WHAT DOES IT TAKE?

ENGAGING BUSINESS IN ADDRESSING THE WATER CHALLENGE

IN SOUTH AFRICA

GOVERNANCE FOR SUSTAINABLE DEVELOPMENT UNDER WEAK REGULATORY CAPACITY

D I S S E R T A T I O N

ZUR ERLANGUNG DES AKADEMISCHEN GRADES
DOCTOR RERUM PUBLICARUM (DR. RER. POL.)

AM
FACHBEREICH POLITIK- UND SOZIALWISSENSCHAFTEN

DER FREIEN UNIVERSITÄT BERLIN

VORGELEGT
VON NICOLE KRANZ

BERLIN 2011

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Tag der Disputation: 20. Dezember 2010

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Abbreviations

ABSA	South African Bank
ANC	African National Congress
AMD	Acid Mine Drainage
Asgi-SA	Accelerated and Shared Growth Initiative South Africa
(BB)BEE	(Broad-based) Black Economic Empowerment
BECSA	Bhp Billiton Energy Coal South Africa
BMMF	Bojanala Municipal Mining Forum
BPG	Best Practice Guidelines
BUSA	Business Unity South Africa
CED	Community Engagement Department (Anglo Platinum)
CEO	Chief Executive Officer
CGS	Council of Geosciences
CMA	Catchment Management Agencies
COMSA	Chamber of Mines South Africa
COSATU	Congress of South African Trade Unions
CRF	Controlled Release Forum
CSI	Corporate Social Investment
CSIR	Council for Scientific and Industrial Research
CSR	Corporate Social Responsibility
DEAT	Department of Environmental Affairs and Tourism
DBSA	Development Bank of South Africa
DM	District Municipality
DME	Department of Minerals and Energy
DQS	German Association for Certification of Management Systems
DPLG	Department for Provincial and Local Government
DRD	Durban Roodepoort Deep (Gold Mining Firm)
DWAF	Department of Water Affairs and Forestry
EIA	Environmental Impact Assessment
EMPR	Environmental Management Program Report
ERPM	East Rand Proprietary Mines
FDI	Foreign Direct Investment
FSE	Federation for a Sustainable Development
FWRDA	Far West Rand Dolomitic Association
GEAR	Growth, Employment and Redistribution
GRI	Global Reporting Initiative

GTT	Government Task Team
HDSA	Historically Disadvantaged South African
ICMM	International Council of Mining and Metals
IDP	Integrated Development Plan
IFC	International Finance Corporation
IPCC	Intergovernmental Panel on Climate Change
ISO	International Standard Organization
IWRM	Integrated Water Resources Management
JPOI	Johannesburg Plan of Implementation
JSE	Johannesburg Stock Exchange
KOSH	Klerksdorp, Orkney, Stilfontein and Hartbeesfontein
LA 21	Local Agenda 21
LM	Local Municipality
MDG	Millennium Development Goals
ML	Megaliters
MIG	Mining Interest Group
MMSD	Mining, Metals and Sustainable Development Initiative
MOU	Memorandum of Understanding
MPRDA	Mineral and Petroleum Resources Development Act
NBI	National Business Initiative
NDA	National Development Agency
NEDLAC	National Economic Development and Labor Council
NEMA	National Environmental Management Act
NFSD	National Framework for Sustainable Development
NGO	Non-governmental Organization
NWA	National Water Act
NUM (SA)	National Union of Mineworkers
OECD	Organization for Economic Cooperation and Development
ORWRDP	Olifants River Water Resources Development Project
ORF	Olifants River Forum
PF	Western Limb Producers' Forum
PGM	Platinum Group Metals
R	South African Rand
RBN	Royal Bafokeng Nation
RDP	Reconstruction and Development Program
RECO	Rustenburg Environmental Coalition
RPM	Rustenburg Platinum Mine
RST	Rustenburg Services Trust
SABC	South African Broadcasting Corporation
SACP	South African Communist Party
SAF	South Africa Foundation
SALGA	South African Local Government Association
SANParks	South African National Parks

SCTC	State Coordinating Technical Committee (West Rand)
SD	Sustainable Development
SDM	Sustainable Development through Mining Initiative
SEAT	Socio-Economic Toolbox (Anglo Platinum Program)
SIWI	Stockholm International Water Institute
SLP	Social and Labor Plan
SDM	Sustainable Development through Mining
SHEC	Social, Health and Environment Committee
SPF	Steelpoort Producers' Forum
TBVC	Transkei, Bophthatswana, Venda, Ciskei
TCTA	Trans-Caledon Tunnel Authority
UNGC	United Nations Global Compact
UWP	South African Consulting Firm (Owner's Initials)
VRESAP	Vaal River Eastern Sub-system Augmentation Project
WAG	Wonderfontein Action Group
WESSA	Wildlife & Environmental Society of South Africa
WBEC	Western Basin Environmental Corporation
WBCSD	World Business Council on Sustainable Development
WCED	World Commission on Environment and Development
WEF	World Economic Forum
WFS	Wonderfonteinspruit
Wits	University of the Witwatersrand
WMA	Water Management Area
WSA	Water Services Authority/Water Services Act
WSSD	World Summit on Sustainable Development
WUC	Western Utilities Corporation
WWF	World Wildlife Fund

Acknowledgements

First and foremost and above all I would like to thank my doctoral advisor and committee chair Professor Dr. Tanja A. Börzel, who has provided constant support, feedback and creative input for my dissertation project over the last four years. Tanja has not only the wonderful talent of motivating and challenging her students at the same time, her scholarly excellence even allowed me – as a relative newcomer to political science - to learn a lot and become fascinated with the subject matter. Needless to say, I also thank Tanja for thoroughly and insightfully commenting on several versions of the thesis and helping me make sense of the empirical data.

Secondly, my thanks go out to Professor Dr. Ralph Hamann, second referee, who has provided valuable South African-centered input to the work and also offered insights and exposure to the South African research context. He has also commented on earlier versions of the thesis during his research stay in Berlin during the summer of 2009.

I am much obliged to the German Research Foundation (DFG) and the Collaborative Research Center "Governance in Areas of Limited Statehood" (SFB 700) for hosting during my dissertation and providing very generous funding for my field research in South Africa as well as several conference visits and research stays during that time. Specific appreciation goes out to my colleagues in the SFB project "Fostering regulation – corporate social responsibility in countries with regulatory capacities", Anna Müller-Debus, Christian Thauer and Jana Hönke.

The PhD project actually allowed me to fulfill one of my long-term passions: to work and do research in Africa. From July to December 2008 I was hosted as a research associate by the Water Resources Governance Systems Groups of the Natural Resources and the Environment Division at the Council for Scientific and Industrial Research (CSIR) in Pretoria, South Africa. I specifically have to thank Dr. Anthony Turton for inviting me and for acting as my mentor during my stay. Further thanks go out to Dr. Jeannette Rascher and Dr. Jenny Clover, who helped me to smoothly settle into the new environment. While all of the individuals mentioned above, have left the CSIR by now and followed new career paths, also Phil Hobbs, Dr. Marius Claassen, and Dr. Inga Jacobs, who are all still with the CSIR, need to be lauded for accepting me as a full member of their research team, a relationship, which will hopefully lead to further interesting cooperation in the future.

I was equally welcome during a shorter research stay in November and December 2007 at the Graduate School of Business of the University of Cape Town, which allowed me to delve deeper into business literature and specifically the African perspective. Professor Dr. Thomas Koelble and Dr. Ceri Oliver-Evans were instrumental in getting me set-up in a wonderful office space at the school's breakwater campus.

I owe many thanks also to my numerous interview partners in South Africa and some other locations, who dedicated countless hours to my research interests and probing questions. While I cannot list all of them and a complete overview is contained in the Annex of the thesis, I would like to mention Friedrich Slabbert (UWP Consulting), Pancho Ndebele (Emvelo Consulting), Jaco Schoeman (WUC), Henk Coetzee (CGS) and specifically Mariette Liefferink (Federation for a Sustainable Environment) as they proved to be outstandingly supportive, challenging and enlightening for my work. I will in fact never forget this memorable trip to an anti-mining rally in the Free State, where together with Mariette I suddenly found myself in front of 2000 very upset township residents marching and protesting for better service delivery and consideration by the local mining house.

I guess this would also the place to thank those who supported my endeavor logistically by hosting me or helping me to safely travel more than 10.000 km across my case study regions without encountering any major problems whatsoever.
Quite a few people have provided ideas, concepts and feedback to preliminary versions or parts of the thesis at many stages during the past four years. One of them Professor Dr. Magali Delmas, now with the Center for the Environment, at the University of California, Los Angeles, who provided creative input and probably planted the idea of pursuing a PhD in "something related to business, environment and development" in my head when I first took her corporate environmental strategy class at the University of California, Santa Barbara almost ten years ago.
I would equally like to thank reviewers and participants at several national and international conferences for their feedbacks to parts of this thesis. Specific appreciation is made of my colleagues of the 2009 PhD Sustainability Academy at the Richard Ivey School of Business at the University of Western Ontario, Canada, who commented on the business-water nexus discussed in my thesis and also the conceptualization of business' contributions to sustainable water management.
I cannot express enough gratitude to my long-time employer, Ecologic Institute Berlin and specifically its director R. Andreas Kraemer, who has been supportive for the PhD project all throughout and provided me with the utmost flexibility for combining research and work for the Institute. Thank you, Andreas! Similarly, my new employer, German Development Corporation, which I joined in February 2010, allowed me to dedicate sufficient time to finishing the thesis. Professor Dr. Thomas Risse provided me with an opportunity to apply some of my findings on sustainability policies within an EU funded project on global governance for sustainable development.
Coming to the personal side of this long list, I would like to mention my colleagues and friends at the Chair for European Integration at FU Berlin and specifically my student assistants; most notably Victoria Wenzelmann, Annabelle Merklin and Stine Klapper, who provided invaluable support and help. Also I am forever indebted to those who assisted me transcribing the interviews used as the empirical basis.
Last but not least, friends and family need to be lauded as they have not only put up with my constant stress level and complaining for a straight four years but also provided me with a reliable source of consolation and support as well as some healthy dose of distraction here and there. Special thanks go out to Dr. Axel Pols as well as Christopher Kaan for making the effort and proof reading earlier versions of the theoretical chapters.
Last, but not least, I would like to mention people and friends I met during my long research stays in South Africa, providing me with the opportunity to not only learn about my subject matter but to get a real good insight into the South African way of life, mentality and all that, which makes an international research experience truly enjoyable.
I dedicate this thesis to my mother, Ingrid Kranz, who never failed in supporting me all throughout, just as she has supported me all my life – and my grandparents.

A. Introduction

The paradigm of sustainable development holds the great promise and equally great challenge of reconciling environmental, social and economic requirements (WCED United Nations World Commission on Environment and Development, 1987). Following an established consensus sustainable development constitutes a desirable development trajectory for all countries, especially for emerging economies and developing countries (United Nations, 1992). At the same time, scholars and practitioners agree that due to its complexity it is difficult to grasp and implement the concept of sustainable development, thus inevitably representing a significant challenge to under-capacitated states. African states are particularly faced with the double challenge of often unsustainable development paths and weak governmental capacity. In the so far mostly Western-led discourse on the emergence of new modes of governance in the context of sustainable development, the contribution by a wide range of non-state stakeholders is suggested, not only as a way to realize sustainable development, but also to guarantee for the longevity and broad acceptance of these development paths (Van Zeijl-Rozema, Cörvers, Kemp, & Martens, 2008).

This thesis aims to further investigate this claim focusing on the situation in weak states. It is furthermore paying specific attention to the role and contributions of those actors considered most controversial with regards to some aspects of sustainable development: business. While their primary role is considered to relate to the economic pillar of sustainable development through the provision of employment and economic growth, in many cases and particularly where the state has been a weak regulator, business practices have proven to be detrimental with regards to the other two pillars of sustainable development, i.e. social and environmental aspects (Murphy, 2004). In the wake of corporate responsibility and corporate citizenship movements however, a different understanding of the role of corporate actors in this regard has been emerging, which looks at the potential contribution of business actors to sustainable development and how this could be realized, particularly with view to the imminent challenges in developing countries (Visser, 2008; Wheeler, 2001). This thesis investigates the conditions, under which such a contribution would be possible, taking into consideration the specific circumstances in a weak regulatory setting.

In order to limit the complexity of the analysis, this thesis focuses specifically on sustainable water management as a proxy for and integral component of sustainable development (Abu-Zeid, 1998; Gleick, 1998; Koudstaal, Rijsberman, & Savenjie, 1992). Providing for adequate water management, for the purpose of natural resource protection, ensuring broad-based access to water services and organizing a fair allocation among different water users, while taking into account inherent uncertainties of natural systems, can be considered as a key governance function (Draude, 2007). Challenges and failures in water resources management across the world currently manifest as increasing water scarcity, massive water quality deterioration and also inadequate access to water supply (and sanitation) services. In the face of these deficits, the question emerges by whom and also how this governance function of addressing these challenges is or should be provided, particularly when considering the weakness of governmental actors in some of those countries, which are most affected by water problems.

It is the main proposition of this study that under certain conditions, including external drivers such as government, normative and social pressures but also firm-internal factors, business is willing to make a contribution to addressing emerging water challenges and thus to become part of the solution rather than constituting the problem. It is expected that governmental actors play a specific role in steering such behavior, not only through strict regulation and mandating, but rather through a mix of policy options, which would also involve other actors.

A.1. State of Research and Research Questions

This study assesses the motivational patterns for business to contribute to addressing water challenges in the context of a weak regulatory and emerging economy setting in an African state. In pursuing this research avenue, this study speaks to a number of research strands, which are brought together in this context.

In the first instance, the study follows other research in the management and political sciences, covering business behavior with regards to sustainable development, corporate citizenship and corporate social responsibility (Crane, McWilliams, Matten, Moon, & Siegel, 2008; Hart, 1997; Scherrer, Daub, & Burger, 2007). This burgeoning body of literature has over the past years established a new paradigm defining the role of business vis-à-vis sustainable development (Bansal, 2002). This largely Western-led research however needs to be viewed through two additional lenses for the purpose of this study.

A further dimension is added by considering business in the context of limited statehood or areas of weak regulatory capacity, such as often encountered in the African context. There have been indications in the literature that business behavior with regards to sustainable development differs at least to some extent in these settings (Fig, 2007; Visser, 2008), either in terms of the actual manifestations of corporate sustainability and responsibility in selected industry sectors, or the emergence of specific forms of interaction between business and other actors (Hamann, Woolman, & Sprague, 2008).

Secondly, this research focuses on the specific field of water management. While the relevance of sustainable water management for overall sustainable development has been widely established over the past years (Global Water Partnership - TAC, 2000), knowledge about the actual contribution of business actors to addressing water management challenges remains limited and patchy (Pegram, Orr, & Williams, 2009).
This study thus in a first instance aims to investigate corporate behavior with regards to sustainable water management in a weak regulatory context, in terms of the type of the contribution, the modes of interaction in delivering the contribution as well as potential long-term dynamics with view to sustainable development. This is captured by the following research question.

What is the type of business contribution to addressing water management challenges and in what way does business contribute? What are potential long-term dynamics with view to sustainable development?

Business behavior is typically assessed in relation to motivational patterns and the management literature proposes resource-based as well as institutional approaches for analyzing such drivers (Bansal & Roth, 2000; Porter & Kramer, 2006). The nature and dominance of these drivers has only been discussed indicatively for the context of developing countries (Visser, 2008). While this holds true for non-governmental NGOs, communities, investors, suppliers, customers and competitors, especially the role of government as a key business driver merits further investigation in this particular context.
There are only a few studies that maintain a differential view on the role of government. Fox, Ward, & Howard (2002) define four possible roles for public actors with regards to engaging business in responsible behavior, which comprise mandating, regulation and enforcement, but also softer forms such as partnering, endorsing and facilitation or a combination thereof. In addition, the effect of governmental inability to perform certain tasks needs to be taken into account as a potential driver for business behavior.

Empirical evidence as well as research indicates that effective drivers will include both elements, those applying pressure from the outside and those addressing the inherent self-interest of firms to contribute to sustainable development (Kagan, Gunningham, & Thornton, 2003). The right balance is then again dependent on a number of factors, including the overall regulatory framework with regards to sustainability challenges, but also the general operating environment for business, the type of business addressed (industry sector, company sizes, etc.) as well as the intensity of the involvement of other societal actors (Midttun, 2005).
Thus, the second tier of specified research question can be framed as follows.

Which factors influence the contribution of corporate actors to sustainable water management?

What role does government play in engaging business actors in addressing the water challenge?

In what way do government and other drivers interact so that they enhance or weaken each other?

In assessing the performance of government, the study recurs on literature discussing state capacity as an input-related concept (Börzel, 2009; Schwartz, 2003). States need to dispose of particular characteristics and properties in order to perform certain governance functions (including the interaction with business). The limited capacities in African states have been amply addressed in literature (Engberg-Pedersen & Levy, 2004; Levy, 2004; Migdal, 1988; Picard, 2005). Furthermore government capacity in this regard varies across different government levels. For the case of South Africa, Cloete (2002) discusses capacity deficits of specifically local government with view to providing services conducive to sustainable development.
This study aims to combine the above-mentioned research strands by addressing the capacity and role of government (at various levels ranging from local to national) in engaging with business actors with view to facilitating a contribution to sustainable water management.

What constitutes the capacity on the side of government and how does it relate to the policy instruments applied to engage business in addressing the water challenge?

The study thus addresses descriptive and causal questions alike, which is also reflected by the research design.

A.2. Research Design

A qualitative and case-oriented research approach is chosen to address the above-formulated research questions. Involving a small number of cases, this method allows for an in-depth analysis of processes and social structures (George & Bennett, 2005), while deliberately limiting the potential for case-based generalizations (Ragin, 2000). Since this thesis however aims to shed light on the intricacies of business government interactions with view to sustainable water management in a weak state setting, a detailed scrutiny of relevant factors in a small N-case setting is warranted.

In order to guide the collection and analysis of potentially very detailed and diverse case study data, a preliminary model is developed based on existing theories (Manning, 1982), drawing on concepts of sustainable water governance as well as institutional models for explaining sustainable business behavior. Following the logic of an inductive research design, the data collected is then used to challenge initial assumptions and to thus arrive at a more refined picture of the causal mechanisms underlying the processes observed in this study (Eisenhardt, 1989). Theoretical assumptions guide the selection and specification of independent variables, i.e. the motivations and drivers for business behavior as well as the categorization of the dependent variable, i.e. the contribution of business to addressing water management challenges.

Where applicable, case study analyses also make use of process tracing elements, e.g. by detailing the emergence of certain governance arrangements and interactions between business and government over a longer period of time. According to George et al. (2005), process tracing allows for detecting intervening causal mechanisms between interdependent and dependent variables. The study thus employs different methods but also different sources of data. Semi-structured interviews have been conducted with representatives of companies[1], government at different levels as well as non-governmental organizations, community groups, consultants and experts during the period from March 2007 to December 2008. Additional information has been collected through participant observation and desk research.

In the resulting model, business' contribution to addressing the water challenge is introduced as the dependent variable. The degree to which business engages in these activities depends on the presence and intensity of certain drivers (i.e. independent variables). These include government and its different forms of engagement as well as other institutional drivers along with a range of firm-internal factors. In this context, it needs to be considered that business and government actors are both subject to their own motivational patterns, constraints and interests in terms of the dimensions and implications of the water challenge. At the same time, interactions and overlaps among different drivers eventually determine the overall outcome dimension in terms of the dependent variable.

[1] The focus is placed on the mining industry for the reasons detailed in the following section.

It is therefore argued that the contribution of business to addressing the water challenge crucially depends on the individual influence as well as the interaction of key as well as other drivers and how these are connected and linked to each other.

A.3. Case Study Selection

The selection of the case studies is guided by the following key aspects. There are in principle four case studies, which feature similar as well as fundamentally different characteristics. The country as well as the industry background is kept constant across all four case studies.

