“Analyzing the water resources management disclosures of South African SRI-indexed companies”

AUTHORS

Martin Botha
Sanlie L. Middelberg

ARTICLE INFO

Martin Botha and Sanlie L. Middelberg (2015). Analyzing the water resources management disclosures of South African SRI-indexed companies. *Environmental Economics*, *6*(2), 83-90

RELEASED ON

Tuesday, 07 July 2015

JOURNAL

"Environmental Economics"

FOUNDER

LLC “Consulting Publishing Company “Business Perspectives”

NUMBER OF REFERENCES

0

NUMBER OF FIGURES

0

NUMBER OF TABLES

0

Martin Botha (South Africa), Sanlie L. Middelberg (South Africa)

Analyzing the water resources management disclosures of South African SRI-indexed companies

Abstract

Water has been identified as the biggest economic and societal *global* risk for the next decade by the World Economic Forum's 2015 global risk report. This risk is also pronounced in South Africa with the country facing a water crisis in terms of the scarcity and the quality of water. This necessitates an increase in the efficiency of water management and water consumption by, *inter alia*, companies. The disclosure of key performance indicators (KPIs) is one of the most effective means for South African companies to communicate their sustainability performance and their impacts on natural capital such as water. The purpose of this paper is to analyze the required KPIs for the reporting and management of water in SRI-indexed JSE-listed companies, based on the GRI guidelines. Content analysis as research method was employed to analyze the integrated and sustainability reports of a selected group of SRI-indexed JSE-listed companies. It was found that the KPIs published by such companies lacked comparability and consistency in their disclosure. The recommendations include that companies should make use of an efficiency indicator measuring input in terms of output.

Keywords: water, integrated reporting, water resource management, sustainability reporting, sustainable disclosure, key performance indicators.
JEL Classification: O13, Q25, Q56.

Introduction

South Africa is a country well known for its biodiversity. In terms of fresh water biodiversity, the country has 223 different types of river ecosystems and 792 different types of wetland ecosystems (WWF-SA, 2013). South Africa's freshwater ecosystems have been mapped and classified into national freshwater ecosystem priority areas (NFEPAs). This mapping indicates that 60% of our river ecosystems are threatened and 23% are critically endangered. The condition of wetlands is even worse: 65% of our wetland types are threatened, and 48% are critically endangered. Pollution from fertilisers, waste water treatment plants and mining threatens to poison South Africa's rivers. Water is a renewable source that is replenished each year during the raining season; it is, however, an irreplaceable source (WWF-SA, 2013). South Africa is amidst a water crisis in terms of the scarcity as well as the quality of its water.

Corporate sustainability is an approach that creates long-term shareholder value by embracing opportunities and managing risks from economic, environmental and social dimensions (Lo & Shue, 2007). This approach demands that companies focus on the effective management of limited non-renewable natural resources. A collective effort is, however, necessary to balance socio-economic needs with environmental needs. Natural resources are the land, air, water, living organisms and all formations of the earth's biosphere that provide ecosystem goods and services imperative for our survival and well-being (IISD, 2013). According to Palaniappan and Gleick (cited by Leong et al., 2014), water management is one of the world's most pressing issues, which frames the focus of this paper.

Globally, a massive increase in water demand over the past century has occurred, driven by forces of industrialization, economic development and population growth. This growing demand is leading to increased tension and challenges around the effective management thereof. This is evident in many parts of the world where industry, agriculture and local communities are competing for this precious resource. According to the WWF-SA (2013), water supply needs to be improved and the efficiency of water use increased in order to avoid a crisis. Within this context, it is crucial that companies manage and measure their water usage.

Australia, similar to South Africa, is particularly vulnerable to water scarcity. As Australia is located on the driest inhabited continent in the world, with significant rainfall variability, water protection and distribution area key priority (Godfrey, 2010). This is even truer in a dry climate such as Australia, which currently has the highest water usage per capita (Crase & O'Keefe, 2009). This highlights that South Africa and Australia recognise water scarcity as a common concern. Water is a resource that all living organisms cannot live without and the excessive consumption and depletion thereof will have a devastating effect on society (Hu, Jiang, Jin & Islam, 2013). An increase in the efficiency of water resource management and water consumption is therefore crucial. Water resource management includes the reporting and disclosure of water-related aspects.

