2010. *Lloyd's 360 risk insight global water scarcity: risks and challenges for business.* London: Lloyd's.

Pick n Pay Stores Limited. 2011. Integrated annual report. [Online]. Available: http://www.picknpay-ir.co.za/financials/annual_reports/2011/downloads/picknpay_ar2011.pdf [Accessed: 17 December 2013].

Pick n Pay Stores Limited. 2013a. Integrated annual report. [Online]. Available: http://www.picknpay-ir.co.za/financials/annual_reports/2013/Integrated_Annual_Report_2013.pdf [Accessed: 20 June 2014].

Pick n Pay Stores Limited. 2013b. Sustainable living report. [Online]. Available: http://www.pads.eezeepage.co.za/i/136259 [Accessed: 20 June 2014].

Pioneer Group Limited. 2011. Integrated report. [Online]. Available: http://www.pioneerfoods.co.za//content/uploads/integrated-report-2011.pdf [Accessed: 17 December 2013].

Pioneer Group Limited. 2013. Realising our potential. Integrated report. [Online]. Available: http://www.pioneerfoods.co.za//content/uploads/integrated-report-2013.pdf [Accessed 20 June 2014].

Puma. 2011. Annual report [Homepage of Puma]. [Online]. Available: http://www.puma-annual-report.com/en/ [Accessed: 11 August 2012].

Puma. 2012. Business and sustainability report. Herzogenaurach, Germany: Puma.

Rapacioli, S. & Malone, R. 2012. *Thirsty planet: business responses to water scarcity.* New York & London: American Institute of CPAs and Chartered Institute of Management Accountants.

Reig, P., Shiao, T. & Gassert, F. 2013. *Aqueduct water risk framework.* Washington DC: World Resources Institute.

SAB Miller and World Wide Fund for Nature. 2009. *Water footprinting: identifying and addressing water risks in the value chain.* Surrey, UK: SAB Miller Plc & WWF-UK.

South African Breweries LTD. N.d. Homepage of SAB Ltd. [Online]. Available: http://www.sab.co.za/sablimited/content/en/sab-heritage [Accessed: 28 October 2012].

The South African Breweries (SAB). 2012. SAB (Pty) Ltd sustainable development report 2012. Sandton: SABMiller.

SAB Miller PLC. 2015. How to become a supplier. [Online] Available: http://www.sabmiller.com/How-to-become-a-supplier [Accessed: 28 November 2015].

SAB Miller, WWF-UK & Deutsche Gesellschaft fur Internationale Zusammenarbeit (GIZ) GmbH. 2011. Water futures addressing shared water challenges through collective action. [Online]. Available: https://www.sabmiller.com/docs/default-source/sustainability-documents/water-futures-report-2011 [Accessed: 12 December 2013].

South African Breweries, WWF, Deutsche Gesellschaft fur Internationale Zusammenarbeit (GIZ) GmbH & Federal Republic of Germany. 2013. South African Breweries: water stewardship in the hops Industry. [Online]. Available: http://www.sabmiller.com/docs/default-source/investor-documents/reports/2013/sustainability/sab-water-stewardship-in-the-hops-industry-report-2013.pdf?sfvrsn=4 [Accessed: 20 June 2014].

SAB Miller PLC. 2011. Dale Steyn appointed SAB water ambassador. Press statement issued on 11 October 2011. [Online] Available: http://www.sab.co.za/sablimited/content/sab-press-releases-archive-2011?oid=2931&sn=Detail&pid=2664 [Accessed: 28 November 2015].

Sappi Limited. 2011. Sustainability report. [Online]. Available: http://www.sappi.com/regions/sa/Sustainability/Documents/2011%20Sappi%20Group%20Sustainability%20Report.pdf [Accessed: 8 December 2013].

Sappi Limited. 2013. Sustainability report. [Online]. Available: http://www.sappi.com/group/Sustainability/2013-Sappi-Group-Sustainability-Report.pdf [Accessed: 20 June 2014].

SacOil Holdings Limited. 2011. Annual report. [Online]. Available: http://www.SacOilholdings.com/assets/dynamic/17/files/52/1362736778_SacOil-annual-report-2011.pdf [Accessed: 6 June 2014].

SacOil Holdings Limited. 2013. Integrated annual report. [Online]. Available: http://www.SacOilholdings.com/assets/dynamic/17/files/55/1362737188_SacOil-reviewed-interim-results-as-at-31-august-2012.pdf [Accessed: 6 June 2014].

Sasol Limited. 2011. Sustainable development report. [Online]. Available: http://www.sasol.co.za/sites/default/files/publications/sustainable_development_report/downloads/11431_Sasol_SD2011_1328013983285.pdf [Accessed: 7 October 2014].