South Africa is an emerging economy, which disposes of advanced legislation in the environmental and water management fields, but is still struggling with the implementation of these, particularly at the local level. Water management is an issue of grave concern across South Africa, due to pollution, over-exploitation and heightened scarcity in the wake of climate change and increasing demand for human consumption, irrigation and industrial use (Ashton & Hardwick, 2008). This situation leads to a 'water challenge' in terms of addressing all these different demands equally and adequately. Furthermore, water constitutes an important input variable for sustainable development, as a key environmental good, but also with regards to social and economic aspects. Equitable access to water services is perceived as a human right and, due to the reliance of numerous industrial processes on water, it is also considered a key factor for economic growth (Ashton et al., 2008).

The study furthermore focuses on **mining** as the industry sector for investigation. Mining is a very heterogeneous sector (in terms of different commodities mined), which has been of significant importance for South Africa's economic development over the last 150 years, but which also features a long history of social and environmental exploitation. This is also reflected by a very negative track record in terms of water management, stricken by pollution, over-exploitation and conflict with other water users. On the other hand, in the context of current responsibility and development discourses, particularly the mining industry is seen as a possible contributor to improving water infrastructure (Graulau, 2008; Orr, Cartwright, & Tickner, 2009), which provides for an interesting spectrum of potential contributions to addressing the water challenge. In addition, due to the immediate impact of mining operations in the areas where they operate, mining firms also often directly interact with the local government level; an aspect which is of interest for the multi-level approach to government capacity of this study.

While thus the national South African context provides for some indications of drivers of corporate behavior vis-à-vis water management in the mining sector, a case-sensitive investigation allows for a more detailed consideration of influencing factors and respective responses.

Within the mining industry, four mining regions located in different South African provinces have been selected, featuring considerably different conditions. In the first place, the commodities mined, whether gold, coal or platinum, display different terms of trade, different levels of industry maturity, different firm composition as well as variation in terms of the manifestation of the actual water management challenge.

The respective contributions of industry are expected to vary in type and mode with maturity and future prospect of the commodity mined as well as the severity of the water resource challenge encountered. Firms with a sound production base and thus sufficient resources are more likely to

engage in substantial activities and contributions, which might also have positive repercussions in the long term, than those firms struggling financially and following a more short-termed orientation. Likewise, firms that are directly faced by water problems, i.e. shortages or pollution incidents, are more likely to get involved than those with a more intermediary exposition. These factors are also expected to influence the mode of interaction in delivering the contribution. Severe water challenges often require substantial interventions, which could only be provided through a combined effort by several firms, given their respective resource base. The case studies are set up as follows.

Gold mining in the Witwatersrand in the Gauteng Province (Case 1) represents an aging and increasingly struggling industry (Coetzee, 2008). It continues having major repercussions in terms of social and environmental impacts, specifically with regards to water pollution, which is occurring as a post-production impact. Within this region, the analysis focuses on five companies, of varying sizes, ranging from large international players, large South African to smaller companies.

Coal mining in the Mpumalanga Highveld (Case 2) is a relatively stable and well-established mining sector (Coetzee, 2008). The water challenge here revolves around water quality impacts but also issues related to security of water supply in neighboring communities. In the focus are three mining companies, two of them subsidiaries of multinationals, one of them an emerging BEE[2] company.

Platinum mining in the Western Limb of the Bushveld complex in the North West Province (Case 3), represents a growing mining sector, with a high impact and high expectations in terms of its potential support to future economic growth (Coetzee, 2008). The water challenge is mostly related to water scarcity, access to water for local communities and regional infrastructure development. The companies considered in this case study are three large mining firms and one emerging firm.

Platinum mining in the Eastern Limb of the Bushveld complex in the Limpopo Province (Case 4) represents a more emerging stage of platinum mining development and the related water challenges, which are almost exclusively focusing on infrastructure development to improve water supply under equally scarce conditions as in the North West Case. Firms considered are for the most identical with those in the North West case study.

Further variation is introduced by other variables such as government capacity at the local level. As discussed above, mining operations are located in four different South African provinces (Gauteng, Mpumalanga, North West and Limpopo), which vary in terms of government capacity, ranging between Gauteng province with a relatively high capacity and Limpopo with a relatively low capacity. These capacity differences are expected to impact firm behavior due to varying regulatory rigor, but also varying capacities with view to service delivery at the municipal level. A strong shadow of hierarchy is expected to lead to better compliance than lax enforcement. Furthermore capacity deficits with view to service delivery at the local level are expected to incite companies to engage in supporting activities (e.g. infrastructure provision and financing), more than in cases where these tasks can be sufficiently addressed by government. Differences are also expected with view to the long-term dynamics of firms' contribution, depending on the intervention of government actors.

[2] BEE: Black Economic Empowerment: Government-led program in order to enhance access of black South Africans to the first economy.

The following section outlines the main, aggregate results with regards to contributions, interactions, long-term dynamics, drivers and government capacity obtained from investigating the dynamics in the four case study regions. It will also briefly address the policy implications that could be based on these results.

A.4. Results and Implications

As a first step, I discuss **contributions** of business actors to addressing the water management challenges in the four cases studies. Considering the set of potential contributions, ranging from compliance with regulations, monitoring and planning at the firm as well as the watershed level, technological innovations, infrastructure finance and development to capacity building and awareness-raising activities, the results display some, however no significant variance in the type of contribution provided. This section discusses the main characteristics of the contributions. More detail is provided in the case study descriptions.

Those contributions found with many of the firms investigated included mainly firm-internal measures, such as compliance, internal monitoring and planning. There was however some degree of variation with regards to internal planning, which was carried out with different levels of sophistication, while watershed-level planning was only carried out by some of the firms investigated.

Other contributions to sustainable water management included very tangible items, such as technological innovations in the field of water treatment technology and efficiency improvement as well as water infrastructure development and finance. This type of contribution also appears to be quite typical for the mining industry. There is a variance however with view to the type and scale of the infrastructure support provided (whether more treatment- or supply-oriented) and also the respective financing model chosen. Firms are often in a position to leverage additional finance, which is not available to municipalities, and thus increase the bankability of infrastructure projects, which might have positive impacts on municipal water supply as well. Moreover, firms' involvement in infrastructure development is also often coupled with programs targeted at strengthening (local) government capacity, including the transfer of technical skills as well as managerial qualifications.

The results also indicate that corporate actors engage in activities related to shaping the public policy dialogue, thus reaching beyond the scope of their own operations. In many cases this is realized in the form of inter-industry or also cross-sector partnerships, but also through the initiation of and participation in multi-stakeholder platforms targeted at establishing industry-standards and shaping the public dialogue on prevalent water management challenges.

In assessing the long-term dynamics of firms' involvement, it is not only necessary to consider potential uncertainties with regard to the impact of the contribution over time, but also the degree to which firms' interests are integrated with those of neighboring communities. Only in case of adequate integration, sustainable outcomes are likely. Similarly, firms' activities with regards to capacity-building and public policy engagement might result in positive effects on the problem-solving-capacity of government actors. On the other hand, overly strong corporate influence might

lead to agency capture and override municipal interest. The case study results provide evidence for both potential long-term trajectories.

Turning to the **drivers** for business to provide a specific contribution, the following key findings could be derived. Corresponding to the low variance in the type of contribution, the key drivers are also quite similar across the case studies: firm-internal and government drivers proved to be decisive in all four cases, albeit with some case-specific variation.

Of the internal (or resource-based) factors, a secure access to water resources for production purposes is one of the main drivers. This is in many cases enhanced by a high issue salience – i.e. imminent water problems, which often resonate with developmental challenges in the region. In addition, the firms' financial and organizational disposition to address water management challenges and engage in certain activities and/or investments proved an important factor.
In the platinum cases for example, firm activities are mainly driven by the risk of resource constraints, but increasingly also in view of developmental challenges in the region. At the same time, platinum firms also dispose of the financial and organizational resources to provide or enable a solution. This is not necessarily the case in the gold mining industry, where several companies were struggling financially and thus were less inclined to engage in any of the contributions mentioned above. This observation indicates that internal factors – next to financial and organizational disposition, individual leadership and motivation of employees also played a role – are relevant for modulating the impact of the other important driver, which is government in different roles.
Overall results point to the elementary relevance of strong legislation and a related shadow of hierarchy as the basis for other policy tools, such as partnership-based approaches or incentive-setting. There is however significant variance of the strength and type of government as a driver across different government levels.

At the national level, government through mandating and standard-setting is in a position to exert a certain shadow of hierarchy, which is eventually driving business to address imminent water management challenges. Nevertheless, the implementation of legislative provisions, the coordination of different government portfolios and especially the application of innovative policy approaches vis-à-vis business is often hampered due to a lack of capacity at some government departments as well as insufficient overall consistency of policy initiatives.

On the other hand, local-level government displayed even more severe constraints. Where government failed to deliver basic services, firms were motivated to engage in such activities, for example in the coal and the platinum mining cases. In other instances, companies reacted by engaging in capacity-building measures. One could however also detect a variance in local governments' ability to engage with business and shape business' contributions in a way, which also benefits local communities. Where this ability was absent, corporate actors were strongly pursuing their own interests, taking advantage of weak government structures.

In the coal mining case for example, crucial drivers for firm behavior were the shadow of hierarchy due to imminent regulation of mining effluents at the national level, but also the ability of municipalities to cooperate with the mining business. The resulting contribution led to significant

innovations in water treatment technology and increased water-efficiency at mines due to improved internal planning. In addition, mining firms significantly contributed to watershed-level planning and engaged in a partnership with local municipalities, which helped to improve local water supply.

In the platinum North-West case, municipalities, assisted by national government, were in a position to integrate their needs with those of business. Firms maintained a relatively high performance level in terms of limiting environmental impacts and created a cross-sector partnership, addressing planning and financial support for water infrastructure development as well as capacity-building for local municipalities. In the second platinum case (Limpopo Province), a platform approach similar to that followed in the North-West case was initiated with the goal of aligning corporate as well as government expectations in terms of water resources development. Thus far, this approach only satisfied industry demand for massive water infrastructure development, while benefits for other development purposes remain uncertain. Capacity-building initiatives undertaken by business at the municipal level are to some extent perceived as a co-option of government. Municipal capacity constraints in service delivery and inability to engage with corporate actors become evident in this case.

As indicated above, a characteristic feature of the cases investigated is the interaction of several drivers, which leads to a mutually-enhancing effect. In the gold mining case for example key drivers were the mandatory approach pursued by national government and a strong shadow of hierarchy (threat of the enforcement of legislation and directives by government), which was augmented by a collaboration-oriented strategy, the imminent water quality crisis in the region and strong pressure from national and local environmental activists. The contribution by business in this case consisted of compliance with government directives and the development of technology-oriented solutions for treating polluted surface and groundwater (acid mine drainage).
Other potential drivers, such as community pressure, international corporate responsibility norms and competitive drivers also play complementary and enhancing roles in combination with the two 'main' drivers: internal and government-related factors.

Such enhancing drivers often gain in relevance over the course of time, while others become less important. For example in the platinum North-West case, security of supply was crucial in initiating firm involvement; community requirements gained in importance over the course of business engagement with national and local government. In the gold Gauteng case; pressure to react was created by national government directives, exerting a considerable shadow of hierarchy. The actual type of the contribution was then determined by competitive drivers.
In discussing the succession of drivers a valid question also relates to their role in shaping future trajectories and the long-term dynamics of business contribution. A preliminary assessment of the contribution reveals that present day solutions might turn out to be less beneficial over time. The case studies however indicate that a strong government role and the involvement of community stakeholders also facilitate sustainable long-term trajectories. This however also points to a certain capacity threshold, which needs to be reached in order for government to effectively engage with firms as well as other stakeholders to enable sustainable outcomes.

Implications

In considering the underlying question for this thesis – *what does it take to engage business in contributing to sustainable water management?* - it appears that a recommendable policy approach combines different drivers, building on internal factors, such as a strong risk perception by business with regards to water scarcity, but also including strong regulation and thus a veritable shadow of hierarchy. The latter would be augmented by innovative policy approaches, such as for example incentives or partnership initiatives between business and government or the inclusion of non-governmental stakeholders, such as community activists.

This approach however requires certain skill and capacity on the part of government and thus encounters serious challenges in a weak state context; as under such conditions regulatory pressure or capacity to engage with different actor is often insufficient. In South Africa, these problems are specifically prevalent at the local level. In cases where capacity is present, for example with some national government departments, pressure can be build up as a strong motivator for business to engage in certain contributions. In other cases however, this driver is non-existent, leading to lax company behavior. When municipalities lack the capacity to deliver certain services, business might be prompted to take over this role (at least to some degree). More than the capacity to deliver (water-related services), the ability to engage business and also other actors emerge as key prerequisite for integrative, long-term (and potentially sustainable) solutions.

The most important contribution of the thesis derives from a close investigation of business contributions and the respective motivations in the context of water resources management in a country with instances of weak regulatory capacity. Understanding what contribution private actors can actually make to addressing the full range of sustainability challenges, including environmental and social aspects (e.g. water scarcity, inequalities in the access to water service), while at the same time catering to economic pressures and under which conditions they take on this role, has only be understood to a limited extent so far.

There certainly is a wide range of literature on the role of government in fostering sustainable development for OECD countries. Much less attention however has been paid to the interaction of governmental policies with corporate strategies and the disposition of private actors, specifically in the context of emerging economies and developing countries.

It is at these interfaces however, where future challenges are likely to manifest, for example due to mounting pressure in the wake of global environmental and social change compromising the viability and sustainability of states and firms alike. Thus, a more profound understanding of government-firm interaction, such as provided by the four South African cases presented in this thesis, is needed in order to offer guidance on the design of appropriate policy tools in order to engage private actors in the provision of common goods, such as sustainable water management.

Secondly, taking conditions of weak statehood and limited government capacity as a given, this thesis furthermore contributes to delineating necessary capacity thresholds for government to not only engage in regulation and monitoring, but even more importantly to set incentives for tapping into firms' inherent motivations for addressing sustainability issues.

This is also likely to address questions raised in the international policy discourse on the characteristics of a 'Green Economy', a concept introduced in the preparation process for the Rio plus 20 World Summit to be held in 2012. In order to drive development into the direction of a more sustainable economy, it will be crucial to explore modes of interaction between two of the key actors, business and government. While further investigations in this direction are clearly warranted, e.g. in other country and industry contexts – the study nevertheless highlights key areas of engagement for policy-makers in those countries facing sustainable development challenges as well as activities in international development cooperation and capacity development.

A.5. Structure of the Thesis

The analysis of business' contributions to sustainable water management in a weak state context and the underlying motivations and drivers is conducted and will be presented in the following way.

Chapter B introduces sustainable development as the leading paradigm for assessing business behavior, and discusses the relevance of and implications for sustainable water management in this context. These observations are placed in the African context to highlight specific regional as well as worldwide water management challenges. After detailing the role of government in water resources management as well as the current status of business in the world of water, the chapter then continues to derive a normative set of characteristics of sustainable water governance, which serves as a catalogue of criteria to assess the contribution of business actors to address water management challenges.

Business' potential strategies will be discussed against this background, building on the theoretical foundations provided by corporate environmentalism as well as related theories (Hoffman, 1997; Reinhardt, 1999). Contribution categories will be derived and described in detail. Equally, the section discusses possible modes of interaction in delivering the contribution. In a third step, factors to guide an indicative assessment of long-term dynamics with view to sustainable development are introduced.

Turning to the independent variables, the following section discusses potential drivers proposed by literature, such as social and competitive drivers, but also internal, resource-based drivers (Bansal, 2005). Specific focus is placed on the role of government actors in driving business behavior and the conceptualization of the underlying capacity of government actors to perform these roles.

Chapter C details the methodological approach developed in the previous chapter by operationalizing the independent and dependent variables, complementing section 0 of this introduction. In addition, the selection of the case studies provides for a more detailed account of the selection criteria presented earlier in this chapter.

Chapter D marks the start of the empirical chapter. It provides for a detailed account of the political and economic situation in South Africa, the current water management challenges and introduces the regulatory as well as other key drivers as they apply to the mining industry at the national level. While these national level factors are suitable to explain firm behavior to some extent, it also becomes evident that a more localized and in-depth case study analysis is warranted in order to display the intricate dynamics.

The main contribution of the thesis is thus represented by the three case study sections (***chapters E to G***), featuring the gold, coal and platinum mining industries in different South African provinces. These case study descriptions are following the same structure. Each case commences with a detailed description of the locality of the case study region and most importantly the actual water challenge encountered.
In the second instance, the contributions of the mining industry in addressing these water challenges as well as the corresponding modes of interaction with other actors are described.
The analysis then turns to the potentially influential independent variables and evaluates their relative strength as well as occurring interactions between different independent variables. A concluding section provides for a comparison between different relevant factors as well as an indicative assessment of long-term dynamics of the interaction and business contribution with view to addressing water management challenges.

The synthesis ***chapter H*** views case studies in synopsis and thus identifies the most common varieties of the contribution but also the most decisive independent variables across all cases. Similarly, interactions between different variables are investigated, thus working towards an identification of the most dominant variables in the context of the proposed model.

The concluding ***chapter I*** revisits the problem-setting and the corresponding model and assesses its validity on the basis of the insights derived from case study analysis. The main findings with view to the different types and modes of contributions and their expected long-term dynamics are placed in relation to the main drivers, specifically the role of government and the related issues of capacity.
This assessment forms the basis for an assessment of gaps in the current study and identifies potential pathways and options for future research. The chapter concludes with a discussion of policy implications for business in water management in the South African as well as the global context.

B. Theoretical Background and Analytical Framework

This chapter details the main elements of the framework guiding the analysis of the case studies presented in this thesis. This is achieved by identifying the relevant discourses in literature and their implications for the research design. The structure of the chapter, the main lines of argumentation are briefly outlined below.

Section 1 delineates the paradigm of sustainable development and discusses the specific relevance of water management in this context. A focus is placed on the situation in the developing world and specifically Africa.

Section 2 then introduces a governance perspective to the challenge of sustainable development and sustainable water management and discusses the specific roles of public and private actors in this regard. Based on an analysis of the main elements of water governance, a frame of reference is developed in **section 3**, which aids in assessing the contribution of corporate actors to sustainable water management.

Section 4 discusses the current state of literature and thus provides for a foundation of the theoretical and conceptual framework. Beginning with the dependent variable, possible varieties of a corporate contribution to sustainable water management as well as possible modes of interaction between different actors involved are introduced. In a second step, suggestions are made as to the long-term sustainability dynamics of the contributions provided by business actors.

In discussing the independent variables (**section 5**) the framework introduces internal or resource-based factors as well as institutional explanations. Specific emphasis is placed on government as a major driver and factors determining government behavior, such as performance and capacity are discussed in more detail. Other possible explanations discussed include international norms and initiatives, resource and competition-related factors as well as social drivers, i.e. the role of non-governmental stakeholders.
In addition to considering all factors individually, potential interactions between different drivers, their enhancing and weakening effect on other drivers are discussed.
These elements are combined to constitute a preliminary model detailing those factors determining business behavior in the area of water management in the non-OECD context.

These considerations provide for the analytical pillars for the research design and reference model of this thesis. The research methodology, the rationale for case selection as well as the approaches for analyzing the empirical evidence gathered in the context of the case studies are presented in Chapter C.

B.1. Sustainable Development and the Relevance of Water

The paradigm of sustainable development serves as a point of departure for discussing the role of business and the state in contributing to sustainable water management as a subset of overall sustainable development. A particular focus will be placed on the situation in and the implications for developing countries and emerging economies.

B.1.1. **Sustainable Development: Paradigm and Challenges in the Developing World**

The idea of sustainable development[3] has its roots in the international discourse about environmental protection and the increasing depletion of natural resources. It was firmly established as a guiding worldwide principle at the UN Earth Summit in Rio de Janeiro in 1992. The resolutions at the World Summit go back to the work of the World Commission on Environment and Development, also referred to as Brundtland Commission, which established the following definition: 'Sustainable development is a development that meets the needs of the present without compromising the ability of future generations to meet their own needs' (WCED, 1987). According to Gladwin and Krause (1996), this normative abstraction has widely been accepted and endorsed by thousands of governmental, corporate and other organizations worldwide, notwithstanding the myriad of alternative interpretations developed since the report of the Commission. Gladwin et al. (1995) provide an indicative overview of the state of the debate, which represents the definitional diversity. About 15 years later, there still is sufficient uncertainty as a definite meaning of sustainable development (Hopwood, Mellor, & O'Brien, 2005; Jacobs, 1999).