Martin Botha, M.Com., Lecturer, Potchefstroom Business School, North-West University, South Africa.
Sanlie L. Middelberg, Ph.D., Associate Professor, School of Accounting Sciences, North-West University, South Africa.

According to Simpson, the chief executive officer of the Carbon Disclosure Project (CDP), there is a global requisite for meaningful and systematic reporting on water (CDP, 2012). Guidelines on the way in which companies can improve water resource management and disclosure have been developed and made available by organizations such as 1) the Carbon Disclosure Project (CDP), 2) Global Reporting Initiative (GRI), 3) King III, and 4) the Association of Chartered Certified Accountants (ACCA). Australia can be regarded as the world leaders in developing general purpose water accounting (GPWA) principles (Hu et al., 2013). Australia's water accounting standard setter, the Water Accounting Standards Board (WASB), defines water accounting as "a systematic process of identifying, recognizing, quantifying, reporting and assuring information about water, the rights and other claims to that water, and the obligations against that water" (Chalmers, Godfrey & Lynch, 2012).

As such, companies are encouraged to carefully monitor and manage water resources, which would result in improved reporting of water-related aspects. The use of key performance indicators (KPIs) is arguably the most effective manner for companies to communicate sustainability performance and their impacts on natural capital such as water. In general, South African companies mostly use the KPIs as suggested by the GRI guidelines to report on environmental issues. Moreover, in terms of water reporting, the relevant GRI KPIs are numbers EN 8, EN 9 and EN 10. The following research questions can therefore be raised: Are South African companies currently reporting on their use and management of water? And if so, to what extent are they utilizing the KPIs as suggested by the GRI? The main objective of this paper is to address these research questions. However, in addressing these questions, information is required that is of high quality, consistent and comparable (Leong, Hazelton, Taplin, Timms & Laurence, 2014). The integrated and sustainability reports of SRI-indexed JSE-listed companies will therefore be analysed based on the KPIs identified for the reporting and management of water. The SRI index is a JSE index measuring companies' corporate governance practices and performance, policies and reporting on the three pillars of the TBL (environmental, economic and social sustainability) (JSE, 2013). The focus will be on SRI-indexed companies that are perceived to be market leaders in sustainability reporting. The contribution of this study is that the KPIs currently utilized in practice were analyzed, good practices identified and improvements recommended.

The rest of the paper is structured as follows: firstly, the theoretical framework within which the concepts of integrated reporting and performance reporting appear, are discussed. This is followed by the research method and a presentation of the results by applying both content analysis and theoretical framework to the research questions. The paper concludes with recommendations, limitations and suggests areas for further research.

1. Theoretical framework

1.1. Integrated reporting. In the 1990s, some companies began to publish sustainability reports. However, as this was a voluntary action, these reports lacked reporting standards. This lack of standards led to the foundation in 1997 of the GRI, a non-profit organization (Musikanski, 2012). The objective of the GRI was to provide guidelines for sustainability reports through a multi-stakeholder approach (Eccles & Krzus, 2010). Since 2002, however, sustainability reporting has become a widely accepted practice and South Africa can be regarded an emerging market leader in this field (IODSA, 2009). This is partially due to the South African corporate governance code, the King I, II and III and other initiatives such as the JSE's Socially Responsible Investment (SRI) index. The latter was utilized as a population for purposes of this study.

The King III corporate governance code supports the notion of sustainability, but emphasizes that it should be part of integrated reporting (IODSA, 2009). King III urges companies to identify the future of their business within the context of an ever-changing social, economic and environmental landscape. Among many other governance recommendations, King III encourages companies to produce meaningful, integrated annual reports by using the guidance set out by the GRI (Rea, 2012). According to King III, sustainability reporting parameters are not yet standardized as in the case of financial reporting, and the performance indicators reported on should be explained in terms of their implications and taking cognisance of available benchmarks. Many listed companies make use of the GRI guidance and also use the JSE SRI-Index criteria as a guiding framework (IODSA, 2009). In South Africa, the first attempt to enforce integrated reporting across all listed companies was introduced in 2010 by the South African Stock Exchange, the JSE Ltd (JSE), which mandated integrated reporting (IRCSA, 2011). The listing requirements of the JSE compel compliance via the King III Report and therefore companies are obliged to produce an integrated report (IRCSA, 2011). In essence, an integrated report is a compilation of the conventional financial statements and the so-called sustainability report, with the aim of providing the stakeholders of the company with a complete overview of the company's historical operations and future prospects. It also integrates and links informa-

tion about strategy, risks and opportunities and relates these to the social, environmental, economic and financial issues (IIRC, 2011).