Sasol Limited. 2013. Sustainable development report. [Online]. Available: http://www.sasol.co.za/sites/default/files/publications/sustainable_development_report/downloads/13269_Sasol%20SD%20HR-1.pdf [Accessed: 7 October 2014].

Schneider, K. 2010. [16 March 2010 – last update]. Coming era of water scarcity will prompt global industrial transformation, according to survey of international experts [Homepage of Circle of Blue]. [Online]. Available: http://www.circleofblue.org/waternews/2010/world/coming-era-of-water-scarcity-prompts-global-industrial-transformation/ [Accessed: 23 September 2013].

ShareData Online. 2012. [Online]. Available: https://www.google.co.za/webhp?sourceid=chrome-instant&ion=1&espv=2&ie=UTF-8#q=share%20data.

Shoprite Holdings Limited. 2011. Integrated report: competing with the right strategy. [Online]. Available: http://www.shopriteholdings.co.za/InvestorCentre/Documents/2011/Annual%20Report%202011%20English_web.pdf [Accessed: 17 December 2013].

Shoprite Holdings Limited. 2013. Integrated report. [Online]. Available: http://www.shopriteholdings.co.za/InvestorCentre/Documents/2013/Shoprite_2013_Integrated_Report.pdf [Accessed: 20 June 2014].

The Spar Group Limited. 2011. Integrated annual report. [Online]. Available: https://www.spar.co.za/getattachment/e98f0312-a78f-4264-9967-4608883c59cc/00000000-0000-0000-0000-000000000000.aspx [Accessed: 11 March 2014].

The Spar Group Limited. 2013. Integrated annual report. [Online]. Available: https://www.spar.co.za/getattachment/e61464be-401b-430f-a5b7-2c96a441017a/00000000-0000-0000-0000-000000000000-(6).aspx [Accessed: 24 June 2014].

The San Franciso Bay Regional Water Quality Control Board. 2015. [Online]. Available: http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/wastewater.shtml [Accessed: 28 November 2015].

The Star. 2012. JSE share price listing. *The Star Newspaper*, Business Report, 7 September.

Sustainability Accounting Standards Board (SASB). 2012. Homepage of SASB. [Online]. Available: http://www.sasb.org/ [Accessed: 28 October 2012].

Sustainable Agricultural Initiative (SAI). N.d. [Online]. Available: http://www.saiplatform.org/about-us/who-we-are-2 [Accessed: 9 October 2013].

Sustainable Apparel Coalition (SAC). N.d. [Online]. Available: http://www.apparelcoalition.org/ [Accessed: 9 October 2013].

The Ceres Coalition. 2013. Homepage of Ceres. [Online]. Available: http://www.ceres.org/about-us/our-history [Accessed: 3 October 2013].

The Ceres Coalition. 2015. Value every drop. [Online]. Available: http://www.ceres.org/issues/water/corporate-water-stewardship/aqua-gauge/aqua-gauge-old [Accessed: 6 December 2015].

The Coca Cola Company. N.d. The water stewardship and replenish report [Homepage of the Coca Cola Company]. [Online]. Available: http://www.thecoca-colacompany.com/citizenship/pdf/TCCC_WSRR_2012_FINAL.pdf [Accessed: 11 August 2012].

The World Wide Fund For Nature (WWF) and DEG. N.d. The water risk filter [Homepage of WWF]. [Online]. Available: http://waterriskfilter.panda.org/Default.aspx [Accessed: 11 August 2012].

Tiger Brands Limited. 2011. Integrated report. [Online]. Available: http://www.tigerbrands.co.za/wp-content/uploads/2014/results/Tiger_Brands_Annual_Integrated_Report_2011.pdf [Accessed: 17 December 2013].

Tiger Brands Limited. 2013. Integrated report. [Online]. Available: http://www.tigerbrands.co.za/wp-content/uploads/2014/09/Tiger-Brands-Annual-Integrated-Report-2013.pdf [Accessed: 20 June 2014].

Tongaat Hulett Limited. 2011. Integrated annual report. [Online]. Available: http://www.tongaat.co.za/imc/annual_reports/ar_home.asp#2011 [Accessed: 17 December 2013].

Tongaat Hulett Limited. 2013. Integrated annual report. [Online]. Available: http://www.tongaat.co.za/imc/annual_reports/ar_home.asp#2013 [Accessed: 20 June 2014].

United Nations Global Compact. N.d. CEO water mandate [Online]. Available: http://ceowatermandate.org/about/ [Accessed: 9 October 2013].

Van Ast, L. & Maclean, R. 2012. *Carbon and water risk for South Africa's top companies, bonds and equity funds: how corporate emissions expose investors to carbon taxes and thirsty assets are vulnerable to climate change impacts.* Cape Town & London: WWF-SA & Trucost.