It is nevertheless possible to identify some components and characteristics of sustainable development, which help in approaching the concept. Loorbach (2002) for example argues that sustainable development is highly normative in its concepts; that it has a strong local connotation and that it involves some change in values as well as technological solutions[4]. Sustainable development is furthermore critically determined by the necessity of resolving trade-offs (if not insurmountable dilemmas) between economic growth, the protection of environmental resources and safeguarding social well-being (Gladwin et al., 1995; Rotmans & Van Asselt, 1999).

The local component of sustainable development has been highlighted by several scholars (Sharp, 1999) and has also been captured by the normative Framework of the Local Agenda 21, which also emerged as a key guidance from the 1992 Rio UNCED Conference. Agenda 21 stipulates that the above mentioned trade-offs fundamentally occur at the local level, while leading to repercussions at higher levels, thus highlighting the necessity to conceptualize policies for sustainable development at the local level as well as the global scale alike (Urquhart & Atkinson, 2000).

Following the international consensus, sustainable development is more and more accepted as the leading development paradigm for societies throughout the world. Reflecting differing sustainability challenges, states in the developed and the developing world have chosen different strategies to

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[3] This chapter discusses the origins of sustainable development as a political context, it should be mentioned however, that sustainable development as a paradigm for natural resources management was first developed, propagated and applied in forest management.

[4] Gladwin et al. (1995) have introduced 'principal components' of generally accepted ideas of sustainable development, which are represented here in place of the myriad of different interpretations and approaches crafted over the past 25 years. Accordingly, sustainable development could thus be approximated by the following attributes: inclusiveness; i.e. the development of human and environmental systems alike, connectivity; i.e. the interdependency of different development trajectories, equity, i.e. the fair distribution of resources and property rights, both within and between generations, prudence; i.e. assuring resilience and avoiding irreversibility, while keeping human impacts in scale with regenerative and carrying capacities and considering the inherent uncertainty and unpredictability, security, i.e. creating the necessary boundary conditions to support a 'safe, healthy, high quality of life by maintaining ecosystem life-support services to humanity, critical natural capital and human freedom, including the fulfilment of basic human rights.

tackle these. Focusing on developing countries and emerging economies, the necessity for shaping sustainable development agendas is most apparent, considering the various and at times harsh dilemmas faced by those societies today in terms of reconciling economic growth and development, social welfare as well as the protection of natural resources (Lopez & Toman, 2006).

In this context, the Millennium Development Goals (MDGs) (United Nations, 2008) have emerged as an important yardstick, which provides for an interpretation and specification of the sustainable development paradigm in emerging economies and developing countries. The attainment of the MDGs and the extent to which these are an integral part of the overall development discourse thus constitute an important indicator for sustainable development in these countries (Lodge & Wilson, 2006). The MDGs comprise such universal development issues as ending poverty, education, gender equality, child and maternal health, the combat against HIV and AIDS as well as environmental sustainability. A further goal mandates global partnership and appropriate policy tools in order to advance the MDG. From a water perspective, the goal on environmental sustainability appears to be most applicable, which sets targets about access to safe water supply and sanitation and the quality of ecosystems. But also some other goals, especially those related to health have a hidden water component (Ashton & Ramasar, 2002).

The relevance of economic growth for achieving (World Business Council for Sustainable Development Young Managers Team) development has been subject to continued discussions over the past years (Toman, 2006). The linkage was re-emphasized by the 2008 Growth Report, issued by a commission consisting of several international organizations (Commission on Growth and Development, 2008)[5]. While growth at any cost was at the focus of attention of earlier debates, one can now observe an emerging understanding that it is not a goal in itself but rather provides the basis for improving livelihoods (Lopez et al., 2006). At the same time there is an increasing awareness that growth requires access to natural resources (e.g. water) and thus inherently bears the danger of overexploiting such resources and thus undermining development in the long-term through unsustainable practices for the sake of achieving short-termed economic growth (DEAT, 2008). This challenge is aggravated by increasingly non-negotiable ecological thresholds, such as the impacts of climate change and other global trends, which are expected to become more and more pressing over the years to come.

B.1.2. **Relevance of Water for Sustainable Development**

The introduction on sustainable development provided above points to the fundamental relevance of the natural resource water. In addition to serving key ecological functions, water also constitutes an important prerequisite for human dignity and is considered as one of the most basic human rights. On the other hand it is key ingredient to a number of production processes and thus assumes value as an economic good as well (Pegram et al., 2009a).

Not only does water pertain to and influence the three components of sustainable development, but it also bears the exact same vectors in itself. In other words, water is of relevance for the environment at large, social aspects and also serves as an input variable for sustainable (economic) growth. At the same time, sustainable water management itself requires the consideration of these three components, i.e. the environmental, social as well as economic components of water

[5] Composition of Commission on Growth and Development: Launched in April 2006, the Commission on Growth and Development brings together twenty-two leading practitioners from government, business and the policymaking arenas, mostly from the developing world. Over a period of two years the Commission sought to improve the understanding about policies and strategies that underlie rapid and sustained economic growth and poverty reduction. The Commission's target audience is the leaders of developing countries.

management. The linkage between water and sustainable development had been captured for the first time through the 1992 Dublin principles (Dublin, 1992), which were then also included as basis for the water component of the Agenda 21 paving the way for an integrative approach towards managing water resources in a sustainable way (United Nations, 1992). Other important milestones in the international discourse on water resources were the International Conference on Freshwater in Bonn, 2001, as well as the World Water Fora, which have been organized since 1997 in three year intervals with the most recent forum taking place in Istanbul in 2009.

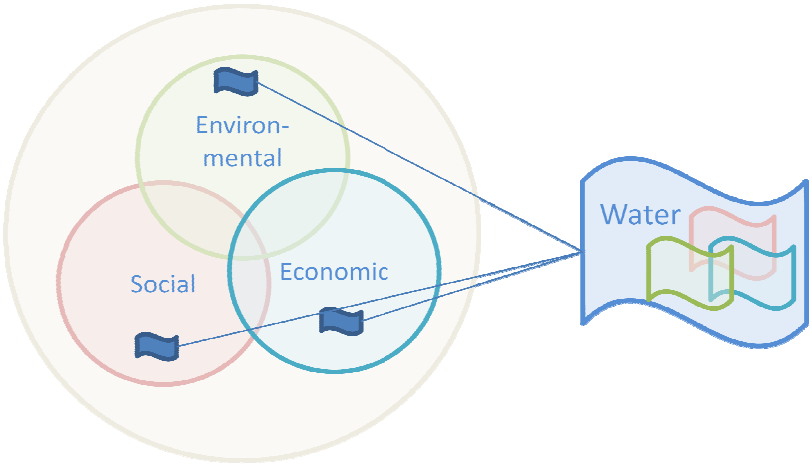

Figure 1: Relationship of Sustainable Development and Water

The multi-faceted characteristics of water and related trade-offs hold true across the world. However, as indicated above, they appear to be of crucial relevance with regards to sustainable development in the developing world.

Water management constitutes an important means to achieve a country's development objectives, such as job creation, food security, GDP growth and most prominently, the eradication of poverty and the achievement of social equality, which is among the most pressing challenges in those countries.

The 2009 World Water Development Report puts clear emphasis on the availability of water resources for a country's growth strategy and the specific role of water management for sustainable development. As Bullock et al. (2009) show in their contribution to this Report, processes within the water management sphere are inextricably linked to the broader framework of sustainable development. They furthermore argue that those linkages need to be clearly demonstrated in order to account for the interrelations and enable the management of trade-offs and synergies. Water management decisions and investments in the water sector affect livelihoods in many ways, through enabling access to water and sanitation, the avoidance of disasters from flood impacts, the prevention of negative health impacts due to polluted water resources, the protection of natural habitats and ecosystems, which are sustaining human livelihoods.

Water resources (including surface and ground water) are exposed to severe stresses at a worldwide scale due to over-abstraction, pollution and environmental degradation. In addition, Pegram et al. (2009a) identify key trends, which are bound to increase the pressure on key water resources in future, including:

- Global population growth, predominantly in those countries already experiencing water stress and suffering from limited institutional capacities,
- Accelerated economic growth, implicating a shift to more water-consuming life-styles and commodities,
- Emergence of the issue of food security and increased pressure on food prices,
- Climate change and variability, leading to increased water scarcity in some and increased flooding events in other areas,
- Increased competition over water resources for hydropower and biofuels in search of energy security,
- Change of land use patterns due to urbanization, deforestation and desertification, leading to the change of hydrological regimes.

The following section provides an overview of the manifestation of specific water management challenges in the African context. These considerations serve as a background setting for assessing the specific contribution of business actors to addressing these challenges.

B.1.3. **Water Challenges in Africa**

The African continent is faced with significant 'water challenges'. Following an uneven distribution of the resource, massive over-abstraction and also pollution have aggravated water scarcity in several regions of the continent (Corcoran et al., 2010). These problems are even expected to increase with climate change (Boko et al., 2007). Water scarcity contributes to the worsening of other development challenges currently prevailing throughout Africa, i.e. lacking access to sufficient and clean water in the first place, but also in terms of water available for agricultural and industrial uses to support much needed economic growth (Asmal, 2008). Data on water availability and water dependency (FAO, 2005) for African countries, indicate that some 38 % of Africa's total population have no access to an improved water source, while 40 % lack access to appropriate sanitation. These numbers point to the immense challenge faced by many African countries on meeting the Millennium Development Goal on Water (United Nations, 2008).

Studies have shown that already existing shortages in terms of infrastructure and institutions, financial means and skills will be aggravated by water shortages, thus impeding the ability of countries to achieve sustainable social and economic development (Hirji, Johnson, Maro, & Chiuta, 2002). The lack of water thus not only impairs the internationally granted human right to water (ECOSOC, 2002a), but also bears a potential for the emergence of conflicts over the resource due to lacking water security (Ashton & Turton, 2008b).

Sustainable water management is therefore an even stronger imperative in Africa than in the developed world. At the same time, it requires not only the change of old management practices, but also points to a potentially strong intervention by the state in terms of implementing new management approaches. African states however, are often ridden by a varying lack of institutional and legal frameworks, poor governance systems, a weak infrastructure base and insufficient scientific and educational capacity (Ashton et al., 2008b), not to mention a lack of awareness of water management challenges and consequently political will to address those. Under these circumstances, it will be an even greater challenge to ensure the co-operation of all actors in the water sector as well as other segments of society in a multi-layered governance system, which is a prerequisite for ensuring sustainable water management (Folke et al., 2002b).

In their 2008 Sharm-el-Sheik declaration, African heads of state for the first time gave recognition to the linkage between growth and water on this continent and acknowledged the paramount role of water for achieving sustainable development in Africa. In this commitment they not only gave renewed attention to the most pressing water development issues, but also addressed the issue of conducive policies and regulatory frameworks, the creation and strengthening of institutions and human resources capacity at all government levels and the provision of sufficient financial resources in the water sector. This as well as other commitments and declarations[6] done over the past two years were restated during the 5th World Water Forum by the Regional Paper for Africa (AfDB & Sarpong Manu, 2009). The Paper reiterates the main development challenges in relation to the MDGs and the Africa Water vision, highlighting the implementation challenges as well as the question of securing sufficient financing for economic growth through investments in infrastructure throughout the continent. While much efforts have gone into improving this situation a backlog of financing still remains, requiring a 'new dialogue between African governments and development partners' (AfDB et al., 2009).

In this context, increased attention is paid to the conditions of a conducive environment for engaging the private sector in addressing the water challenge, particularly at the local level. This also points to business actors as increasingly important factor with regard to the management of water resources in this region (Pegram et al., 2009a). There is a broad agreement that private actors are in a position to make an important contribution to alleviating crucial water management challenges in Africa, together with government and civil society. The water challenge is thus translated into a governance challenge. The following chapter dissects the governance challenge from the perspective of sustainable development and specifically with regards to water governance. It details the current role of business, delineates the role of the state and seeks to map out potential modes of interaction for these actor groups.

[6] This includes the 2008 eThekwini Declaration and AfricaSan ActionPlan (February 2008), the Tunis Ministerial Declaration on Accelerating Water Security for Africa's Socio-Economic Development (March 2008), the Declaration of the Ministerial Conference on Water for Agriculture and Energy in Africa: the Challenges of Climate Change (Sibya, December 2008), two preparatory stakeholders meetings held in Lusaka and Accra for the 5th World Water Forum, December 2008 and January 2009.

B.2. Sustainable Development as Governance Challenge: Roles of Business and the State

These initial observations regarding sustainable development and water set the stage for a more detailed consideration of the actual governance challenges and the respective roles of business and the state in this regard.

Some characteristics of sustainable development have already been outlined above rendering the picture of a highly complex policy field. While the convergence of multiple issues brings with it the necessity of defining trade-offs, the embeddedness and mutual dependence of social, economic and ecosystem factors also implies that there are *no clearly defined boundaries* of the policy field.

It is furthermore often not possible to define a clear goal of a sustainable development process in terms of a defined outcome. In some interpretations the *process* is the goal, necessitating constant, small, 'day-to-day' adjustments and adaptations (Bleischwitz, 2003). Other scholars also conceptualize sustainable development as a *transition* from currently unsustainable development paths to more sustainable ones through constant adaptations (Loorbach, Kemp, & Rotmans, 2007).

Goal-setting in the context of sustainability therefore is often described as process of search, discoveries, innovation and diffusion. While Van Zeijl-Rozema et al. (2008) also see sustainable development as a moving target, they have introduced a useful differentiation of policies for sustainable development by classifying approaches on a bipolar range varying from those approaches that are more targeted at maintaining the environmental carrying capacity of the natural system to those looking to improve overall well-being, i.e. including the full-range of sustainability issues, including social as well as economic aspects[7]. The goal of sustainable development thus is clearly *consensus-based* and defined by society and the discourses taking place. Some authors make a further distinction between the thoroughness of the process and the change effected[8]. Consequently, the interpretation and manifestation of sustainable development very much depend on the challenges prevailing in the respective societal context.

Adaptations play a key role in the process, not only in terms of defining the consensus-based goals, but also due to constantly changing boundary conditions, such as climate change, but also demographic developments and economic impulses. These changes are difficult to predict and might occur in a highly dynamic, non-linear way (Young, 2008). Uncertainty and reflexivity are inherent to sustainable development trajectories and need to be harnessed and addressed respectively to the extent possible through the improvement of the knowledge available as a basis for decision-making. Learning is introduced as a key prerequisite to support these governance processes (Olsson, Folke, & Berkes, 2004). In addition, these observations also point to the relevance of tailored governance forms to address the challenge of sustainable development in the respective national or regional context.

Taking into consideration the many challenges and complexities of sustainable development outlined above, the question emerges as to what governance approach is appropriate for the specific problem structure[9]. What is the role of key actors involved?

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[7] This is also congruent with the differentiation suggested by environmental psychology between eco-centric and anthropocentric positions (Kortenkamp & Moore, 2001; Stern, Dietz, & Kalof, 1993).

[8] Williams and Millington (2004) differentiate weaker sustainability, which entails rather marginal changes to the human-centred development paradigm, and stronger sustainability, which foresees more profound changes to the way natural resources are exploited to ensure human well-being.

[9] Governance for sustainable development could be described as those policies aiming at fostering sustainable development within a national or regional context, which are at least to some extent reflecting the stipulations for sustainable development brought forward

First and foremost, sustainable development is often presented as a typical case for the emergence of new modes of governance, which go well beyond traditional state-centered policy-making, while at the same time not completely ignoring the state either (Bleischwitz, 2003; Lafferty, 1994). Rather, different modes of governance are possible and they exist in a continuum.

A distinct feature of these new modes of governance in order to tackle the goal of sustainable development is the pluralistic approach, which involves a wide variety of actors at multiple levels and leads to behavioral changes among them, through focused interaction. Governance for sustainable developed is thus also understood as shared responsibility of public and private actors (Van Zeijl-Rozema et al., 2008). In this context, governance for sustainable development can not only be seen as a process for resolving the occurring trade-offs mentioned above, but also as a mechanism for deriving a mutually agreed direction and vision for development beyond those trade-offs (Gladwin et al., 1995).

From a management perspective this then involves the operationalization of this vision as well as constant monitoring in order to provide feedback on development steps taken and to synthesize the observations to a narrative of how the situation has emerged and might unfold in future (Boyle, Kay, & Pond, 2001). This process can only be realized through the involvement of other actors than the state, such as civil society as well as private for-profit actors (Meadowcroft, 1994).

The role of business with regards to sustainable development is however rather contested or ambiguous at best. There are many instances where business behavior and rationale has proven detrimental to at least one pillar of the sustainable development paradigm (Bansal, 2002). Business is usually perceived as a problem in the sustainability context, with digressions ranging from environmental pollution and degradation to social exploitation and human rights violations.

At the same time, there is evidence and a burgeoning body of literature on positive contributions of business to sustainable development (Elkington, 1998; Laszlo, 2003). It is increasingly argued that business is in a unique position to play a particular role in promoting sustainable development due to its innovative potential in terms of developing new technologies, its outreach through global markets and last but not least its financial leverage. Firms thus also increasingly engage in the provision of public goods, going beyond traditional profit-maximizing behavior, while still performing successfully on competitive markets (Bleischwitz, 2003; Gunningham, Kagan, & Thornton, 2002).

But what determines whether business is more of a problem or solution with regards to sustainable development? Certainly, governmental actors play an important role in determining the particular outcome of business involvement with regards to sustainable development (Bansal, 2005; Delmas & Toffel, 2004a; Rivera, Oetzel, DeLeon, & Starik, 2009). The specific roles of the state in this regard are elaborated in the following section.

In the first place, it is often argued that government needs to take on a leadership or mandating role, as - due to the lack of urgency - long-term sustainable development might not be achieved (or even pursued as a matter of fact) without the intervention of the state (Fox & Prescott, 2004). This lack of urgency or saliency might derive from a general lack of awareness of the underlying development challenges among those in charge as well as the public in general, thus necessitating traditional forms of hierarchical steering (Van Zeijl-Rozema et al., 2008).

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at the international level over the past decades. The governance system moreover would provide for the mutually compatible integration of the economic, socio-political and eco-systems within a legitimate regulatory framework; which assumes that the state and government subscribes to the principles of sustainable development to some extent.

If not through direct steering, the state's influence could also be exerted through a so-called shadow of hierarchy. This would involve instances where there is no direct intervention through the state in terms of mandating, but rather an indirect involvement, e.g. monitoring, which however demonstrates that the state could intervene and exert its power if deemed necessary, thus casting a 'shadow of hierarchy' (Börzel, 2007a).
At the other end of the spectrum, the state would rather act in the role of a bystander, such as for example suggested by the New Public Management paradigm or neoliberal approaches, which would leave decisions almost exclusively at the discretion of non-state actors.
It seems however more likely that the problem characteristics of sustainable development as a "wicked problem set, social complexity and weak institutionalization" favor non-hierarchical steering or new modes of governance, where the state acts as a mediator, enabler and/or partner (Van Zeijl-Rozema et al., 2008). The actual governance form can possibly be found in the combination of these different roles mentioned above.
Irrespective of its role and characteristics, the state retains important functions, as it controls and at the same time enables other actors, such as business to contribute to sustainable development. It furthermore provides for the emergence of polycentric and multi-level policy arenas in order to allow for the participation of a wide range of actors and thus ensure the adaptability and flexibility of the policy process (Folke, Hahn, Olsson, & Norberg, 2005).
This notion of regulated self-regulation, which has also been referred to as transition management and understood as "a forward-looking and adaptive model for steering societal change towards sustainable development goals" or reflexive governance (Loorbach et al., 2007) has become a widely accepted model for understanding governance for sustainable development in the OECD world. Transition management or reflexive governance as a form of steering is building on societal normative concerns as well as on business interests and is looking to altering the ways in which issues are addressed and organized (Voss & Kemp, 2005). The realization of this form of governance requires a high level of skill and insight, not only from the side of government, but also the other actors involved (Folke et al., 2002a).