Notwithstanding the King III report indicating the importance of sustainability disclosure and emphasizing that it should be part of integrated reporting, it does not recommend specific water disclosure requirements. Instead, King III refers companies to the GRI guidelines for assistance in improved disclosure (Rea, 2012).

1.2. Performance reporting. It is conceded that the GRI guidelines should form the foundation from which a company can improve its reporting and disclosure practices. The GRI identifies a large number of KPIs related to environmental aspects that companies can incorporate in their reporting on water-related aspects. The latest GRI guidelines, namely the G4 guidelines, have three specific KPIs or environmental indicators for water (ACCA, 2013). These are: 1) EN 8: Total water withdrawal by source, 2) EN 9: Water sources significantly affected by withdrawal of water, and 3) EN 10: Percentage and total volume of water recycled and reused (GRI, 2013). Each of these three KPIs will now be presented and discussed.

1.2.1. EN 8: total water withdrawal by source. The KPI of total water withdrawal by source measures the sum of all water drawn into the boundaries of the company from all sources. These sources include surface water, ground water, rainwater and municipal water supply for any use over the course of the reporting period.

This KPI is an indication of the company's size and importance as a water user, and provides a baseline figure for other calculations relating to efficiency and use of water. The total water use also indicates the level of risk posed by disruptions to water supplies or increases in the cost of water. Clean fresh water is becoming increasingly scarce, which, in turn, can have an impact on production processes that rely on large volumes of water. In regions where water sources are limited, the company's water consumption patterns can negatively affect relationships with other stakeholders.

The reporting company is required to identify the total water withdrawal from any water source that was either withdrawn directly by the company or through intermediaries,which include the abstraction of cooling water.

The following KPIs were identified and included in the KPI water framework that was compiled in this study and used for measuring the total water withdrawal by source (EN 8) (GRI, 2013).

(a) Report the total volume of water withdrawn in cubic meters per year (m^3/year) from the following sources:

- surface water, including water from wetlands, rivers, lakes and oceans;
- ground water;
- rainwater collected directly and stored by the company;
- waste water from another company;
- municipal water supplies or other water utilities.

(b) Report on the standards, methodologies, and assumptions used in measuring the total volume of water withdrawn.

The second KPI evaluates the water sources significantly affected by the withdrawal of water.

1.2.2. EN 9: Water sources significantly affected by withdrawal of water. As withdrawals from any water system can negatively affect the environment by 1) lowering the water table, 2) reducing the volume of water available for use, or 3) altering the ability of an ecosystem to perform its functions, it is crucial that it is measured. Furthermore, these changes have wider impacts on the quality of life in the area, including economic and social consequences.

This KPI therefore measures the scale of impacts associated with the company's water use. In terms of relations with other users of the same water sources, this KPI enables an assessment of specific areas of risk improvement, as well as the stability of the company's own water sources.

The reporting company is required to identify sources significantly affected by the water withdrawal and should meet one or more of the following criteria:

- Withdrawals that account for an average of 5% or more of the annual average volume of a given water body;
- Withdrawals from water bodies that are recognised by professionals as being particularly sensitive due to their relative size, function or status as a rare, threatened or endangered system (or to their support of a particular endangered species of plant or animal); and
- Any withdrawal from a Ramsar-listed wetland (refer to the details below) or any other nationally or internationally proclaimed conservation area regardless of the rate of withdrawal.

Ramsar refers to a convention held around wetlands in the Iranian city of Ramsar in 1971. The broad definition of wetlands according to this convention include 1) lakes and rivers, 2) swamps and marshes, 3) wet grasslands and peat-lands, 4) oases, 5) estu-

aries, 6) deltas and tidal flats, 7) near-shore marine areas, 8) mangroves and coral reefs, and 9) human-made sites such as fish ponds, rice paddies, reservoirs, and salt pans (Ramsar, 2012).

The following KPIs are used in the KPI water framework to evaluate the water sources significantly affected by water withdrawal (GRI, 2013).

(a) Report the total number of water sources significantly affected by withdrawal by type:

- size of water source in cubic meters (m^3);
- whether or not the source is designated as a protected area (nationally or internationally);
- biodiversity value (such as species diversity and endemism, total number of protected species);
- value or importance of water source to local communities and indigenous people.