Wagner, K. 2012. Companies' climate change disclosure could be better. [Online]. Available: http://www.sasb.org/wp-content/uploads/2012/10/SASB-Press-Kit4.pdf [Accessed: 11 January 2016].

Walters, S.S. & Prinsloo, J.W. 2002. The impact of offshore listings on the South African economy. South Africa Reserve Bank Quarterly Bulletin. Pretoria: South African Reserve Bank.

Water Footprint Network. [Online]. Available: http://www.waterfootprint.org/?page=files/FAQ_Question_about_the_Network [Accessed: 9 October 2013].

Woolworths Holdings Limited. 2011. Good business journey report. [Online] Available: [Accessed: 12 March 2014].

Woolworths Holdings Limited. 2013a. Good business journey report. [Online] Available: [Accessed: 20 June 2014].

Woolworths Holdings Limited. 2013b. [Homepage of Woolworth]. [Online]. Available: http://www.woolworths.co.za/store/fragments/corporate/corporate-index.jsp?content=../article/article&contentId=cmp100395 [Accessed: 27 September 2013].

Woolworths Holdings Limited. 2015. Farming for the future. [Online] Available: http://www.woolworthsholdings.co.za/investor/gbj/2010/environment/f.asp [Accessed: 28 November 2015].

APPENDIX A: EXAMPLE OF SCORECARD FOR THE CERES AQUA GAUGE™

Category	Subcategory	Description *The Company:*	Activity	Company Performance
MEASUREMENT	Data Gathering	*Collects and monitors data related to:*	1.1 Its own regulatory compliance, water use, and discharge	
			1.2 Its own environmental and social impacts on direct water sources	
			1.3 External factors affecting direct water sources	
			1.4 Stakeholder perceptions and concerns related to water issues	
			1.5 Effectiveness of suppliers' water management practices	
	Risk Assessment	*Identifies and quantifies water-related risks for its:*	1.6 Direct operations	
			1.7 Supply chain	
MANAGEMENT	Governance	*Sets accountabilities for water through:*	2.1 Board of directors	
			2.2 Senior management	
			2.3 Public policy and lobbying positions	
	Policies & Standards	*Sets performance standards and goals through:*	2.4 Publicly available water policy/statement	
			2.5 Standards and goals on water withdrawals/consumption for direct operations	
			2.6 Standards and goals on wastewater discharge for direct operations	
			2.7 Plans to address local watershed risks	
			2.8 Supplier standards and codes, procurement and contracting practices	
	Business Planning	*Integrates water in decision-making related to:*	2.9 Business planning and capital allocation	
			2.10 Product design and development	
			2.11 Opportunity identification	
ENGAGEMENT	*Engages with internal and external stakeholders on water-related issues:*		3.1 Local communities	
			3.2 Employees	
			3.3 Suppliers	
			3.4 Governments and regulators	
			3.5 NGOs and community groups	
			3.6 Other industries/companies/water users	
			3.7 Customers	
DISCLOSURE	*Discloses:*		4.1 Water-related information	
			4.2 Data and analysis related to water in financial filings/reports	
			4.3 Audited/assured water-related data	

Company Performance: Leading Practice · Advanced Progress · Initial Steps · No Action

(Ceres: Barton and Adrio 2011)

APPENDIX B: ETHICAL CLEARANCE DOCUMENT

UNISA university of south africa

Ref #: 2014/CAS/SAS/0006

RESEARCH ETHICS REVIEW COMMITTEE:
COLLEGE OF ACCOUNTING SCIENCES

Ms TM Askham (student number 50870130)
Supervisor: Prof HM van der Poll (staff number 1125346)

This is to certify that the application for ethics clearance submitted by
TM Askham (50870130)
for the study
Water sustainability: Measurement, Recognition and Reporting
in the fulfillment of the Degree of MPhil (Accounting Sciences) has been **approved**.

The application for ethics clearance for the above-mentioned research was reviewed by the CAS Research Ethics Review Committee on 4 March 2014 in compliance with the Unisa Policy on Research Ethics. **Ethical clearance has been granted**. Please be advised that the research ethics review committee needs to be informed should any part of the research methodology as outlined in the Ethics Application (Ref. Nr.: 2014/CAS/SAS/0006), change in any way.

The Research Ethics Review Committee wishes you all the best with this research undertaking.

Kind regards,

Prof HC Wingard
Chair: CAS Research Ethics Review Committee
College of Accounting Sciences
Unisa
wingahc@unisa.ac.za
14 March 2014

Prof E Sadler
Executive Dean
College of Accounting Sciences
Unisa

University of South Africa
Preller Street, Muckleneuk Ridge, City of Tshwane
PO Box 392 UNISA 0003 South Africa
Telephone: +27 12 429 3111 Facsimile: +27 12 429 4150
www.unisa.ac.za