While there is a growing understanding regarding the conceptual characteristics of sustainability policies, actors shaping policies for sustainable development in developing countries or emerging economies are in many cases faced with additional challenges in terms of implementing these policies (Jacob, Künkel, & Volkery, 2006; McLennan & Ngoma, 2004). Business is often perceived as capitalizing on weak regulatory capacities in these countries and thus forging a race to the bottom, leading to an aggravated exploitation and deterioration of resources. While this race to the bottom could partly be disproved (Clapp, 2002; Wheeler, 2001), still the challenge for government remains to develop and implement appropriate regulatory tools to sanction corporate malpractice. Also, in cases where certain governance functions, e.g. the delivery of certain services, is delegated to non state actors, governments still need to dispose of the skills to oversee this delegation and to potentially incite and enable other societal actors for making a contribution to sustainable development. Fulfilling these tasks requires certain capacities, which points to the inherent dilemma of weak states when it comes to designing and especially implementing governance systems for sustainable development (McLennan et al., 2004). In section B.5.5 the necessary capacities and resulting activities of the state in steering this process will be discussed in more detail.

Whether considering processes in the developed or the developing world, sustainable development remains a complex policy field with resulting inter-woven governance structures between economic, social and environmental policy fields. With regards to the role of business, this thesis investigates the importance of the state versus alternative drivers for ensuring a business contribution to sustainable development.

The resulting framework aims to specify the variety of drivers and conditions which are conducive to a business contribution to sustainable development. The specific empirical context chosen is the field of water management. The following section places the considerations regarding governance for sustainable development in the context of this policy field.

B.3. Governance of Water Resources

In reflecting the considerations about governance for sustainable development undertaken in the previous chapter, water governance follows similar logics, while at the same time catering to the necessities of managing the complex resource water[10].

The Global Water Partnership describes water governance as 'the range of political, social, economic and administrative systems that are in place to develop and manage water resources, and the delivery of water services at different levels of society (Rogers & Hall, 2003). While this might include a wide range of different arrangements, Tropp (2007) furthermore points out that in reaction to the complexity of managing water resources adequately (i.e. in an integrated way), one can observe the emergence of new forms of governance, such as networks and partnerships and other modes of rather horizontal steering. This complexity also determines the set of actors, which are of relevance to the management of water resources. This includes not only the state, but also civil society as well as the private sector. While the concept of water governance thus explicitly broadens the scope of actors, the importance of the issues at stake also points to the question as to what specific responsibility each of the actor groups bears in any possible governance arrangement.

But what, from a governance perspective, is so specific about water as a natural resource? The notion of water resources as a common pool resource is helpful in understanding the necessary allocation of responsibilities as well as the implications for the role of each of the actors mentioned above, particularly the role of the state.

The governance of common pool resources differs from open access regimes, in that in the former case a so-called 'management group' is established in order to restrict the access of non-members to the resource and to establish rules of appropriation. These rules have to be accepted by non-members; members of the management group have rights and duties as regards the use and the allocation and thus hold the right to manage the resource (Rogers et al., 2003). This model applies to water resources, when open access to the resource is restricted, which is not always the case, as pointed out by Dinar et al. (1997). To further illustrate this notion, it is useful to take into account the following specificities about water as a resource, which also set it aside from other environmental goods. There are several relevant characteristics:

First and foremost, water – like air - is an irreplaceable resource. There are no substitutes that would fulfill the same function or purpose (Lehn & Steiner, 1998). Secondly, water is a regional resource;

[10] The challenges with regards to sustainable water management in Africa have been outlined in section B.1.3. Integrated Water Resources Management (see has been introduced as the accepted management paradigm to address these challenges. In distinguishing IWRM from water governance, a useful proposition has been made by Franks and Cleaver (2007) stating that IWRM is the systematic process for the sustainable development resources in the context of social, economic and environmental objectives, while governance is about the actions that make these actions possible. It will be addressed in more detail in section B.3.3.

while the effects of poor water management will eventually be noticeable at a global scale in terms of large-scale changes and effects, the immediate impact of poor water management is felt locally in most cases. Both aspects point to the attribute of ***substractability***, i.e. the degree to which the use of the resource by one user compromises the use by other users (Ostrom, Gardner, & Walker, 1994). With regards to water this observation applies to some water uses (e.g. water abstraction or water pollution), while others are non-rival (e.g. recreational uses).

In this context it should be noted that water is a renewable resource, which can be recuperated through a natural water cycle, and also technological solutions to recycle and thus re-use water. Still the capacity to recycle is limited and can also be compromised. The current discussions on the impact of climate change on water resources and increased water scarcity furthermore demonstrate that the amount of the resource available is even decreasing in some parts of the world, which would aggravate the aspect of substractability (Gleick, 2003).

In applying the second characteristic proposed by Ostrom (1990) in identifying types of resources – ***excludability***, water clearly is a resource, where it is rather difficult to exclude additional users due to its relatively broad accessibility (Dinar et al., 1997; Mehta, 2003). On the other hand, with regards to water services provision, necessary infrastructure requires significant capital investment, which limits the accessibility for certain users and often necessitates a collective provision of these services.

Independently from these considerations one could also follow an ethical rationale and describe water as a core element of the human existence, thus establishing a moral imperative with regards to this resource and its protection[11].

B.3.1. **Role of the State in Water Governance**

Following these characteristics of the resource water pointed out above, the state often takes on a central role as the custodian of water resources as well as the responsibility for the provision of water supply and sanitation services to household, commercial and industrial users.

Water resources management and water services provision can be sub-divided in a number of specific activities to be performed by government. According to Pegram et al. (2009a) these include the following:

- Water resources protection; referring to maintaining the functions of water ecosystems,
- Water quality management; referring to the monitoring and control of discharges to water systems in an effort to maintain water quality,
- Water allocation; referring to the fair distribution of water resources to productive uses, human consumption as well as ecological needs. The state appropriates most of the rights to manage and use water resources, thus creating a situation, where water is partly state property and partly private property, subject to the discretion of individuals (Rogers et al., 2003). In allocating access and use rights for water resources, the state needs to balance the interests of different stakeholder groups.
- Water use regulation, control and enforcement; monitoring of water use licenses and promotion of water use efficiency,
- Water infrastructure development: financing, operation and maintenance of large and small-scale water infrastructure for water services provision and flood control,

[11] Internationally the human right to water has been established – at least tentatively - by the 2002 General Comment 15 of ECOSOC (ECOSOC, 2002a).

- Water pricing and the establishment of an appropriate value for water, in order to promote efficient water use while at the same time maintaining equitable access to water. Approaches in the past have combined hierarchical steering, the use of market mechanisms, as well as a combination of both (Dinar et al., 1997).

In performing these activities, government frequently takes on a mandating role by issuing quality targets, setting allocation rules as well as establishing water use regulations and by more or less stringently implementing and thus enforcing these legal provisions, policies and strategies. In addition, government creates a considerable shadow of hierarchy through monitoring certain water uses or ecosystem health as well as by providing incentives for responsible water use.

In quite a few cases, government however, clearly takes on a mediating or partnering role. This is for example the case when balancing different water needs or providing an appropriate and enabling framework through strategy development and planning, allowing for other actors to engage in water management activities (GWP, 2008). With view to water infrastructure, government has taken on different roles, such as the provision of water infrastructure and related services by government alone, other scenarios have seen government in a mandating role (delegating services provision to other actors), as bystander (transferring the responsibility to other actors) as well as a partner (jointly fulfilling the tasks). However, especially with regards to water policy, what is often encountered is a mix of these roles.

The different functional tasks are usually carried out by government at different administrative levels: legislation is drafted and established mostly at the national level, with some exceptions in federal systems. Strategy development and planning is undertaken at all government levels with regards to the respective area of responsibility; i.e. national water resources planning at the national level, detailing the overall allocation and distribution of national water resources down to the lowest level: local planning for a municipality. The national level is responsible for coordinating national water interests with neighboring countries or riparians along a shared water course under the auspices of international water law (GWP, 2008). Implementation and enforcement is delegated to medium to lower levels of government as well, with regional administrations taking the lead. When it comes to the provision of water services often the local government level is the key actor. Water management structures are in most cases congruent with overall administrative structures; still there is a trend to address water management issues on the base of watersheds through dedicated basin management authorities.

Government thus obviously plays an important role in providing the appropriate governance framework, setting the correct incentives and impulses (Tropp, 2007), while fulfilling these tasks requires a considerable level of capacity and skill. As Tropp (2007) reemphasizes for the developing world, capacity issues with government in the management of water resources are evident and have led to severe distortions and failures in current water governance arrangements and are thus bound to lead to further complications. In response to these failures, but also due to increasing complexity and uncertainty in the wake of a wide range of pressures exerted on water systems today (Bullock et al., 2009), new forms of governance are emerging, bringing in non state actors complementing the role of government. While the role of civil society is widely accepted for making water governance arrangements more accessible and transparent, the role of business again is much more contested.

B.3.2. **Business and Water Management**

The relationship between business and water management bears a considerable amount of negative incidences. Pollution of ground and surface water, the over-abstraction of water resources are only some of the negative impacts of business operations on water management.
In terms of water services, corporate actors have earned negative reputation due to a number of failed privatizations of water service provisions, particularly in the developing world. The following cases have been chosen to represent a myriad of similar incidences.

Water Abstraction
In 1998/99 a Coca-Cola plant was established in Kerala, India, which led to a significant decrease in groundwater levels and the drying up of wells in this area due to massive water abstractions. The quality of water was also affected. The operating license was withdrawn following several court decisions. Coca-Cola had to stop its production in Kerala and continues to be subject to strong protests by Indian as well as international NGOs; still the company looks into possibilities for continuing its production in Kerala and has also set up production at other sites in India (FIAN International, 2004).

Failed Privatization
The Bolivian City of Cochabamba has become the classic case study of a 'failed' privatization of water services provision. After a 40-year concession was awarded to a private consortium – subsidiary of the US-American corporate Bechtel - , water prices rose significantly, which spurred massive protest among the citizens of Cochabamba. Bending to local as well as international protest in the wake of outbreaks of violence with the police attempting to control the protests, finally the government terminated the contract. Cochabamba epitomizes a whole range of 'failed' water privatizations in developing countries (Schönfeld, 2007). For example, Bond (2009) describes a similar case from South Africa, where French-based Suez on the basis of a five-year trial contract to supply water to Johannesburg municipality embarked on a massive cost-cutting strategy, which also included the installation of meters and limiting access for water users in township areas, which eventually resulted in broad resistance among these communities and a case at the Johannesburg High Court. Eventually, Suez did not obtain the planned contract extension, while water supply systems in the Johannesburg remain unsatisfactory, particularly for underprivileged areas and informal settlements[12].
It has also opened the floor for the discussion of whether privatization is possible at all or should be allowed with regards to water services, or whether and what safeguards need to put in place through respective governance arrangements in order for public-private arrangements to work 'better' in future (Beisheim, 2007; Prasad, 2008).

These examples indicate that water as a business opportunity is vested with numerous risks and pitfalls for the companies, prompting for examples some of the larger multi-national water utilities, such as Suez, Veolia, Thames Water to withdraw from the market.
On the other hand the negative impact of business on water resources remains largely uncontested and continues to be subject to protests and opposition at the international as well as the local level.

[12] A more detailed description of the case is provided in the background chapter South Africa.

More recently however, the perception of business in water is slowly changing and transforming, as business' potential to make a contribution to sustainable water management beyond their sphere of interest is more and more recognized. Much in a sense of a Corporate Water Responsibility, water is becoming an integral element of companies' sustainability and responsibility strategies. In some cases, corporates realize they have the capacity and resources to make a pro-active contribution to wider issues of sustainable water management, which goes much beyond the water that is used for operations or production processes and often beyond what might be mandated by regulators in the respective country setting (Morrison & Gleick, 2004). Taking into account the situation many parts of the developing world, where water resources are under severe pressure and service delivery is lagging behind, there is an increasing understanding that business must or should also look beyond the immediate production line and consider the broader societal issues (WBCSD, 2006)
In this regard, the question emerges, whether it is sufficient to rely on the mechanisms of corporate responsibility and ethics (Pegram et al., 2009a) as these may display considerable weaknesses (Newell, 2005), or whether it is rather the interaction between public and private actors that determines sustainable development trajectories.
Before exploring in more detail in what way business could potentially contribute to sustainable water management, a closer look is taken at governance elements, which are considered conducive to sustainable water management. This set of normative requirements then serves as a point of departure for assessing business behavior in this regard.

B.3.3. **Characteristics of Sustainable Water Governance**

The set of requirements for sustainable water governance is based on the assumption that the characteristics of the resource water necessitate a specific rule system, which has been described by Ostrom (1990) in her work on the appropriation and provision of common property resources. Based on these observations, a set of normative requirements can be derived that would provide for the sustainable governance of such complex systems as water. Dietz, Ostrom, and Stern (2003) suggest the following factors. While these are presented as distinct factors, there are clearly numerous interdependencies and relationships between many of these aspects. These are however omitted at this point for analytical clarity.

First, the provision of sound, trustworthy *information* is considered key in making decisions about complex environmental systems In addition, such data would need to be congruent with the scale of the problem addressed (Young, 2002) and secondly cater to the needs of the decision-makers. In accounting for the uncertainties inherent to the management of natural systems, the information provided needs to give an estimation of the uncertainties involved as well as allow for the assessment of trade-offs encountered across multiple scales.

Secondly, with the management of natural resources always bearing the potential for conflict among different stakeholders, adaptive governance systems must be geared to avoid and address potential or actual conflicts, through establishing mechanisms allowing for these parties to *participate in decision-making*, thus creating arenas for learning and change (Pahl-Wostl, 2008). This is also confirmed by the view on water governance suggested by Turton et al. (2007), which proposes a trialogue model in order to capture the interfaces between different actor groups pertinent for adaptive water management. They argue that government, society and science need to engage in a

mutual dialogue in order to facilitate a transition to more adaptive water management. Turton et al. (2007) describe the relationship between government and society as 'an unwritten, hydro-social contract, incorporating the norms and values of society that structure the relationships between key stakeholders. They point to the interfaces between these different actors as important loci where dialogue and learning take place and where common values are developed, which then in turn affect the resilience and robustness of the water system under management. Providing access to water planning and management to a wide range of stakeholders is considered fundamental in this regard, while specific attention needs to be given to those with limited capacities to participate[13].

Furthermore, there is a clear need for inducing *rule compliance*; i.e. the implementation and enforcement of regulations established (Ostrom et al., 1994). Appropriate mechanisms can take on different forms, depending on the respective groups of stakeholders addressed. Appropriate forms, especially with view to driving business behavior are discussed in detail in section B.5.3.

As indicated before, *infrastructure* constitutes a further key component with regards to the management of water resources. According to Dietz et al. (2003) the role of infrastructure can be conceptualized in two ways. On the one hand infrastructure supports the exploitation of the resources and thus the use of infrastructure needs to be subject to careful planning. On the other hand, infrastructure has a more positive connotation in that it can contribute to protecting natural resources, help provide equitable access to natural resources use, enable the monitoring of human impact on the resources and assist with the generation of information for planning purposes.

Finally, the authors advocate certain *preparedness for change* of the institutions established for managing the resource. This concept draws on some the previous factors and represents the principal lesson of adaptive management research (Gunderson & Holling, 2001). More recently, in the face of global environmental change, research has addressed the necessity to cope with occurring and future changes and uncertainties. This capacity to adapt is considered a key component of sustainable water management systems (Global Water Partnership - TAC, 2004).

The Global Water Partnership, an international network of experts in the field of water management, furthermore promotes *integration* as one of the key attributes of water governance systems (Global Water Partnership - TAC, 2004). Integration would include the linkages between macro-economic policies and water development, management and use, the integration across different sectors (e.g. industry, agriculture, and households) as well as the integration of decisions made at the local and river basin level with broader national objectives. Integration as guiding management paradigm for achieving sustainable water management is referred to as integrated water resources management (IWRM) and is broadly defined as 'coordinated development and management of water, land, and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems' (Global Water Partnership -

[13] The aspect that emerges strongest in both cases, is that of learning, or rather social learning in the context of reflexive governance, which is achieved through the dialogue and interaction of all stakeholders involved (Pahl-Wostl, 2008; Turton et al., 2007). It is argued that learning will allow for co-evolution, adaptation and eventually sustainable development.

TAC, 2000)[14]. Following work by Holling (1978), Pahl-Wostl and Sendzimir (2005) suggest the concept of adaptive management as central management style to realize effective IWRM processes.

Although ill-defined to some degree, it could be argued that adaptive and integrated management systems serve as core frames of reference for sustainable water management. In addition, this key management paradigm is augmented by a number of workable management principles.

The precautionary principle refers to careful *planning* and the use of scenarios in selecting water management measures. Measures should be chosen according to the no-regret-principle and in the best case be reversible (O'Riordan & Cameron, 1994), thus supporting the requirement of preparedness and adaptive management.
The polluter-pays-principle points to the *responsibility* of those causing the pollution or deterioration of water resources for mitigating these impacts retroactively, whether through undertaking the clean-up or providing financial means for others to perform this task (Rogers, De Silva, & Bhatia, 2002).
The principles of source reductions and resource minimization in the first instance address the limitation potential pollution sources, for example through redesigning production processes or installing end-of-pipe clean-up mechanisms. Secondly, the principle advocates the reduction of the resources used, for example through increased efficiency of production processes (Molden, 2006; Umweltbundesamt, 2001). These principles also speak to the IWRM components of water resources assessment and careful planning for IWRM as well as efficiency in water use.

In reviewing the characteristics and requirements for sustainable water management outlined above, the overall governance style, echoing the observations by (Dietz et al., 2003), should be predictable, open and enlightened in terms of a clear vision about water management. At the same time, this requires a professional bureaucracy with regards to sufficient human and financial resources, infrastructure and available knowledge, the ability to form partnerships and allow for broad-based civil society participation. The latter aspect points to the relevance of an *appropriate institutional framework*, which is vested with these characteristics and in a position to fulfill these tasks. Ostrom (1990) proposes a set of institutional design principles for addressing local common pool resource problems, which also provide for some guidance for water management institutions at other scale levels[15]. Still, the focus for this thesis is placed on the capacity necessary for (government) institutions to perform the required tasks and thus provide for an enabling environment for other actors to become involved in sustainable water management (GWP, 2008). While successful strategies and set-ups are bound to follow the same pattern and logic (Dietz et al., 2003), the actual type of the institutional set-up will eventually vary with the specific water management situation as well as other factors deriving from politics, culture in a country or region. A further differentiation needs to be introduced between institutions at the national, basin and local level (Pegram et al., 2009a).

[14] In 2002, at the World Summit on Sustainable development in Johannesburg, the goal was established for all countries to develop integrated water resources management plans by 2005, which has even more contributed to the manifestation of the concept (Bullock et al., 2009).

[15] In addition to a clear definition of boundaries, i.e. those responsible for and those affected by resource management decisions, Ostrom (2005) highlights the necessity of setting-up mechanisms allowing for collective action and establishing clear rules for the allocation of benefits and costs. Structuring resource management institutions as nested enterprises of multi-level and polycentric systems is considered a prerequisite for dynamic and adaptive resource management arrangements.

These attributes and requirements of sustainable water governance serve as a basis for identifying and evaluating business strategies and activities with view to their potential to assist in addressing key water management challenges. The following sections focus on these contributions and - in a second step - investigate motivations and key drivers defining corporate strategies.

B.4. Focusing on the Role of Business Actors: Dependent Variable

In order to approach the role of business actors in water management I recur on the academic discourses and corresponding theories on business behavior vis-à-vis sustainable development. The role of business in sustainable development has been and still is rather contested. Business is perceived to be guided by profit-seeking behavior, which might prove detrimental to each of the three pillars of sustainable development (Bansal, 2002). Responsible business activities are increasingly undermining this assumption and leading to a more differentiated view on the role of business in sustainable development (Hart, 1997; Rondinelli & Berry, 2000; Schmidheiny, 1992; Shrivastava, 1995).

There is a vast pool of literature of an academic as well as practice-oriented nature, exploring the relationship between business actors and sustainable development. As part of the debate, terms such as corporate social responsibility, corporate environmentalism and corporate citizenship have emerged and found their interpretation in the context of industrialized countries as well as the developing world and emerging economies alike (Visser, 2008).