(b) Report on the standards, methodologies and assumptions used.

The third and last KPI measures the percentage and total volume of water recycled and reused.

1.2.3. EN 10: Percentage and total volume of water recycled and reused. The rate of water recycled and reused can be a measure of efficiency and can furthermore demonstrate the success of a company in reducing total water withdrawals and discharges. This is because increased reuse and recycling of water can result in a reduction of water consumption, treatment and disposal costs. The reduction of water consumption through reuse and recycling can furthermore contribute to local, national or regional goals to manage water supplies.

This KPI measures both water that was treated prior to reuse and water that was not treated prior to reuse. Collected rainwater and wastewater generated by household processes such as washing dishes, laundry and bathing, also referred to as grey water, is included.

The KPIs listed below will measure the company's performance in terms of the percentage and total volume of water recycled and reused (GRI, 2013).

a. Report the total volume of water recycled and reused by the company in cubic meters per year (m^3/year).
b. Report the total volume of water recycled and reused by the company in cubic meters per year (m^3/year) as a percentage of the total water withdrawal reported under KPI EN 8.
c. Report the standards, methodologies and assumptions used.

These KPIs formed the basis of the KPI water framework that was compiled and used to measure each company's integrated and sustainability report in terms of their disclosure on water. The research methods adopted in this study will be discussed next.

3. Research methodology

The research follows a mixed method approach by combining both qualitative and quantitative research techniques. The researcher followed a post-positivist approach in the design of this paper and content analysis was the method used to collect the data. Content analysis is a systematic method of categorizing the content of texts (Smith, 2011). The data was collected by analyzing the integrated and sustainability reports published by the companies listed on the JSE's SRI-index. The KPI water framework compiled from the literature study was utilized as the measuring instrument to analyze the data.

The population in this study is all the companies listed on the JSE SRI-index. The criteria of the SRI-index highlight that the index identifies three broad categories that companies should report on, namely 1) environment, 2) society and governance, and 3) related sustainability concerns. In the second category (environmental category), the SRI-index classifies companies as a high, medium or low impact company (SRI, 2014). By means of quota sampling, this paper selected companies under the high impact category. As water-related reporting is a relatively new concept, the researchers chose to focus on companies perceived to be serious about sustainability reporting and that furthermore have a high impact on the environment, i.e. SRI-indexed companies listed in the high impact category.

The results and conclusions of the paper will now be discussed.

3. Results

A total number of 37 JSE SRI-index companies' integrated and sustainability reports were analyzed. This target group of companies was further clustered into four sectors according to their listings on the JSE. After this clustering, there were four groups, namely basic materials, mining, industrials and consumer goods. Table 1 presents the number of companies analyzed per sector.

Table 1. The number of companies analyzed per sector

Sector	Number of companies
Basic materials	5
Mining	17
Industrials	7
Consumer goods	8
Total	37

Source: own research.

From Table 1, it is evident that the sector with the highest representation was the mining sector with 17 companies (46%). In the following tables, the results relating to each sector's KPI performance as previously identified will be presented and discussed. The results will be presented based on the three specific KPIs of: 1) EN 8: Total water withdrawal by source, 2) EN 9: Water sources significantly affected by withdrawal of water, and 3) EN 10: Percentage and total volume of water recycled and reused. Table 2 presents the results of the first KPI of total water withdrawal by source. It was found that the companies sampled in three of the four sectors reported above the average percentage (89%) on the total water withdrawal per source except for the consumer goods sector (refer to Table 2). All of the companies that were part of the sample in the basic material sector (100%) reported on the total volume of water withdrawal per source, followed by the mining sector with 94%.

Table 2. EN 8: total water withdrawal by source

Sector	Basic materials	Mining	Industrials	Consumer goods	Average %
Reported on total volume of water withdrawn	100%	94%	86%	75%	89%
Report on detail withdrawal per source	60%	82%	43%	25%	59%
Water sources reported on by companies that provided detailed reports					
Surface water	2	10	0	1	
Groundwater	3	12	0	1	
Rainwater	0	2	0	0	
Waste water	2	6	0	0	
Municipal/potable water	3	12	3	2	

Source: own research.