As a theoretical starting point I relate to an expansive stream of research, referred to as corporate environmentalism, which claims that environmental concerns are no longer mere technical issues for firms, but have entered proactive corporate strategies (Hoffman, 2000). This strategic reorientation is furthermore conceptualized as a response to various drivers, which influence business (Hoffman, 2000; Prakash, 2000), thus opening the black box of the firm as an actor in the arena of environmental protection/sustainable development (Delmas & Toffel, 2006). In essence, these concepts are closely related to a conceptualization of business and its role in society and how this is changed and shaped in a constant interaction with government and other actors (Moon, Crane, & Matten, 2005).

While the school of corporate environmentalism primarily refers to firms' environmental strategy and performance, it clearly also bears additional dimensions, which Hoffman discusses as the social and technological aspects of environmentalism. The social component in this case derives from the social impacts of environmental degradation and thus the interaction with the constituents of this issue, such as NGOs, but also citizens and consumer groups. The technological components on the other hand are derived from the necessity to rethink production processes, waste streams, raw and material use. The degree to which firms are in a position to develop new technological approaches to address environmental challenges determines the likelihood of their overall success and survival. Bansal (2005) for example, discusses how organizations apply the principles of sustainable development to their products, policies and practices in order to 'express sustainable development' at the firm level.

The concept of corporate environmentalism furthermore proves to be useful for considering firm behavior towards water management, in that the concept explicitly considers impacts of environmental change on corporate strategy and interprets it as a social pressure, imposing a clear mandate for action and change (Hoffman, 1997).

In the first step the focus is placed on describing the potential contributions of business to addressing the water challenge as the dependent variable of the model set-up.

The dependent variable consists of three dimensions. In the first place, I consider the strategic choices of business with regards to addressing the water challenge; secondly I refer to the mode of

interaction in delivering the contribution. In addition, a further dimension is discussed, which addresses the long-term dynamics of business behavior and their intervention in water resources management, which provides for an indication of the sustainability implications.

The overall approach is following the rationale proposed by the school of corporate environmentalism, according to which drivers, which are described in the following section, lead to a strategic reorientation at the firm level. In this case environmental concerns will become fundamental issues for core business strategy (Hoffman, 2000). However, this mechanism can also be expanded in order to include other issues relevant in the context of corporate responsibility.

B.4.1. **Varieties of the Contribution**

From literature one can derive the following strategic avenues that a company might choose to adopt in response to the pressures experienced. They are applied to the requirements of water governance as introduced in the previous chapter.

Compliance

Striving to comply with existing regulatory provisions is often considered the basis for building further strategic avenues. Compliance can comprise a number of activities, such as the installation of prescribed technology, self-monitoring of emissions or general business practices, adherence to standards established and reporting to the regulating authority. There has been a long-standing debate on the merits and problems related to command and control regulation, which deems it fundamental in terms of improving environmental quality on the one hand (Cole & Grossman, 1999), but also speaks to potential shortcomings. These largely pertain to limited operational flexibility creating inefficiencies, impediments to technological innovation on the side of the company (Jaffe, Peterson, Portney, & Stavins, 1995), but also the considerable cost involved for the regulated as well as for the regulator (Fiorino, 1999). Nevertheless, regulation is considered the backbone for responsible corporate behavior and might in a second step lead to self-regulatory approaches (Graham & Woods, 2006). In the shadow of regulation, as discussed by Prakash and Potoski (2006) and also Short et al. (2008), such self-regulation might take place in the context of voluntary programs or reaction to the company's own motivational patterns[16]. In addition to the 'shadow of hierarchy', the relative strength of other drivers can also exert a considerable influence (Auld, Bernstein, & Cashore, 2008). These mechanisms are discussed in more detail in the following chapter.

With regards to water management, compliance with rules and regulations is the fundamental basis for any other contribution (Ostrom et al., 1994). From a firm's perspective this would include the installation of all required water-saving equipment as well as abiding to certain monitoring and reporting regulations.

Operational Efficiency, Technological Innovations

A common strategic avenue beyond compliance pertains to an increased operational efficiency through a more efficient use of resources and the minimization of waste output. This behavior often implies changes in production processes, which can also result in other impulses for the innovation of

[16] This discussion draws on the discourse among US-American business and political science scholars in order to delineate for a suitable point of the departure for the discussions in the context of this thesis.

processes and products and is thus closely related to the technology strategy of a firm (Hoffman, 2000; Pfriem et al., 2006). Improved process development could address such issues as reuse and recycling on-site and lead to innovative approaches, such as eco-industrial parks (WBCSD, 2000)[17].
Particularly, with regards to the management of water resources, there are a number of firm-internal measures that can be implemented, such as heightened water use efficiency in production processes. Important contributions are also technological improvements and innovations, which are targeted at water savings and more efficient use, as well as water reclamation. Especially the latter field has seen significant innovations and technological improvements over the past years.
Furthermore, the aspect of innovation is also closely related to product properties. With regards to water management, the 'water footprint' of products is gaining in significance (Gerbens-Leenes et al., 2007). This concept draws attention to the entire production process and takes into consideration the water usage over the entire lifetime of the product. While the water footprint is currently used for benchmarking among competing firms, it is bound to be developed into a more market-oriented tool, catering to environmentally conscious consumers to promote the corporate image and brand name (Charter & Tischner, 2001).
These measures are contributing to the principles of source reduction, pollution control and the minimization of resource use.

Planning, Monitoring

Internal planning[18] with a particular focus on assessing and evaluating the impacts of business activities is often conducted under the premise of risk management and foresight. It is expected that this aids in reducing unexpected (and unnecessary) costs related to emergency response in case of damage incurred, remediation activities, product liabilities and insurance premiums (Hoffman, 2000) as well as indirect cost incurred due to reputation damage and a loss of trust among key stakeholders. In the context of such activities, some companies even consider a change of their management approach in order to better account for strategic drivers. Devoting more (financial and human) resources to managing a firm's sustainability performance as well as an adjustment of the business mission could be part of the strategic realignment. Schaltegger et al. (2007) provide for a comprehensive overview of the integration of 'sustainability thinking' within all functional areas of a firm and make suggestions with regards to tools to be employed in order to achieve a strategic re-orientation as well as its operational implementation. Sustainability accounting is only one of many measures proposed (Schaltegger, Bennett, & Burritt, 2006).

Planning is of crucial importance with regards to water management from corporate perspective and takes on different dimensions. In the first place internal water-related planning is key for the reasons given above: risk minimization, cost-planning and stakeholder involvement. Water planning can thus take on a central corporate role much in the sense of a strategic realignment. In addition to internal planning of water uses and demands there is a need to consider the linkages of a company's water situation to surrounding catchments and water systems. Corporate water planning in many cases expands beyond the fences of the production site and takes into consideration the dynamics of entire catchment.

[17] Most interestingly, the debate in Sustainability Management and innovation for sustainable development is driven by European authors.

[18] In many cases, this involves the introduction and maintenance of environmental information systems at the company level.

At the basis of planning are **monitoring** activities. Businesses have developed more or less sophisticates systems and processes to collect data on business processes as well as their environmental and also social impacts. Next to internal uses, data is also provided to government to allow for compliance monitoring in supplementing government-generated monitoring data, but also to assist in government planning activities.
The benefits for businesses derive from a more complete knowledge of the available resources and the overall resilience of the surrounding water systems. Corporate activities constitute a contribution to sustainable water management in case monitoring data and planning material is shared and constitutes to an overall better understanding of the water systems in the specific region or area.

Infrastructure, Finance

Firms often devise of the necessary finances and know-how (Bansal, 2005), which might be lacking on the side of government, to develop, finance and realize certain water infrastructure or management options. In other instances corporate interests overlap or coincide with public interests, which is often the case with regards to infrastructure development (Pegram et al., 2009a).
In some cases, firms engage in the construction and also maintenance of infrastructure, which caters to their specific needs. In cases where this infrastructure also takes into consideration community-requirements, it could be considered a veritable contribution (Prasad, 2008). Along the same lines financial contributions to develop infrastructure and other aspects of water resources management constitute an important contribution in case they are used to finance developments and improvements, which expand above and beyond the self-interest of the company (Addams, Boccaletti, Kerlin, & Stuchtey, 2009; Pegram et al., 2009a). In revisiting the arguments made above about the excludability characteristics of water resources, one needs to ask who exactly benefits from infrastructure investment. Bakker (2008) in recurring on Chatterjee (2004) discusses the limitations of the term community, which is not necessarily including all parts of society, but rather a small 'economically, culturally, and social elite subset'. The degree to which business contributions transcend these barriers is an important factor to consider. It is particularly relevant with regards to water infrastructure, which might only be selectively provided to selected groups.

Capacity

Often the technical skills but also knowledge about the administrative processes, financial management and project planning are lacking with those government bodies responsible for implementation (see section B.5.5 for a more detailed account of the different forms of government capacity). Companies are increasingly engaging in creating and strengthening those capacities with government and other stakeholders. The modes of capacity-building and transfer are described in the following section.

Infrastructure, finances and (administrative) capacity are of crucial relevance in water management (Pegram et al., 2009a). Supporting and supplementing government responsibilities in this regard therefore would constitute a significant contribution by corporate actors, in case they are provided voluntarily and not in the context of a delegation by government.
The strategic options described thus far represent a rather tangible approach towards sustainability challenges and sustainable water management and cater to the requirements of improved information, overall preparedness to change as well as infrastructure and institutional capacity.

Awareness and Shaping of the Policy Field

In addition to these more tangible strategic avenues, business actors can choose to reach out to their diverse stakeholders and thus enter the public policy arena in different ways. Through interacting with their stakeholders, creating platforms for exchange and raising awareness for water management challenges, companies thus enable those groups to raise their concerns and equally contribute to an open dialogue about management options. Loorbach et al. (2009) describe this as the development of a shared vision of sustainable development through the establishment of a strategic network arena with the key stakeholders.

This activity is obviously closely related to the mode of interaction chosen, as will be discussed on the following section. It is furthermore necessary to take into consideration the underlying intention of the company, as there is probably a thin line between a genuine interest in exchange and dialogue and shaping discussions in a way that might support their own cause.

Bendell and Kearins (2005) address a different aspect of public policy involvement by re-focusing on government actors, referring to the 'political bottom' line. By this they describe the active involvement of business in political processes for sustainable development through raising topics of concern, directing the debate in a way that most severe shortcomings are addressed. Business, albeit with varying degree depending on their size as well as other factors, can exert a significant influence on the shaping and making of water policies in the countries and or areas where they operate. Moon and Vogel (2008) point out that especially large corporations have a significant impact in this regard, which, if leveraged responsibly, can actually lead to the formulation of 'responsible policies'. Such efforts are gaining in relevance for water issues as well. It can thus be considered as aspect however more subtle component of capacity-building.

According to Loorbach et al. (2009) through these types of engagement business can contribute to facilitating systems change and learning, which constitutes an important requirement for sustainable water governance. Similarly, Auld et al. (2008) argue that efficiency gains and testing of new technologies are one side of the contribution while changes in the economic environment or changes in the competitive environment bear a long-term transformative potential. These effects however will clearly only become visible in the long-term.

Summary

The following figure summarizes the contributions possibly provided by business to addressing the water challenge. The grouping structure - from right to left represents the level of involvement with other actors. While those activities on the right mostly take place at the company level; activities on the right involve a considerable interaction with other actors.

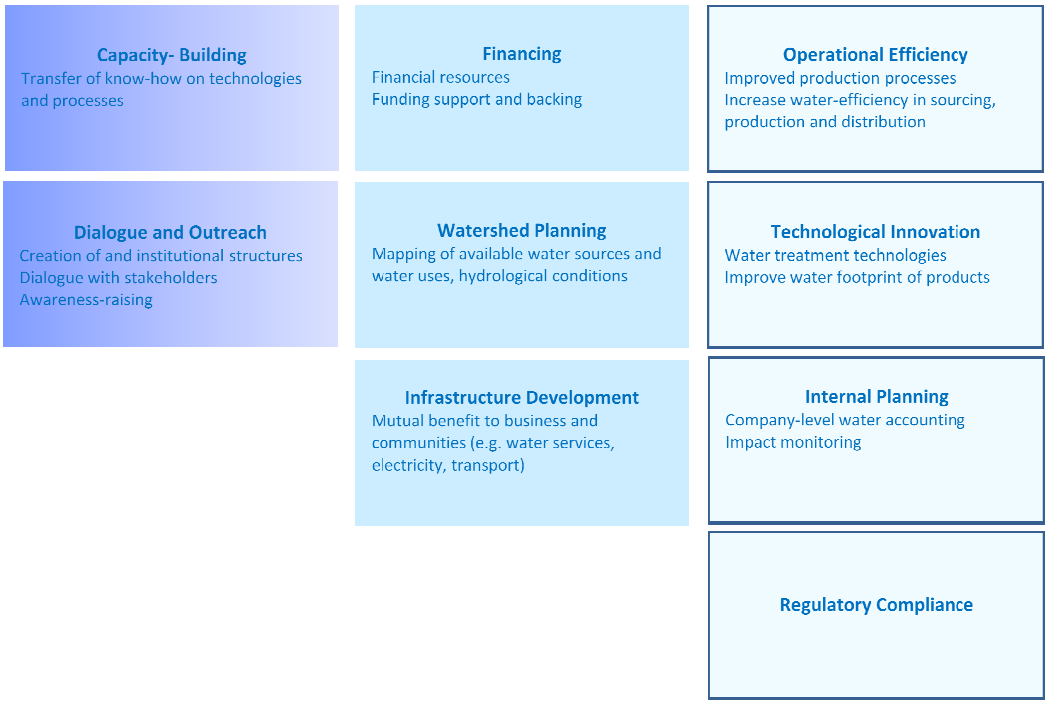

Figure 2: Overview of Business Contributions to Addressing the Water Challenge

The following table provides an overview of how corporate contributions cater to the different requirements of sustainable water governance and management. The matching was based on the qualitative requirements of the governance elements and potential manifestations of the different types of business contributions. It becomes quite evident that different business activities might contribute to various requirements, while addressing others may prove quite challenging, such as for example the requirement of integrated water resources management.

Table 1: Elements of Water Governance and Matching Elements of Business Strategies

Elements of Sustainable Water Governance	Elements of Business Strategies/ Business Contribution
Information	Monitoring
Participation and Learning	Awareness; Shaping of the policy field
Rule Compliance	Compliance
Infrastructure	Infrastructure Development; Financial Support
Preparedness/Precautionary Principle	Planning, Monitoring
Polluter-Pays-Principle	Compliance, Responsibility for Impacts
Principle of Source Reductions and Resource-Use Minimization	Compliance, Efficiency Improvements, Technological Innovation
Efficient Institutions and Sufficient Resources	Capacity; Financial Support
Integration	Combination of several contributions, such as monitoring, planning, awareness

Contributions furthermore differ with the governance level where they are provided. The local level is most relevant for the immediate operations of the firm and involves interactions with local government, e.g. on securing water supply (i.e. infrastructure development), or with the communities in the direct neighborhood of the operation, e.g. regarding the mitigation of pollution impacts.
At the national level, a more systemic consideration of water risks is likely to prevail, more focusing on advocacy, lobbying and the involvement with policy-makers with regards to shaping water policy. In addition to the national level, the watershed level, i.e. the catchment context, also represents an important action arena for firm. At this level, they need to coordinate their contribution with other actors and aim for integration with other uses (Pegram et al., 2009a).
In the following section, the question will be addressed of how the respective contribution is provided. A further issue to consider is the aspect of long-term dynamics of firms' contributions. As indicated above, respective activities might not directly contribute to sustainable water management. For example, infrastructure development benefits corporate interests in the first instance, while long-term dynamics might prove beneficial or detrimental for sustainable water management. This differentiated approach will be discussed in section B.4.3.

B.4.2. **Modes of Interaction**

The contributions to sustainable water management introduced above are provided by the respective business actors in various constellations with other actors, such as peers, government as well as non-state stakeholders. Analyzing the mode of interaction employed in providing a specific contribution allows for rendering a more complete picture of the actual implications for sustainable water management. Furthermore, reflecting on preferred modes of interaction provides for an indication of advisable governance approaches in guiding firm behavior.
The mapping of the modes of interaction is guided by a variation on the framework developed by Hönke, Kranz et al. (2008). The following modes of interaction are subject to a closer investigation.

Individual	**Supply chain (Supply and demand management)**	**Collective (association, cluster)**	**Multi-stakeholder platforms**	**Bi-partite or tri-partite partnership**	**Capacity-building Lobbying**
	Hierarchical	Horizontal	Dialogue	Multi-lateral	Bilateral, unidirectional

Companies could deal with sustainability or water-related issues solely within their ***own sphere of influence*** on an individual basis. Legal compliance is for example managed at this level, so are internal planning, monitoring or clean-up efforts.

At the second stage, there are a number of interactions, which derive from the immediate operating environment of a company. This could include interactions along the ***supply chain***, i.e. working with key suppliers on water efficiency or promoting security of supply in the upstream supply chain. For example, this involves the establishment of demand management measures to actively reduce water use among suppliers. The relationship between the firm and suppliers can be described as hierarchical, since suppliers are subject to a firm's requirements and demands allowing the firm to exert quite some leverage (Hall, 2000; Sarkis, 2003; Walton, Handfield, & Melnyk, 2006).

Beyond the supply chain, this could also be expanded to ***collaborative efforts with other business*** actors. This phenomenon is particularly common in industries that hold collective reputation, such as the mining industry. Such collaborative efforts are limited to the participation of companies only and often pertain to the establishment of industry-focused standards, for example joint codes of conduct and best practices (Gunningham & Sinclair, 2001). King and Lenox (2000) however discuss the limitations of these voluntary commitments under conditions of weak sanctioning capacity. In the field of water management, approaches for collective regulation are also slowly emerging; furthermore joint planning or infrastructure development is gaining in significance in the water sector. This is comparable to technological cooperation in product or process design (Dogson, 1993).

In other cases, business chooses to work with other stakeholders, such as NGOs, community groups in order to address certain sustainability challenges. This can take place in the context of stakeholder dialogues (Wiedemann & Schütz, 2000) or more formalized forms, such as ***multi-stakeholder platforms***, which comprise diverse actors, such as the state and trade unions. This type of cooperation probably bears the largest potential for mutual learning processes and other positive effects, such as the securing a beneficial reputation and the building of trust (Hemmati, 2002). Rosenau (2004) also argues that the combination of strengths of both, the private sector, which is more competitive and efficient and the public sector, which responsibility and accountability vis-à-vis society is conducive in this context.

From multi-stakeholder platforms, it is only a small step to ***partnerships***, as bipartite partnerships involving state and business actors, or tripartite arrangements with a broader participants' basis.
Hamann et al. (2009a), propose an assessment of partnerships based on approaches by Benner et al. (2004) and Zadek and Radovich (2006). They suggest a differentiation in more dialogue oriented for a (see above) and more formalized 'implementation platforms'. Accordingly, dialogue platforms are more open-ended forms of interaction, often seeking to fill a governance gap, while operating with rather undefined objectives and less formalized structures. On the other hand, implementation focused partnerships more often operate with a clear mandate, clearly assigned roles, a formal institutional structure and an underlying legal agreement. They constitute an interaction focused on solving a given problem, coordination to address rule and standard setting or the provision and in many cases the financing of a public service[19].
It is particularly with partnerships activities targeted at water infrastructure development and financing that the boundary between internal business considerations and public policy is clearly transcended. Other example for activities with a similar impact are instances where firm-related water resources planning is linked to and thus impacts planning activities from the government's side.
As discussed before, actively engaging with stakeholders, including government, stakeholder dialogues and other activities that are designed to shape public policy with regards to water also need to be considered in this category.

[19] Of particular interest in investigating these partnerships is the role that business and government take respectively. Leaderships is a decisive element of shaping the outcome of partnership (Huxham & Vangen, 2005). For business actors, partnerships thus offer an opportunity to take leadership on certain issues in cooperation with other actors and move beyond the firm-internal perspective of corporate responsibility (Elsig & Amalric, 2008). Compagnon (2008) discusses that under certain conditions this might assist in alleviating an implementation deadlock.

In terms of a more unidirectional involvement of firms and governments, ***lobbying*** involves the transfer of firms' ideas and interests through the establishment of certain positions, e.g. in direct interaction with government or in the context of consultations. Lobbying often has a negative connotation, as it certainly also involves influencing governments' decisions in favor of business interests, e.g. weakening or preventing regulation and standard-setting (Lyon & Maxwell, 2008; Rivera et al., 2009). At the same time however, lobbying also allows for the exchange of different positions and thus the preparation of management decisions (Potters & Van Winden, 1992). Problems arise if lobbies vested with more resources "out-compete" other, weaker interests, which might lead to an imbalanced representation of interests. Proactive, environmentally conscious companies use lobbying in order to create a level playing field and introducing responsible approaches into regulative provisions (Sharma & Vredenburg, 1998), (see previous section (Bendell et al., 2005; Loorbach, 2002).

Finally, ***capacity-building or capacity development*** of governmental actors is the most intensive form of public policy involvement of firms.
Capacity-building as a concept is interpreted in many different ways, from analytical (Honadle, 1981) as well as normative perspectives. Especially the international aid sector has massively adopted this concept. A much quoted definition by UNDP refers to capacity-building as the creation of enabling policy and legal frameworks; institutional development, including community participation and human resources development and strengthening of managerial systems (Alaerts, Blair, Hartvelt, & Título, 1991; Hartvelt, 1996). However, there are many other different definitions and understandings, ranging from economic capability for development, to institutional performance, to the level of individual competence (McLennan et al., 2004).

In the context of this thesis however, capacity-building is understood as a transfer of certain knowledge and management know-how to government officials (i.e. the individual level) as well as institutional development. This could also include knowledge about planning processes, certain technological solutions, the allocation of finances as well as the handling of budgets, specifically with view to managing water resources and focusing on engaging with business, for example in the context of partnerships. In essence, capacity-building thus contributes to the different areas of capacity, which are presented in more detail in section B.5.5.
Capacity transfer can be realized in several ways, such as external training, but also in-situ models. In the latter case, company staff works with government officials for a limited period of time. Additionally, as mentioned before collaborating on certain problems can also contribute to capacity-building as government officials 'learn by doing'. Thus, there is also a definite overlap between partnerships and capacity-building activities[20].

The following table provides an overview of the contributions and possible according modes of interaction in delivering these contributions. The overview reveals that there are rather typical combinations between certain contributions and interaction modes. Collective action appears to be a commendable type of interaction for many contributions to sustainable water management, given

[20] This approach is for example adopted by the program: Capacity Development for Partnerships between Local Government and the Mining Sector, implemented by GTZ.

the at large investment necessary as well as the complexity of some water management issues. The contributions capacity development, learning and awareness already bear a strong interactive component.

Table 2: Contributions and Modes of Interaction

	Individual	Supply Chain	Collective	MultiStake	Partnership	Capacity development/ Lobby
Compliance	●	●				
Internal Planning	●		●			
Innovation	●	●	●			
Efficiency Improvement	●	●	●			
Financing			●		●	
Watershed planning			●	●		●
Infrastructure			●		●	
Capacity				●		●
Awareness, Learning			●	●	●	●

B.4.3. **Long-Term Dynamics**

The framework developed above maps potential contributions of business to sustainable water governance. In adopting one or several of these activities as part of their corporate strategies, business thus potentially promotes the sustainable management of water resources.

While this constitutes a good approximation of the sustainability impact of corporate activities, corporate activities might not automatically lead to sustainable outcomes, might have additional impacts in the long run and result in impacts on other sectors and with regards to other (environmental) resources.

Several approaches for the assessment of sustainability impacts and the application of indicators for sustainable development have been developed over the past years (see for example (Bossel, 1999; Rotmans & Van Asselt, 2002)). These propose a wide range of evaluation criteria and methods to assess the sustainability of policy decisions or the actions of individual actors.

In the context of this thesis, the following aspects appear to be particularly relevant and will be discussed in more detail as a tentative validity checks on the contributions provided and also as potential points of weakness, thus mitigating and overly optimistic view of corporate contributions.

Time and Uncertainty

While inherent to the concept of sustainable development (WCED United Nations World Commission on Environment and Development, 1987), the notion of time deserves additional highlighting in this section. In most cases, the true effects of policies or corporate strategies with regards to sustainable development evolve and thus only become visible over time (Slawinski & Bansal, 2009). While what is considered sustainable is very much dependent on the (possibly changing) perception of a wide range of stakeholders, it is however possible to infer sustainable trajectories from present day activities of firms and the way they are viewed by different stakeholder groups.

An important component to consider, when discussing long-term implications of business contributions is the increasing inherent uncertainty of potential outcomes (Brugnach, Dewulf, Pahl-Wostl, & Taillieu, 2007). Especially, in terms of impacts on or related to natural systems,

uncertainties derive from various sources, such as the effect of the measure or activity undertaken as well as from the potential reaction of the natural system, i.e. in this case the water system.
In addition, the two implications mentioned below, integration and governance feedback, both feature a strong time and thus also uncertainty dimension as they pertain to the dynamic interrelations between different actors. While the interaction of firms with their stakeholders is framed largely positive in the literature presented above with regards to their contribution to sustainable development, there is a need to also take in to consideration potentially negative effects of such activities over a longer period of time.

Integrative Aspects

As introduced above integration is a widely-accepted paradigm in water management (Global Water Partnership - TAC, 2004). In aiming to derive potential business contributions to integration, it furthermore became evident that integration is difficult to attain and might probably require a whole range of contributions. At the same time, these might also have implications beyond the immediate water-related impacts.
In order to gauge these implications and provide for a better assessment of corporate contributions to integration, the following features are introduced as approximations for an indicative assessment in the context of this thesis.
In the first place it is essential to consider the extent to which corporate activities related to addressing the imminent water challenges lead to potential negative or positive effects with regards to other environmental resources (for example biodiversity, soil, air). If integrated in an ideal way, water-related measures will not have a negative impact on any other environmental resource. If impacts are unavoidable, according the IWRM paradigm, these need to be justified and compensation should be considered. Accordingly, this also applies to potential positive or negative impacts on social issues, which in the case of water often involve aspects of access rights, environmental justice as well as the affordability of water services.
The third integrative requirement then involves economic implications (Addams et al., 2009). What is the relationship between water management decisions and economic considerations? As these aspects are often pitched against each other as a trade-off, the challenge of integration is probably particularly pronounced in this regard. An important component of this challenge is the effect of water-related activities in specific sectors on other (industry) sectors. For example, water use management by agriculture-based industries will be different from those in mining or energy generation. Water management by each of these sectors is likely to influence the resource base of each of the other sectors, classically by withdrawing or polluting water. Similarly, water resources management for ensuring public service provision might lead to limitations for other uses.
In following the definition in section B.3.3 the paradigm of integration thus asks how well these different options and uses have been considered under current conditions as well as when considering potential implications in the long term.

Governance Feedback

As described above, firms' contributions comprise activities that go beyond their own company fence and supply chain and involve the interaction with a range of stakeholders, including government. In reflecting the elements of sustainable water governance described by Dietz et al. (2003), firms thus become directly involved in shaping public policy processes, for example through fostering capacity-

building for government actors, raising the awareness for eminent water management challenges, but also by initiating debates and creating platforms for exchange and learning.

Following the argumentation by Loorbach et al. (2009) these types of activity constitute an important element of responsible firm behavior, which is directed at not only developing sustainable solutions at the firm level, but also positive impacts on the policy field, so that it is more open for addressing sustainability challenges.

In the best case with regards to governance feedback, these contributions and interactions lead to mutual learning, which could assist firms to adapt their strategies, and also have a similar effect for the other stakeholders, including government (Korhonen & Seager, 2008), so they know better how to address which problems. This type of learning process is often considered crucial in enabling sustainable, broadly accepted outcomes (Voss et al., 2005).

Firms' contributions in this regard are thus considered beneficial as they provide additional resources and know-how to the governance process. Government clearly benefits from firm efforts with regards to capacity-building. This also holds true for the entire policy process, as government actors are placed in a better position to effectively to manage, monitor and enforce water policies and to interact with other stakeholders for this purpose.

This type of governance feedback, which involves the fostering of learning processes as well as the build-up of government capacity, thus is to be considered as largely positive. An important question that needs to be raised in this context however pertains to potentially negative effects that could incur from the close encounter of business and government and the 'feedback' loop established between firms' activities and government capacity and activity.

State or agency capture is a concern that emerges prominently in this context. Hellman and Kaufmann (2001) discuss several varieties of state capture, particularly with regards to the situation in transition economies. Utting (2002) points to the pitfalls of multi-sector partnerships, albeit particularly focusing on the UN system, by noticing a considerable influence of business on agenda-setting by governmental agencies. Especially when considering weak or under-capacitated governments, the issue of state capture or overly strong influence of business on shaping government agendas according to their preferences becomes an issue, as government objectives might be altered or diluted so as to only cater to a preferred group of stakeholders, i.e. in most cases business (Börzel, 2010). While this phenomenon is not confined to areas of limited statehood, there have been numerous examples in the past. Particularly in the mining sector, which has often been deeply entrenched with the host country's government, there have been quite a few instances which bear resemblance to the phenomenon of state capture (see section D for a more detailed description of the situation in South Africa). Looking at the interaction of business with no-state actors, similar concerns emerge in cases where corporate actors seek to co-opt the public opinion and influence stakeholders' perception. When considering the long-term implication of business intervention and contributions, a careful investigation of the respective manifestations of the governance feedback is thus mandated.

A further feedback loop, which is however not subject to further investigation this thesis, involves the repercussion of business – stakeholder interactions on the strategic orientation of firms themselves. Only by accounting for the complexity of issues brought forward by different stakeholders, firms will be in a position to effectively address the full dimension of sustainability challenges as they pertain to corporate viability (Rowley, 1997). Roome and Wijen (2006) describe how business organizations can change and adapt to challenges by successfully interacting with their

key stakeholders. Whether firm can bring to fruition stakeholder interaction for strategic decisions taken at the management level or not, will probably prove decisive for overall corporate success (Bansal, 2005; Loorbach et al., 2009). For future investigations, this aspect could thus be included as an element of firms' incentive structures.

In returning to the analysis conducted in the context of this thesis, the incentive structure of firms is constituted by a number of drivers, which will be conceptualized as independent variables of the underlying model in the following section.

B.5. Independent Variables

In categorizing drivers, respectively explanations for corporate contributions to sustainable water management, reference is made to the following strands of literature. Hoffman (2000) identifies several categories of drivers, which were further transformed according to Bansal and Roth (2000) in order to arrive at a workable number of drivers or explanations. In the first instance resource-based explanations will be discussed, followed by institutional explanations. Bansal (2005) suggests this differentiation in order to depict the wide range of relevant explanations for firm behavior. Drivers are discussed and interpreted through the lens of water management. Finally, the drivers will be re-examined against the literature on such driving forces in developing countries and emerging economies.

B.5.1. **Internal Factors (Resource-based)**

The firm-internal or 'resource-based' perspective takes into consideration those assets available at the firm level that determine the firm's competitiveness (Barney, 1997). These factors can include tangible assets, such as financial reserves, but also know-how, firm culture and reputation (Grant, 1991). Bansal (2005) highlights the relevance of these internal resources for corporate sustainable development. In their work, Delmas and Toffel (2004b) also show that it eventually boils down to a firm's characteristics when it comes to the uptake of strategies and changes towards corporate sustainability.

The following internal or resource-based aspects are highlighted in the context of this study. Several inter-connected factors might have an effect on how a firm addresses sustainability issues but also how it reacts to exogenous pressures. The physical and organizational structures of a firm, the general understanding of the issues by management as well as other cultural factors play an important role in shaping a firm's capacity to proactively contribute to sustainable development (Harris 2005)[21].

Swanson (2008) specifically discusses the **awareness and commitment** of corporate leadership to sustainable business practice. If there is a strong interest among leaders within the company for sustainable development or sustainable water management, the respective strategic orientation is more likely than in cases where there is only little high-level support on these issues.

Similarly overall **company culture** with regards to sustainability and responsibility issues has an influence on how these issues are handled within the organization (Barth, Wolff, & Schmitt, 2005; Kotter & Hesketh, 1992). Is sustainable development or are water resources valued as important assets by the company? Water is an aspect of high cultural relevance in many countries and regions. Companies that originate from a water-scarce area are probably more likely to engage in water-conscious behavior (Visser, 2008).

Harris (2007) specifically highlights the relevance of the corporate capacity to react to demands and pressures brought upon companies, to learn and to proactively engage in activities of corporate sustainability. The more firms that have established mechanisms to **learn** from past experiences, the

[21] Delving deeper into organizational structures, Delmas and Prakash show, how firms' heterogeneous strategies can be traced back to the different uptake of external pressures by different entities within a firm (i.e. legal department, marketing department, etc.) which then again leads to different responses and strategies.

more likely they will develop strategies, which allow for better managing future sustainability challenges.

Other important factors are the **availability and deployment of resources**, which have among others an impact on the size and type of contribution a company might provide. Bansal (2005) introduces capital management capabilities and 'organizational slack' a two further categories. It is argued that firms develop capital management capabilities by managing assets and technologies. Firms with capital- and material- intensive operations are more likely to have a (negative) impact in terms of sustainability issues. At the same time they also develop and devise of necessary technologies and know-how to address these challenges. This aspect is particularly important, when considering the relevance of infrastructure for addressing the water challenge. Firms with the capability of planning and implementing such infrastructure will be in a position to make a respective contribution.

The term 'organizational slack' is then introduced in order to denote those resources allowing an organizations to adapt to internal and external pressures and that might not have an immediate pay-off (Cheng & Kesner, 1997). This type of 'extra' resources is particularly relevant in the context of sustainable development, where pay-offs might not accrue immediately or in rather intangible forms.

A further important factor is the International orientation of the business considered, in terms of the operation in and the dependence on foreign markets. Companies operating in other contexts, especially those with higher regulatory demands, will devise of additional knowledge on how to address sustainability issues (Zyglidopoulos, 2002). Bansal et al. (2000) furthermore show that firms with an **international orientation** pay more attention to maintaining their license to operate in local countries through maintaining high environmental and social standards.

Apart from those capabilities and resources that determine a company's competitive advantage, (Hart, 1995) refocuses the debate on the relevance of constraints and uncertainties posed by the increasing limitations of natural resources (biophysical, but also energy and mineral resources). Firms strive to control potential uncertainties and thus unpredictable cost implications deriving from threats to the resources base.

Water is a prime example for a potentially limiting factor, especially in cases where it constitutes a key input variable for production processes (Orr, Cartwright, & Tickner, 2009). It is either the lack of water or an abundance of waste water that can constitute a considerable resource constraint and thus a risk to business (Skidmore, Barrett, Ndebele, & Lyon, 2008). This is risk is currently perceived to increase due to climate change impacts (WBCSD, 2009b).

First, decreasing water availability and thus a reduced reliability and security of supply can pose a considerable risk to production processes, for example in the platinum mining industry. Declining water quality would aggravate this aspect, particularly in the food as well as in the very water-intensive beverage industries.

Second, supply chain interruptions due to water quality and quantity are further key factors of a water-based risk assessment (Morrison et al., 2004). Water is often in an upstream position for many production processes, i.e. agricultural production or the generation of hydro-electricity for aluminum processing. Direct dependencies and threats, as for example in the beverage industry, obviously lead to a much greater interest in water issues and probably also a more pro-active behavior of that specific sector (Makower, 2004). Business' dependency on water resources might not only be found upstream in the supply chain of a product, but also at downstream stages in the value chain. Water often serves as the receiving medium for emissions and thus as a diluting agent. Often production

processes generate substantial amounts of waste water, which (if the respective mechanism are in place) need to be purified before released into the environment (Turton, 2008a).
The two factors mentioned above directly translate into economic incentives as the **cost of water** increases with less clean water available and thus will directly affect a company's bottom-line (Turton, 2008a). This will definitely hold true for the input side as long as water is adequately priced, whether however the output dimension will be considered, depends on the degree to which pollution, i.e. external costs will be internalized. The concept of the water footprint takes this approach even further, as it considers the water footprint of a product over its complete life-time (Hoekstra & Hung, 2002).
In this regard, actors influencing the resource base or the price of the resource, such as regulatory provisions (Pegram & Schreiner, 2009b), water utilities, water providers constitute an important institutional driver; this type of driver will be discussed in the following section.

B.5.2. **Institutional Explanations**

In addition to internal factors, further drivers are derived from institutional theory, which emphasizes the social context within which firms operate (Scott, 2001) and where institutional mechanisms influence corporate strategy (Di Maggio & Powell, 1983). Delmas and Toffel (2004a) furthermore argue that organizational aspects, i.e. internal factors influence how institutional pressures are perceived and in what way they influence corporate strategy. The underlying mechanism driving corporate behavior is the importance of achieving social legitimacy for long-term business survival and success (Powell & Di Maggio, 1991; Scott, 2001).
The following drivers discussed represent only a selection of the variety of possible institutional pressures as discussed by Hoffman (2000). They were chosen in reflecting their potential relevance in the context of the research question. They include normative drivers, such as international norms codes and initiatives fostering corporate responsibility, mimetic pressures within a defined industry, competitive drivers as well as social pressures exerted by communities and environmental interest groups. Regulation or government pressures, a form of coercive power according to DiMaggio et al. (1983) are usually considered strongest compared to other business drivers (Rugman & Verbeke, 1998).

Normative Drivers at the International Level

National and international norms play a crucial role in driving firm behavior. These normative drivers include internationally accepted norms regarding sustainable business behavior, such as corporate social responsibility (CSR), and corporate citizenship (CC) and their corresponding codes and initiatives as well as water specific initiatives and codes.
The concept of CSR is probably the most prominent but also the most criticized term used to address responsible firm behavior. Of the many existing CSR interpretations, there is the expectation of certain NGOs that CSR will contribute to solving the global poverty gap, social exclusion and environmental degradation, companies mostly view it as a tool for quality management, marketing and communication (Carroll, 2001).
Several organizations have developed their own understanding of the terms CSR. According to the WBCSD, a business-led think tank, CSR is understood as "the commitment of business to contribute to sustainable economic development, working with employees, their families, the local community and society at large to improve their quality of life." The WBCSD thus explicitly emphasizes the

ethical duty of companies to contribute to social progress as a consequence of the interdependency between business and society (WBCSD, 2005).

Another authoritative definition of CSR has been suggested by the European Commission. According to the Commission's "Communication on Corporate Social Responsibility: A business contribution to sustainable development" CSR mandates "going beyond compliance and investing more in human capital, the environment and relations with stakeholders" (Loew, Ankele, Braun, & Clausen, 2004).

As reflected by these rather normative statements and public policy perspectives, the academic discourse on CSR has evolved around similar issues. Of key interest are the different levels of corporate responsibility, ranging from legal obligations to ethical and philanthropic commitments (Carroll, 1991), the relationship between CSR and corporate sustainability (Hart, 1995) and CSR as a business strategy (Rowe, 2006). Central concepts discussed include the questions, to what extent CSR reflects those aspects of business contribution that go beyond what is mandated by law (Bendell et al., 2005) and the different manifestations of CSR in terms of more explicit or rather implicit behavior of firms (Matten, Crane, & Moon, 2008). Particularly, when discussing the impact of CSR, a number of critical points have been raised, ranging from claims that it merely includes philanthropic efforts and that impacts are limited and often targeted at improving firms' reputation rather than making an actual contribution to the solution of societal problems (Bendell, 2005). In cases where CSR practices are not accountable to societal control they are even deemed to be harmful to sustainable development (Utting, 2005).

In this context, the concept of corporate citizenship, which is closely related to the notion of CSR should also be mentioned briefly. The two terms are in many cases used interchangeably. Still, the term corporate citizenship gains in relevance in the discourse on the role of business in developing countries, which renders it relevant and interesting in the context of this thesis.

The rights-based approach to corporate citizenship (Wettstein, 2005) argues that it is the duty of business as a member of society, i.e. as a corporate citizen, to not only conduct business responsibly and strive for legitimate profits but rather to take on a political role as well.

This engagement is however not to be confused with lobbying in defense of the conventional business interests to institutionalize or legitimize corporate malpractice, nor with voluntaristic and community-oriented programs provided on an ad-hoc basis. Rather the rights-based approach makes the claim that corporations in acknowledging that rights' violations for some parts of society are inherent to market mechanisms will opt for political advocacy in order to effect the transformation of these mechanisms, in which they are operating (Matten et al., 2005; Wettstein, 2005).