The GRI requests companies to not only report on and disclose the total water withdrawal, but also to provide more detail regarding the *source* of water withdrawal. As is evident from Table 2, the companies in the mining sector provide the greatest detail in terms of the different water sources reported, with a percentage of 82%. Twelve companies withdrew water from groundwater and municipal water, with surface water being withdrawn by 10 companies, while waste water was withdrawn by six companies. The lack of detailed withdrawal by source of companies in the sectors other than mining indicates that companies are still struggling to collect the information to be able to report on the different water sources of withdrawal.

Although the GRI recommends that the measuring unit water withdrawal should be reported in is m^3, differences were found in the measuring unit regarding the quantity of withdrawal from the various sources. The comparability of information therefore becomes difficult because of the inconsistency from one company to another. A need therefore exists for better guidance on the measuring unit and on how and what to measure. According to the Australian Government's Bureau of Meteorology, the benefit to users of water accounting reports would be enhanced if the information is relevant and comparable such as using an industry standard (Bureau of Meteorology, 2012).

It was further found that some companies set a baseline year as a benchmark to measure the companies' performance against. This can be problematic because production levels (output) vary from year to year. A solution to this problem could be to report using an efficiency indicator. One example of a company using an efficiency indicator is Goldfields Limited (2013), which expressed total water withdrawal (input) against one ounce of gold produced (output). This is referred to as an efficiency indicator and could possibly be an improved way of performance measuring and can enhance comparability between companies.

An example of a company providing water withdrawal and the source thereof per business unit (operation) is the mining company Exxaro (2013). By reporting per business unit, the company was able to report on increases or decreases of water withdrawal per site. According to Leong et al. (2014), a critical component of water-information disclosure is geographically-based site level reporting. Danoucaras, Woodley and Moran (2014) concur that water reporting is at its most useful when it can be traced back to one operation rather than a company aggregated total. By providing consistent information across *all* sites, companies are able to highlight that they are not manipulating their reports by cherry-picking the best performance, but are consistent across their operations (Leong et al., 2014). Exxaro is a good example of a company illustrating commitment towards site-level reporting.

Table 3 presents the results in terms of the second KPI of information provided about the water sources significantly affected by companies as a result of water withdrawal.

Table 3. EN 9: water sources significantly affected by withdrawal of water

Sector	Basic materials	Mining	Industrials	Consumer goods	Average %
Does the company report on the total number of water sources significantly affected by withdrawal of water taking the following into account:	60%	65%	29%	13%	46%
Size of water source affected	2	7	2	1	
Whether the source is in a designated or protected area	2	9	2	1	
Indication of biodiversity value	2	9	2	1	
Importance of water source to local communities	3	9	2	1	

Source: own research.

The results indicate that companies performed poorly in terms of reporting on this KPI with a 46% average disclosure. The mining sector disclosed the greatest detail with a score of 65%, followed by the basic material sector with 60%. These results concur with findings by Mudd (2009) and Leong et al. (2014) that found companies commonly reported on KPI EN 8: water withdrawals while, on the other hand, companies rarely reported on KPI EN 9: water sources significantly affected. This is a cause for concern as the EN 9 KPI is especially significant to a variety of stakeholders.

The rest of Table 3 presents the detailed findings about 1) the size of the affected area, 2) whether the source is in a designated or protected area, 3) the biodiversity value, and 4) the importance of the area to the community. Companies that have not significantly affected any source by their withdrawal of water should report it in their integrated and sustainability reports by simply stating that: "No sources were significantly affected by our withdrawal." In most cases, this statement was not found in either the companies' integrated or sustainability reports.

The third and last KPI measures the percentage and total volume of water recycled and reused. This is an important indicator that measures a company's commitment towards recycling and reusing water. Table 4 presents the results of the analysis of the companies integrated and sustainability reports in terms of this KPI.

Table 4. EN 10: percentage and total volume of water recycled and reused

Sector	Basic materials	Mining	Industrials	Consumer goods	Average %
Total volume of water recycled	60%	65%	14%	25%	46%
% water recycled of total volume	20%	53%	14%	13%	32%

Source: own research.

The results for KPI EN 10 indicate that 65% of the companies in the mining sector reported the total volume of water that they recycled, with the basic material sector in second place with 60%. The second part of the KPI water framework is even more important as it provides the percentage of companies that report on the amount of water recycled as a percentage of total water withdrawal. The results indicate that an average of only 32% of the companies disclosed this percentage. It should be emphasized that this KPI is especially important within the South African context as it is a water restricted country. The importance of water recycling and also how to measure and report on it is therefore crucial for companies.

To better analyze reuse and recycling efficiency indicators, background information about the water resources of the operational facility, descriptions of the climate, geographical location and conditions, will provide a better understanding of the context of the reporting company (Danoucaras et al., 2014).

Conclusions and recommendations

The disclosure of KPIs is arguably the most effective manner for companies to communicate their sustainability performance and their impact on natural capital. As South Africa is a water constrained country, it is crucial that companies should monitor and manage their water usage. The main research objective was therefore to analyze the required KPIs for the reporting and management of water in SRI-indexed JSE-listed companies, based on the GRI guidelines. A KPI water framework was used to measure the water management disclosure of the sampled companies.

The main findings of the study include that all the sectors adequately reported on the total withdrawal (EN 8), which was contrary to the results for the disclosure of the EN 9 KPI, which indicated that companies reflected less detail in their reports. With regard to the first part of KPI EN 10, which addresses the total water recycling and reused, companies seem reluctant to provide the required informa-

tion leading to the assumption that some companies do not recycle or reuse water. The second part of KPI EN 10 addresses the amount of water recycled expressed as a percentage of the total volume withdrawn (EN 8). Inadequate reporting in one or both of these indicators will have an effect on the reported percentage.

It was found that the companies reported using different measuring units. It is therefore recommended that companies should report using an identical measuring unit standard. In order to enhance the reporting practices of companies, it is furthermore suggested that companies should provide more geographically-based information. This refers to reporting operations at site level and therefore each site can be viewed within context.

EN 9 requires companies to report on the water sources significantly affected by the withdrawal of water. However, it is recommended that if companies do not affect any sources, it should be stated in their integrated and sustainability reports.

Another recommendation is that companies should be encouraged to provide background information about the water resources of the operational facility, descriptions of the climate, geographical location and conditions, which will again create a better understanding of the context of the reporting company. It is furthermore recommended that an efficiency indicator measuring input in terms of output could improve the disclosure of important environmental information. Such an efficiency ratio has the potential to become a usable and comparable indicator per sector or industry. In the future, it could be utilized as a benchmark or standard to assess the effectiveness and efficiency of water management across companies. The efficiency ratio can also be internally utilized by a company to assess improvement from one year to the next.

Through the disclosure of KPIs, companies are able to set targets and track their progress in meeting such targets over time. By using standard KPIs, companies are encouraged to increase the level of comparability between companies and increase the confidence that stakeholders place on water management disclosure.

Limitations and areas for further research

As the focus of the study was on the SRI-indexed companies that are classified as companies that have a high impact on the environment, the results of this study cannot be generalized. Considering this limitation, and the increasing importance of sustaining water, the study can be expanded to include companies not listed on the SRI index. Another area for future research includes that other KPIs, as listed in the GRI G4 guidelines, could also be investigated.

References

1. ACCA (2013). Improving natural capital reporting and finding the tools to help [online]. Available at: http://www.accaglobal.com/content/dam/acca/global/PDF-technical/sustainability-reporting/tech-tp-incr.pdf [accessed: 2014-07-02].
2. Bureau of Meteorology (2012). Accounting for Australia's Water. [online]. Available at: http://www.bom.gov.au/water/about/publications/document/InfoSheet_8.pdf [accessed: 2015-03-17].
3. CDP (2012). CDP Water disclosure South Africa Report 2011. WSP Environment & Energy South Africa.
4. Chalmers, K., Godfrey, J.M. and Lynch, B. (2012). Regulatory theory insights into past, present and future of general purpose water accounting standard setting, *Accounting, Auditing & Accountability Journal*, Vol. 25, No. 6, pp. 1001-1024.
5. Crase, L. and O'Keefe, S. (2009). The paradox of national water savings: a critique of "Water for the Future", *Journal of Policy Analysis and Reform*, Vol. 16, No. 1, pp. 45-60.
6. Danoucaras, A.N., Woodley, A.P. and Moran, C.J. (2014). The robustness of mine water accounting over a range of operating contexts and commodities, *Journal of Cleaner Production*, Vol. 84, pp. 727-735.
7. Eccles, R.G. and Krzus, M.P. (2010). *One report: Integrated reporting for a sustainable strategy*. Hoboken, NJ: Wiley.
8. Exxaro (2013). Supplement to Integrated Report. [online]. Available at: http://www.exxaro.com/wp-content/uploads/2012/11/Exxaro_WEB_2014_web1.pdf [accessed: 2015-03-26].
9. Goldfields Limited (2013). Integrated Report. [online]. Available at: https:www.goldfields.co.za/reports/annual_report_2013/pdf/annual-review-2013.pdf [accessed: 2014-09-18].
10. GRI (2011). Sustainability reporting guidelines. Version 3.1. [online]. Available at: https://www.globalreporting.org/reporting/reporting-framework-overview/Pages/default.aspx [accessed: 2013-06-21].
11. GRI (2013). *G4 Sustainability Reporting Guidelines*. Amsterdam, The Netherlands: The Global Reporting Initiative, p. 92.
12. Godfrey, J.M. (2010). Australia leads water reporting initiative. Speech presented in the Water accounting panel discussion held in Melbourne, Australia, 27 October.
13. Hu, H., Jiang, Y., Jin, Q. and Islam, J. (2013). The effects of Standardized Water Accounting from the Water Accounting Standards in Australia, *Life Science Journal*, Vol. 10, No. 3, pp. 427-432.