This interpretation of corporate citizenship is particularly interesting with regards to the role of business in fostering sustainable development, as it discusses firms as actors, which are in a position to shape and reshape the overall set-up of structures and mechanisms at a broader societal claim.

This rather far-reaching interpretation of corporate citizenship is however also finding reflection in the current international academic discourse. McIntosh (2007) notes that firms are assigned the same rights, duties and responsibilities as 'normal citizens', thus emphasizing that CSR activities are increasingly taking place in traditionally 'political' arenas. Being a 'good citizen requires' a company to understand all dimensions of its political situation including the responsible use of power and influence. Mirvis and Googins (2009) illustrate this new relationship between business and society, that prompts business to re-shape their strategies, as assessing the needs of society and using them as a basis for determining the contribution that can be made by business to address these.

Examples for initiatives and codes seeking to promote CSR or corporate citizenship are standardization schemes looking to assure environmental management, such as for example ISO 14001. The ISO guidelines have found broad application and have proven to be an important tool in fostering voluntary compliance with environmental standards (Baskin, 2006; Delmas, 2003; Potoski & Prakash, 2005). Other important international efforts with regards to corporate responsibility include the United Nations Global Compact,[22] and also the Global Reporting Initiative (GRI), which is designed to make available transparent information about the environmental and social performance of globally operating enterprises. Concerning the performance of transnational enterprises, the OECD has established a set of guidelines, a government-backed, though non-binding code of conduct for international business in such areas as labor, environment, consumer protection and the fight against corruption[23].

The role of business in **water resources management** has gained increased attention lately, with specific initiatives and reports emerging in the past couple of years. Such initiatives have as a common starting point the perceived risks to business deriving from water scarcity in the wake of climate change (BSR & PacInst, 2007), but also address the issue of a wider responsibility of business towards addressing emerging water issues in the areas where they operate. Major initiatives in this regard include the CEO Water Mandate under the auspices of the United Nations Global Compact (United Nations Global Compact & Swedish Ministry of Foreign Affairs, 2007), the Partnering for Water Initiative of the World Economic Forum (World Economic Forum, 2008), the Water Project of the World Business Council for Sustainable Development (WBCSD, 2006), as well as a number of emerging initiatives, such as the Water Footprint Network (Gerbens-Leenes et al., 2007).

The Partnering for Water Initiative of the WEF focuses on brokering platform processes, bringing together corporates, national and municipal government as well as financiers in order to facilitate the realization of large scale water infrastructure projects, which are designed as win-win situations, granting water access for industrial operations and ensuring improved water supply to communities. First projects have been set-up at several sites in South Africa and India (World Economic Forum, 2008). The WBCSD has focused on a more strategic approach aiming to determine the many roles business can play in the 'world of water'.[24]

The CEO Water Mandate goes back to a collaborative partnership of the UNGC and committed companies, most of them affected by water-related problems. It recognizes the importance of the corporate role in addressing water challenges and is structured around six key areas for corporate activities pertaining to direct operations, supply chain and watershed management, collective action, public policy, community engagement and transparency. The Water Mandate like the UNGC is a

[22] The Compact was launched about ten years ago and has developed into the major voluntary international initiative directed at initiating and supporting responsible behaviour of corporation in the areas of environmental protection, social aspects, human rights and anti-corruption. While the Global Compact principles are by no means binding, the Compact maintains a range of programs and initiatives and makes use of local and regional networks across the world in order to advocate the goals of the compact through information and experience sharing as well as peer pressure. The Global Compact has also launched 'Principles for Sustainable Investment' designed to introduce the principles to investment decisions.

[23] The Guidelines establish voluntary principles and standards which are consistent with applicable law and apply to the global operations of multinational enterprises based in so-called adhering countries. These governments are committed to promoting the guidelines and their observance among multinational enterprises that operate in or from their territories.

[24] One of the products of these efforts is the so called Water Tool, which is aimed at supporting companies and other stakeholders in mapping water-related risks and opportunities in operations as well as the extended supply chain. It is available at www.wbcsd.org/web/watertool.htm.

voluntary initiative, which intends to provide a platform for corporate engagement (United Nations Global Compact et al., 2007).
The initiatives presented aim to re-define and shape corporate behavior vis-à-vis water management. While the WEF Initiative has a strong orientation towards implementation of concrete projects, the Water Mandate as well as the WBCSD Water Project provide for a forum to open up the discussion on past experiences as well as possible future solutions.

These international codes and initiatives represent strong normative drivers (Di Maggio et al., 1983). They are usually endorsed by reputable organizations, such as the UN or the OECD and have further gained in legitimacy due to the endorsement by governments (Delmas, 2002), NGOs as well as peers. For this reason, adherence to these norms is usually perceived as a risk-mitigating strategy (Jänicke, 2007).

Mimetic Drivers and Industry Pressures

Following similar motivations, in reaction to the considerable risks, uncertainties and challenges inherent to sustainable development, firms often choose to imitate their successful peers. This is often the case with visible and well-designed initiatives of industry leaders (Bansal, 2005). Other research has shown that organizations are more likely to copy behavior by actors they are tied to through networks. Consequently industry associations play an important role in developing and promoting sector-wide codes of conduct (Kollman & Prakash, 2001). Companies generally have an interest in establishing a 'level playing field' and thus mitigating risk (Kolk & van Tulder, 2005; Kolk, van Tulder, & Welters, 2005).
With regards to water management, such pressure would include best practices established by a firm, which would then be adopted by others as well. Similarly, recommendations and guidelines issued by an industry association with regards to water management, would find broad application throughout an industry.

Competitive Drivers

Other than normative drivers, whether established by international organizations or through peer pressure, companies are driven by the behavior of their competitors in the respective market environment (Hoffman, 2000). Companies strive to excel in comparison to their peers and thus secure their own market share. There are ample examples for companies that aim to gain competitive advantages by integrating environmental or social issues in their strategic set-up. This competition can play out in many aspects and might be motivated by the following aspects (see e.g. (Barney, 1997; Conye, 1986; Porter & Linde, 1995; Porter, 1985; Porter & Kramer, 2002). Innovations and a lead position with regards to technological solutions for efficiency improvements in production processes as well as on product design will positively impact on production cost and eventually also revenue. Especially with regards to efficiency-gains and cost saving through more efficient water management competition is increasingly playing a role. Companies are increasingly wary of competitors, which might move ahead in terms of addressing water challenges through innovation (Pegram et al., 2009a).
Porter et al. (2006) close the conceptual loop by demonstrating that the observance of social and environmental context conditions crucially influences a company's ability to compete. As companies seek to increase their competitiveness, they engage in responsible behavior. The more they manage to observe and internalize factors in their competitive environment in relation to responsibility

demands, the more competitive they will be[25], i.e. the better they will be able to enter new markets and sustain or gain additional market share with consumers.

Consumers

Consumers constitute a considerable driver for sustainable business behavior as they influence a firm's competitive environment. It is widely understood that consumer trust due to a high brand value will lead to a stable customer base as well as higher willingness-to-pay. Smith (2008) maps the variety of consumer behavior in this regard. Accordingly, consumer boycotts constitute a very strong factor. On the other hand, ethical consumerism, i.e. the increasing demand for sustainable products, heightened attention to sustainable and or responsible behavior on the part of the companies has surged over the past ten years[26]. Social justice issues as well as considering the impacts over a product's entire life-cycle are gaining in significance as well. With regards to the water issues, consumers have reacted to some extent, especially in the case of well-known visible brands. However, the concept of the water footprint, has not gained broad visibility yet (Hoekstra et al., 2002). On the other hand, Khanna and Anton (2002a) were able to show however that the effect of 'consumer' pressure is significantly lower in cases where a company sold intermediary products, which were not directly subject to the critical selection of retail-consumers.

Investors

Investors and financiers are important determinants of a firm's competitive environment. Access to finances directly affect the resource base and thus the company's ability to react and adapt (see above) (King & Lenox, 2001). Financiers increasingly make use of internationally accepted norms in order to decide on potential investments. Insurance companies are employing due diligence mechanisms and make use of environmental criteria in order to minimize the risk in their underwriting practices. Along the same rationale, banks have been using screening criteria to better control their investment risks in relation to environmental as well as social liabilities (McNulty, 2006). In addition, shareholders and the investment community have pushed the agenda towards more responsible investment in the last 15 years.

This is nowadays manifested by a large number of investment funds using environmental as well as social screening criteria for their investment, tools such as the Global Reporting Initiative (GRI), rating agencies with a sustainability focus as well as the PRI Initiative of the Global Compact (UNGC, 2008). These initiatives are also catering to the increasing attention to sustainability issues at the most important stock exchanges, such as the FTSE For Good index (London Stock Exchange) as well as the Dow Jones Sustainability Index (New York Stock Exchange).

There is also an increased attention of the financial sector and the respective rating agencies for the business potential inherent to water-efficient technologies as well as an increased sensitivity toward responsible behavior with regards to water resources, which is often dubbed as the 'new carbon' (Jensen & Namazie, 2007; Wild, Franche, Menzli, & Schön, 2007).

Social Drivers

Social drivers comprise all constituents in the social environment of a company, most prominently NGOs, but also community-based organizations, the media as well as trade unions. They are in a

[25] Other motivations might be the access to capital on local and financial markets, the anticipation and correct interpretation of regulations before competitors.

[26] This has taken shape as the LOHAS (Lifestyle of Health and Sustainability) movement or green consumerism.

position to mobilize public controversy, but also to change the overall perception of the role of corporates with regards to environmental or social issues. Hoffman and Ventresca (1999) speak of cultural conventions and social norms regarding acceptable corporate behavior, articulated and carried forward by these civil society actors.

National and international NGOs play a crucial role in shaping corporate behavior by taking up issues and bringing them to the awareness of the firm as well as other actors. Typical forms of engagement include civil regulation – spanning from more confrontational forms, such as boycotts and protests to the participation in cooperative processes (formulation of corporate standards, codes and labels) to litigation against companies and in some cases the use of international legal instruments (Newell, 2001). This spectrum also represents the different types of NGOs, ranging from the more cooperative types, which are focusing on research and also seek collaborative arrangements with companies to more confrontational ones, resorting to protests and naming-and shaming campaigns. There a several examples of companies that have changed their practices due to NGO pressure (Baron, 2003).

Water has become key concern for many international and national NGOs, particularly in the context of the anti-privatization movement (FIAN International, 2004). The WWF has developed a strong profile in research and collaboration-based campaigns with regards to the role of business in the world of water (Orr et al., 2009).

Community-based organizations follow a somewhat similar, but still quite distinct logic. CBOs are much closer to the actual issue, which in many cases occurs at the local level. They also have a better stance in mobilizing support as they are more appealing to those directly affected, which are then more motivated to support the initiative. Given the long track of citizen protests against corporate malpractice with regards to environmental as well as social issues in both the developed world, but also increasingly in developing countries (Lund-Thomson, 2005), corporates have more and more embraced this issue and sought to better embrace and cooperate with neighboring communities. Bowen et al. (2008) point to the challenges inherent to 'engaging' with the communities, as there is only little evidence on effective engagement strategies. There might be considerable differences among communities in terms of their ability to exert pressures on corporate actors in their vicinity. Income, education levels as well as the share of minority population have proven to result in considerably limited clout vis-à-vis business (Arora & Carson, 1999; Lund-Thomson, 2005).

It is specifically locally organized CBOs that on the one hand act as custodians of local water resources and pay attention to increasing local vulnerability due to climate change-induced water shortages (O'Brien, Quinlan, & Ziervogel, 2009). On the other hand, community groups are most likely to become involved in issues around improving access to water supply and sanitation (Prasad, 2008).

Labor unions constitute a further interesting actor in this regard. While they are strictly bound by their original mandate, there have been recent cases, especially in developing countries, where their interests were congruent with those of more community or environment-oriented groups (Knigge, Kranz, & v.Bieberstein, 2004). In these instances trade unions align their activities of other activists, thus adding considerable leverage to the impact of these campaigns.

Hoffman (2000) also points to the **media** as crucial in not only aiding above mentioned actors to reach their goals, but also with regards to their potential in conducting advocacy on its own right and shaping the overall discourse about corporate responsibility towards social and environmental issues.

Bansal and Clelland (2004) mention media as a part of the institution-building process as they shape the norms of acceptable and legitimate sustainable development practices.
Negative reputation originating from stakeholder activity can severely impact on other aspects of business and thus compromise a company's license to operate. Good performance with regards to sustainability issues can garner a positive reputation and eventually influence the bottom line in a positive way as well (Epstein, 2008). Auld et al. (2008) describe a win-win situation where good performance leads to reputational benefits as well as increased trust by the NGO community. Fombrun et al. (2000) also conceptualized corporate citizenship as a way to control reputational risks.

B.5.3. **Government Drivers**

Government constitutes one of the strongest drivers influencing firms behavior with regards to sustainable development (Delmas et al., 2004a). In many cases, government role is associated with a strong coercive power through legislation. Fox, Ward and Howard (2002) however suggest a more differentiated model of the varying roles of government with regards to driving responsible corporate behavior.
They suggest a differentiation into four different roles, mandating, facilitating, partnering and endorsing, which are discussed in more detail in the following section.

Table 3: Government Roles in Fostering Corporate Responsibility (Fox et al., 2002)

Mandating	Command and control legislation	Regulations and inspectorates	Legal and fiscal penalties and rewards
Facilitating	Enabling legislation	Creating incentives	Capacity -building
	Funding support	Raising awareness	Stimulating markets
Partnering	Combining resources	Stakeholder engagement	Dialogue
Endorsing	Political support		Publicity and praise

The first category, *mandating*, consists mainly of ***regulatory drivers*** and thus comprises the vast 'toolbox' of regulation undertaken with regards to firms' impact on the environment and social issues, which classically comprises command-and-control regulation, criminal enforcement and fines (Bansal, 2005), forced disclosure of environmental and/or social performance, compliance programs, the use of pollution and also resource abstraction charges as well as emission permitting schemes (Hoffman, 2000). The relevance of legislation in driving responsible behavior and the issue of compliance have received much attention in business literature over the past decades (Kagan et al., 2003; Lampe, Ellis, & Drummond, 1991). Regulatory pressures formalize underlying norms and values and thus directly influence strategic decisions in terms of corporate sustainability at the management level (Barth, 2007).
Past research has addressed the interplay of various aspects of regulatory drivers, such as the relative strength and effectiveness of the respective regulatory approach (Barth et al., 2005). Regulation can systematically influence the incentive-structure for corporate sustainability as well as the type and mode of business activities in this regard. According to a framework developed in the context of the RARE project (Barth et al., 2005), it is possible to use the intensity of public policy

impacts and the incentive type as two dimensions of an analytical tool for public policy towards corporate sustainability.

In terms of low intensity or broader public policy measures, this relates to the underlying general legal framework in a country, for example the organization of industrial relations and company law. This framework determines how firms perceive their self-interest and thus corporate sustainability as an element of corporate strategy. In other words, the general legal and policy framework in a country will influence, whether, how and to what degree firms engage in corporate sustainability, without making a direct reference to this aspect.

The second low-intensity impact of public policies on corporate sustainability derives from the regulation pertaining to 'sustainability issues', such as labor rights, welfare systems, anti-corruption measures and environmental protection. Firms are mandated to adhere to this framework, but do not consider it as a strong strategic impulse (Matten & Moon 2004).

Next to these broader public policy measures governments engage in targeted or 'high-intensity' activities described above, which are directly addressing corporate behavior with view to sustainable development.

The water policy field is a good example for illustrating these different regulatory aspects. In the first instance governments regulate how water resources ought to be protected and managed, how water resources should be allocated and how the access to water resources should be assured. The government also regulates how other natural resources, which are related to water, such as land and air, are managed. This is setting the scene for government interaction with regards to water, which is specifically targeting corporate activities. This includes the regulation of the emission of pollutants into water bodies, water abstraction for production purposes, other impacts on water resources as well as the linkages of corporate and municipal water systems. The latter task is often performed by government at the local level. In addition government regulates other issues that relate to corporate strategies but do not directly pertain to the management of water. With regulation on water use and waste water disposal becoming more stringent, especially in regions affected by increasing water scarcity, more pressure is exerted on business from governments through the issuing of water permits, user fees, water pricing schemes etc. The related penalties, expansion restrictions and higher transaction costs might thus not only pose a considerable potential liability but also financial risk for business (Skidmore et al., 2008).

Facilitating, partnering and endorsing are measures with a less compulsory character. At the same time however, they can be turned into coercive measures, once taken up by the regulatory system.

Facilitation through government can take on many different varieties, mostly through providing positive incentives intends to direct firms towards more sustainable behavior. Potential activities include for example tax incentives that reward responsible behavior, the formulation of voluntary codes of conduct. Other measures involve awareness-raising to create a better understanding for sustainability issues among corporate actors as well as capacity-building to foster necessary skills to adapt corporate strategies for the consideration of sustainability issues.

The framework also suggests the creation of favorable market conditions for sustainable products. Applied to the field of water, facilitation would involve highlighting and raising awareness for the importance of the water issue with corporate actors, engagement on key skills with regards to water efficient modes of production, risk management or other responsibilities with regards to water as

well as the establishment of water-saving codes and initiatives or alternatively the strengthening of the water component in other commitments.

Endorsement relies on mechanisms that seek to commend the behavior of some actors over the performance of others and thus to entice the peer pressure mechanisms or processes of mimicry. Commendable tools in this regard are for example public praise of those companies performing exceptionally well through creating positive public attention, corporate awards and other tools affecting corporate reputation. More formalized approaches are benchmarking systems, conducted in some industry sectors and also labeling programs that highlight positive product properties.

The third mode and most interactive way of crafting soft incentives for corporate sustainability is *partnering*. The participation in partnerships can provide incentives for and shape existing individual corporate contributions to sustainable development. Not only do they provide a platform for mutual learning and dialogue (i.e. in the context of multi-stakeholder-dialogues), but can also be purpose-driven towards the provision of public goods and services (Hamann, Pienaar, Boulogne, & Kranz, 2009b). Governments can either act as convener of such networks and partnerships or – deliberately or not – resort to the role as participant in cases, where business adopt partnering as a strategic option (see sectionB.5.4) (Fox et al., 2002; Williams et al., 2004).

In assessing the type of incentive of the public policy measures, there is a clear difference between positive and negative incentives. Positive incentives comprise the rather soft modes of partnering, facilitating and endorsing, negative incentives would be those involving regulation. While soft modes are by far more popular with the corporate world than those involving sanctions, they provide for no or little guarantee for state actors that the intended effect will actually be realized, as they leave more room for individual discretion at the company level and have no clear enforcement mechanisms (Barth et al., 2005).

At the same time, it needs to be acknowledged that strict regulation might not leave room for beyond compliance behavior, thus not leading to the desired results, i.e. a strategic decision at the corporate level for sustainable engagement. Rivera et al. (2009) apply Oliver's categories of business responses to public policy processes (Oliver, 1991) with regards to protective processes, i.e. environmental and social policies. They identify a curvilinear relationship, ranging from resistance to cooperation and beyond compliance behavior within the different stages of the policy process, initiation, selection and implementation. They also point to the moderating effect of country characteristics in terms of driving business behavior.

Particularly if capacity to regulate or implement regulation is weak, mandating might not be the most optimal approach. For this reason, effective policies include both elements, those applying pressure from the outside and those addressing the inherent self-interest of firms to contribute to sustainable development (Kagan et al., 2003). The challenge is constituted by finding the right balance of factors, which are supporting each other and thus lead to the desired results (Khanna & Anton, 2002b). According to research results on companies operating in OECD countries, there appears to be the need of a shadow of the regulator, which is present in the form of frequent inspections and compliance initiatives, in order to advance self-policing (Short et al., 2008), while too strict regulation stifles 'beyond compliance behavior.