14. IIRC (2011). Towards integrated reporting: Communicating in the 21st century. [online]. Available at: http://theiirc.org/wp-content/uploads/2011/09/IR-Discussion-Paper-2011_spreads.pdf [accessed: 2013-06-14].
15. IISD (2013). Natural Capital. [online]. Available at: http://www.iisd.org/natures/agriculture/capital.asp [accessed: 2014-06-30].
16. IODSA (2009). King Code of Governance for South Africa. [online]. Available at: http://www.iodsa.co.za/PRODUCTSSERVICES/KingIIIReportPapersGuidelines/KingReportonCorporateGovernanceinSA/KingIII.aspx [accessed: 2013-03-14].
17. IRCSA (2011). Framework for integrated reporting and the integrated report. Discussion Paper. [online]. Available at: http://www.sustainabilitysa.org/Portals/0/IRC% 20of%20SA%20Integrated%20Reporting%20Guide%20Jan%2011.pdf [accessed: 2013-06-14].
18. JSE (2013). What is the Socially Responsible Investment Index? [online]. Available at: http://www.jse.co.za/Investor-Relations/Sustainibility/Socially-Responsible-Investment.pdf [accessed: 2013-12-10].
19. Leong, S., Hazelton, J., Taplin, R., Timms, W. and Laurence, D. (2014). Mine site-level water reporting in the Macquarie and Lachlan catchments: A study of voluntary and mandatory disclosures and their value for community decision-making, *Journal of Cleaner Production*, Vol. 84, pp. 94-106.
20. Lo, S. & Sheu, H. (2007). Is corporate sustainability a value-increasing strategy for business? *Journal Compilation*, Vol. 15, No. 2, pp. 345-358.
21. Mudd, G.M. (2008). Sustainability Reporting and Water Resources: a Preliminary Assessment of Embodied Water and Sustainable Mining, *Mine Water Environ*, Vol. 27, pp. 136-144.
22. Musikanski, L. (2012). How to account for sustainability: A Business Guide to Measuring and Managing. UK: Dō Sustainability.
23. Ramsar (2012). Ramsar wetlands for our future. [online]. Available at: http://www.ramsar.org/cda/en/ramsar-home/main/ramsar/1_4000_0 [accessed: 2014-08-29].
24. Rea, M.H. (2012). King III & GRI + 13: Review of sustainability reporting in South Africa as per the Global Reporting Initiative Guidelines. [online]. Available at: http//www.iras.co.za/Documents/Research/King_III_and_GRI_13_Research_Report.pdf [accessed: 2014-07-02].
25. Smith, M. (2011). *Research methods in Accounting*. 2nd. ed. London: Sage Publications.
26. SRI (2014). Background and Criteria. [online]. Available at: https://www.jse.co.za/context/JSERulesPoliciesandRegulationItems/Backgroud%20and%20Criteria%202014.pdf [accessed: 2014-09-18].
27. WWF-SA (2013). Water related issues. [online]. Available at: http//:www.wwf.org.za/?gws_rd=cr&ei=iER7UpjMIoWo0QWwloGYDg#q=world+wide+fund+for+nature+south+Africa [accessed: 2013-10-20].