The right balance is then again dependent on a number of factors, including the overall regulatory framework with regards to sustainability challenges, but also the overall operating environment for

business, the type of business addressed (industry sector, company sizes, etc.) as well as the intensity of involvement of other societal actors (Midttun, 2005).
Bansal (2005) furthermore points to the aspect of time. This has already been discussed with regards to the dependent variable, in terms of long-term impacts. However, time also plays a role in terms of the variation of drivers over time. While mandating might be decisive in initial stages, with a changing perception of sustainability issues at the firm level, other drivers, such as influencing or being influenced by peers, reputational gains through product innovations might become more important.
From the discussion of the type and dynamics of possible drivers for responsible business behavior it can be derived that individual drivers do not exert their influence independent from other drivers, but rather are inter-linked and inter-connected, influencing each other. Some of the interactions are discussed in the following section.

B.5.4. **Interactions**

In addition to interactions between different roles of government, one could also conceptualize a potential relationship between government roles and other business drivers introduced before. Government can exert a direct impact on business or activate and enhance other drivers.

In *mandating*, governments can for example refer to international norms and standards as well as national industry norms in their regulation and thus enhance the impact of their own regulatory initiatives as well as the effectiveness of internationally established norms. A prominent example is the use of ISO 14001 guidelines as a compulsory element of government regulation or as a tool to monitor and assess corporate performance in this regard (Delmas, 2002).
In *facilitating*, government actors emphasize other drivers by enabling their implementation or increasing their effectiveness. This could include the stimulation of market forces, by promoting sustainable consumption patterns, but also raising-awareness through highlighting the role of social actors or building capacity and offering training on sustainability issues. An important aspect of facilitation, when it comes to resource protection is the creation of incentives for sustainable use, such as tax incentives for water saving. Instead of directly regulating pollution or water abstraction, government makes use of price signals and thus competitive drivers in order to steer corporate behavior.
Endorsement is used in order boost a number of drivers that are already existent through symbolic emphasis. Other than in mandating, government does not prescribe certain behavior, but rather gives awards to companies adhering to certain codes, thus offering political support for corporate strategies. Endorsing very much conveys the shadow of hierarchy. Government does not directly mandate certain corporate behavior, but rather conveys its preferences through endorsements.
And finally in *partnering*, government actors offer their own resources to support industry initiatives, but also initiatives by other actors, such as NGOs in order to promote sustainable and responsible behavior. In addition, it offers space for other actors to become involved in the discourse on sustainable corporate behavior.

Table 4: Possible Relations between Government Roles and Business Drivers[27]

	Normative Drivers	Industry Pressure	Competitive Drivers	Social Drivers	Resource drivers	Internal Factors
Mandating	●	●	●			
Facilitating			●	●	●	●
Endorsing	●	●		●		●
Partnering		●		●		

From this brief review it becomes quite evident that designing and implementing regulatory regimes to drive sustainable business behavior requires a range of capabilities and activities on the part of government. Turning to the problematique in weak states, the question emerges as to whether such states are actually capable of performing accordingly, especially since well-established, presumably well-functioning states in the OECD world also struggle with these challenges (Midttun, 2005).

This brings the attention to the relevance of the overall *governance context* as a potential driver. While the shadow of hierarchy exerts pressure on business actors, which might either lead to resistance or the desired behavior (Rivera et al., 2009), the opposite, i.e. the lack of such strong context is described as a shadow of anarchy (Börzel, 2010; Mayntz, 1995). In case government is not in a position to deliver services at an appropriate level (e.g. water services) or to implement (water-relevant) legislation, business as well as other societal actors might be prompted to step forward and fill this 'governance gap'. The specific motivation is derived from any of the other drivers discussed. Equally, the governance context might prove to be unfavorable, thus preventing investments of any kind (Madsen, 2009).
Consequently, government capacity features prominently as an important factor to consider; the following section discusses the concept of government capacity as an input variable influencing government performance.

Being able to predict and assess the behavior of government constitutes an important aspect of firms' risk management strategies. As Loorbach et al. (2009) argue, only if uncertainties inherent to government behavior can be sufficiently controlled, it will be possible to achieve sustainable business success. From the perspective of government, there is also an interest to reduce uncertainties with regards to its approach, as this is likely to increase compliance with binding rules and regulations (Levi & Stoker, 2000).

B.5.5. **Government Capacity**

In discussing government capacity necessary for fostering corporate sustainability, it is thus important to consider two aspects. In the first place, I ask about the capacity necessary to engage in different types of interactions with business as well as the ability to combine different roles and to switch from one mode of engagement to another one if necessary.
In a more general context however, one needs to consider the capacity of government to formulate any policy and undertake the necessary steps to implement those. In a way, the roles played by government vis-à-vis businesses form part of overall government performance, which among others

[27] These depict only some of the possible interlinkages, in addition mandating can obviously take place with regards to many of the other drivers, which forms part of the low-intensity impacts discussed above. These linkages are omitted for better clarity.

denotes the implementation of public policies, as well as the ability to detect shortcomings in this regard and to effectively address those (Ingraham, Joyce, & Kneedler Donahue, 2003).
In this regard it is also relevant to conceive performance or the 'taking-on of specific role' as having an immediate dimension as well as a longer-term connotation, which is of relevance when discussing aspects of sustainable development.
In addition, this comment also points to a certain normative element when discussing government performance. Whatever performance is deemed 'effective' can only be determined when viewed against an established best case, such as – for example – the effective regulation and engagement of corporate actors with regards to water management impacts.

Concepts of Capacity

The term state capacity is discussed in several ways in the literature. Following a differentiation suggested by Honadle (1981), it is possible to treat state capacity as an output- as well as an input-related concept.
Output-related approaches conceive state capacity as "the ability of states to implement official goals, especially over the opposition of powerful social groups, or in the face of difficult economic conditions" (Jerre, 2004; Skocpol, 1990). Kjær, Hansen and Thomsen (2002) refer to the ability to formulate and implement and embark on mapping capacity enhancing mechanisms and capacity enabling factors. In focusing on capacity as 'the ability of policy-making authorities to pursue domestic adjustment strategies', Weiss (1998) develops the concept of 'transfomative capacity' and highlights the relationships between government and other actors in determining this type of capacity[28].

In the context of this thesis however, state capacity is used as an input-related approach. This, according to Börzel (2007a), "avoids the fallacy of circular reasoning to which many studies fall prey, when they equate state capacity with state performance". In explaining the roles of government for driving sustainable corporate behavior, state capacity is thus included an input factor determining the manifestation of government roles[29].
In approaching the different dimensions of the input-related understanding of state capacity (Börzel, 2009), resources, whether pertaining to legal authority, financial or human capital[30], feature prominently as an important component (Schwartz, 2003). Financial resources allow for purchasing technical equipment and infrastructure, the acquisition of knowledge and also the development of human capital. The latter is crucial with regards to implementation and realization; well-developed

[28] Jänicke (1997) also discusses capacity as an output-related concept as the ability of the state and other societal actors to recognize and effectively tackle environmental problems. The strength of state and non-state actors as well as the 'cognitive-informational, political-institutional and economic-technological conditions' are established as key determinants of this ability. Large-n studies by Jacobs and Volkery (2005) highlight the relevance of effective management as an element of the capacity for problem-solving and innovative environmental policy. Furthermore, the urgency of the problem to be addressed needs to be considered as an important factor. The ability to grasp these pressing environmental issues, the economic context, and availability of technological approaches are highlighted additionally important factors.

[29] Albeit capacity is treated as an input-related concept, environmental contingencies should briefly be mentioned, especially with regards to economic, political and cultural factors. Following an institutional approach, La Porta et al. (1999) suggest these three categories as determinants of government performance or capacity. They refer to North (1981) in saying that government capacity will increase with an expansion of economic activities. Political drivers determine government performance in that they reflect the preferences of those in power; i.e. pointing to the phenomenon of 'politics' and the will to implement (or the lack thereof) in analyzing government effectiveness (Olson, 1993). The factors trust, tolerance and ethics as well as other components of society emerge as important elements of cultural approaches to explain government capacity (Putnam, 1993).

[30] Military resources, albeit mentioned in the literature are not considered in this thesis.

human resources are also instrumental in terms of leveraging and applying legal provisions and undertake compliance monitoring (Börzel, 2003).
In this context Börzel (2009) also discusses the necessary efficiency in mobilizing, coordinating and channeling resources to the respective purpose, e.g. to make use of resources and translate them into public services, as an important integrative task, constituting state capacity.

Ingraham et al. (2003) provide for a more detailed view on this concept by discussing the effective management of available resources: financial, capital, human resources and information management. According to Rosenbloom (1989) financial management comprises those activities related to the allocation of money for public purposes according to strategic directives, capital management is more directed at the planning for and maintenance of long-lived resources; an area of particular importance at the local level with regards to the maintenance of water infrastructure. Human resources management on the other hand relates to the recruitment, retaining, motivation and training of public employees in order to create and maintain the technical and managerial skill level needed to perform governmental tasks in a consistent and sustainable manner (Ingraham et al., 2003). In addition to managing the relationship between political leadership and administration, providing for continuity of civil service is one of the key challenges in public sector human resources management. In terms of cross-cutting attributes of management effectiveness, leadership is considered an important factor. According to Ingraham et al. (2003) leaders are instrumental in setting priorities and also in providing for the coherence of the administrative framework by supporting the development of a vision, which provides a framing for the organization's mission[31].

In his work on governance for sustainable development at the local level in emerging economies, Cloete (1999, 2002) discusses capacity in relation to the task of service delivery. In this respect, capacity not only refers to the internal ability of government to manage the delivery, but also to grant affordable and sustainable access to other actual or potential service providers (i.e. other actors) for this purpose. Furthermore, this activity cannot be understood as a once-off, but needs to be conceived as a long-term and robust activity. He introduces components constituting local government capacity, which reflect the items introduced above.

- availability of sufficient resources as well as the optimally coordinated use of these resources, which might be provided by the public and private sectors of society,
- effective strategic and operational management,
- commitment and honest and skilled leadership and direction.

In addition to resources and their effective distribution and allocation, a second determinant of state capacity revolves around the characteristics and behavior of veto players and how the state is capacitated to deal with these actors. Too many critical veto players might compromise the autonomy of the state to implement policies (Evans, 1995; Olson, 1982; Tsebelis, 2002). In contesting

[31] As further indicators, the authors list communicative, coordinative and decision-making skills as manifested by formal structures and procedural effects as well as by attitudes, beliefs and values of public employees. An important task for leaders is the integration of different management functions, which can be accomplished through the appropriate allocation of information and budgets. Continued monitoring and control and a clear orientation towards results is an important component of management effectiveness. There is an immense variety of literature on the development and use of performance indicators and measures in different government contexts (Poister & Streib, 1999).

this approach, alternative explanations argue that high state capacity would comprise the ability to integrate those affected in order to increase compliance (Lijphart, 1999).
Thus, capacity can actually be understood as the ability to act as embedded, enabling or engaging state (Börzel, 2007b). Particularly, the concept of the enabling state emphasizes to ability to create platforms for deliberative processes (Zürn, 1998). Accordingly, the state builds these spaces to facilitate the exchange of information, the creation of mutual trust among different actor groups, while also constituting an integral part of these spaces itself. Through building these networks with societal stakeholders, the state manages to gain access to resources and information provided by other actor groups, which then assists in the implementation of policies (Scharpf, 1993). In this context, Scharpf (1997) argues 'that hierarchical coordination is increasingly replaced by negotiations in the shadow of the state'.
The capacity to create deliberative spaces also features elements of effective management in terms of convening, facilitation and leadership skills. Cohen and Eimcke (1995) particularly stress the importance of building and maintaining effective systems for gathering, organizing and using pertinent information as basis for impartial deliberative processes. Börzel (2007b) furthermore argues that 'enabling capacities' might also be supportive of resource- and autonomy-related capacities. This is also supported by Migdal (1988), who establishes that strong states have the capacity to engage with 'society', while weak states have a reduced capacity to perform this task.

Schwartz (2003) for the context of environmental policies in emerging economies also describes this integrative or engaging behavior of the state as 'reach and response' – the degree to which the state is successful in extending its ideology, socio-political structures and administrative apparatus to all levels of society and how this results in a response on the part of the state, but also other actors to pressing (environmental) issues.
In the context of sustainable development, this can be interpreted as the ability to promote sustainable growth paradigms among all kinds of societal actors. Furthermore, this would involve the co-ordination of different approaches and strategies emerging in this regard. The state takes on the role as a mediator, which creates opportunities for contribution to sustainable development, but also facilitates the process of information exchange and knowledge sharing through the creation of spaces for networks. Based on the capabilities vested in the state, government engages in specific behavior with regards to a certain policy issue. On a more general level, one could argue that the state is providing the correct framework for other actors, ensure the embeddedness of different policy options, provide for legitimacy and support. Kemp et al. (2005) also describe government as a facilitator of change.

When considering the input-related concept of state capacity with view to sustainable development, the management of water services or more specifically the interaction with corporate actors, the following components emerge as relevant.

- the existence of a clear national vision and operational strategy on sustainable development[32], sustainable water management and related policy fields, founded on a democratic process,

[32] While corporate motivations are often described as short-termed, this doubt is only seldom raised with regards to the state.

- the state's willingness to actually pursue sustainable trajectories and implement respective policies in this regard,
- the allocation of sufficient resources to support the implementation of this vision,
- the distribution of resources and management capacity across all levels of government, from national to local,
- enabling and engaging other societal stakeholders, thus facilitating their contribution to sustainable development,
- assuring the managerial as well as institutional sustainability in order to support the long-term characteristics of sustainable development.

In many countries of the developing world some or all of these components are not existent, not well developed or badly managed as illustrated by Migdal (1988). While the author derives this assessment with view to the general roles of the state: penetrating society, regulating social relationships and extracting and appropriating resources, these weaknesses also apply more specifically for the challenge of sustainable development, as the above-mentioned requirements are more pronounced in this regard. Similarly, water resources management often constitutes a particularly vulnerable area of weakness due to the crucial role of the state in managing and appropriating the resource (Tropp, 2007). An empirical indication of this weakness is provided by the Yale Environmental Performance Index, which displays the overall weak performance of sub-Saharan countries in water resources management (Emerson et al., 2010).
McLennan (2004) relates this lacking performance with regards to sustainable development also to deficits in social capital (Putnam, 1993)[33] in many African countries, particularly at the local level. Thus, in addition to building inclusive and accountable local administration with the capacity to engage stakeholders, capacity and willingness also needs to be available with non-governmental actors, such as businesses as well as other societal stakeholders (Börzel, 2010).
Sustainable development emerges from the dialectic interaction between government and other actor groups. This study aims to identify drivers and also stumbling stones in this relationship as they occur in weak state contexts.

B.6. Independent Variables in the non-OECD Context

Against the background of capacity constraints pointed out above it is useful to reconsider the independent variables discussed so far for the OECD context. Where conditions of limited statehood and constrained state capacity prevail, these independent variables often take on a different relevance and interpretation than in the OECD context. Visser (2008) has proposed a validity check of these drivers and highlighted some of these differences.
What also needs to be re-emphasized is the different perception of business actors in the non-OECD context. Visser, Middleton and McIntosh (2005) point to the ambiguous record of business in many African countries, mentioning political corruption, environmental degradation, and social distortion as most visible negative impacts. This is supported by continued wide-spread pessimism as to the

[33] Social capital is defined as ‚feature of social organization, such as trust, norms, and networks, that can improve the efficiency of society by facilitating coordinated actions' (Putnam, 1993).

role corporations, whether small or large, national or multi-national, play in this regard with the 'race to the bottom' claim still looming large and that rightly so in some instances (Orock, 2006). Business in these situations is often dominated by short-termed considerations and decisions (Clapp, 2002; Wheeler, 2001), which are in many aspects contradictive to any sustainable growth paradigm, especially with regards to water management in a developing country context.
But there is also mentioning of positive contributions of business that have taken place as well as the great need for corporate contributions to addressing severe development challenges, while also acknowledging the specific challenges posed to the business community in this respect. As a consequence, motivational patterns for business to engage in corporate sustainability and responsibility are different from those encountered in the OECD world (Visser, 2006).
Notably, environmental protection according to Hayes (2006) receives a relatively low priority in the discourse on corporate responsibility in Africa. This can be related to the more immediate necessity to address other pressing development issues. However, especially the issue of water management is a prime example for the interconnectedness of environmental protection and other development challenges and thus might be suitable to open up discussions towards a more inclusive approach.

The following section provides for a preliminary overview of the potential variation of motivational drivers for sustainable business behavior in the non-OECD context. A more in-depth analysis of the manifestations of the drivers will then be performed in the context of the case studies.

There are many cases where the limited capacities of governments to deliver services or implement certain legislation, prompt a corporate contribution to bridging these '**governance gaps**'. Whether through delegation by government or following its own initiative, business thus in some cases takes over functions normally or formerly provided by the state (Moon et al., 2005). Examples here are the provision of medical care, or other services, such as electricity and water provision.
Other '**political drivers**' (Visser, 2008) exist, where companies become engaged with political reforms in countries where they operate, such as affirmative action in the case of South Africa, public health programs or sustainable development strategies[34]. Such activities are mostly motivated by an interest to contribute to a secure and stable production environment (Jacob et al., 2006).
Graham & Woods (2006) furthermore discuss compliance mechanisms in developing countries under conditions of weak regulatory capacity. They observe that **self-regulation** might occur in cases, where particularly multi-national companies adhere to **internationally promoted codes of conducts**, which are then taken up and monitored by government to the degree possible given limited government capacities. It is even argued that such codes are particularly relevant where state regulation is weak or absent, as transnational companies tend to follow the same approach across their operations (Epstein & Roy, 2007) and thus have a motivation to promote those standards wherever they operate.
In terms of the reception of international norms, concepts such as corporate citizenship and CSR, have found entry to discussions about firm behavior in developing countries and emerging economies (Frynas, 2006) and there seem to be mentionable successes in the adoption of CSR standards and practices among companies operating in these countries (Baskin, 2006; Hanks, Hamann, & Sayers, 2007).

[34] On the other side of the spectrum, in times of political crises or when operating in zones of conflict, companies are often faced with the need to respond proactively or withdraw from the country (Ballentine & Nitzschke, 2004).

Despite the race to the bottom concept, economic globalization is thus often identified as one of the key drivers of the proliferation of corporate responsibility, with those companies hoping to establish themselves or maintain their position on global markets and reaping reputational gains. Consequently '**resource drivers**', pertaining to the financial viability, are modified as transnational companies are listed at Western stock exchanges and thus are more receptive to the surge of socially responsible investing with a development focus. **Competitive drivers** might be equally determined by the exposure to global markets due to higher product and production standards in target markets (Börzel, Héritier, Kranz, & Thauer, 2010).

In addition, customer structures at domestic markets, e.g. new markets at the 'bottom of the pyramid' might lead to a reorientation of business behavior (London & Hart, 2004). The latter aspect might be particularly relevant to those firms, which are not exposed to international codes, investments or markets.

As for **social drivers**, stakeholder groups usually have a different composition from those in OECD countries. In addition to local NGOs, also international NGOs tend to play an important supportive role. Generally though, NGOs tend to focus less on environmental issues, as social shortcomings are often more pressing. Accordingly, labor unions and also community-based organizations, and here specifically traditional authorities, are more relevant (Lund-Thomson, 2005). Eweje (2005) points to the growing demand brought forward by communities vis-à-vis multinationals operating in their area to assist in meeting locally defined social and economic goals. Thus, the issue of community liaison is of particular relevance in emerging and developing economies; it is particularly here, where corporate activities become 'political' in the sense of 'building local capacity' (Goddard, 2005) and 'filling in where government falls short' (Frynas, 2006). Hamann, Kapelus et al. (2005) describe the particular challenges that emerge in terms of business-government interaction in these contexts, especially when parallel governance structures exist.

Finally, it is argued that ethical behavior is often embedded in the **cultural settings** of a country or its traditions, which could facilitate the emergence of philanthropic corporate behavior and responsible corporate behavior (Blowfield & Frynas, 2005).

These are some possible modulations of the independent variable as derived from current literature. They contribute to the underlying assumptions of the model presented in the following section. A more refined impression of these drivers for the concrete context of the case studies chosen will be derived from the analyses undertaken on the basis of this model approach.

B.7. Preliminary Model

Drawing on the individual components presented in the previous chapters, which are based on the literature reviewed, a preliminary conceptual model for government - firm interaction in the context of the water challenge is proposed as depicted below.

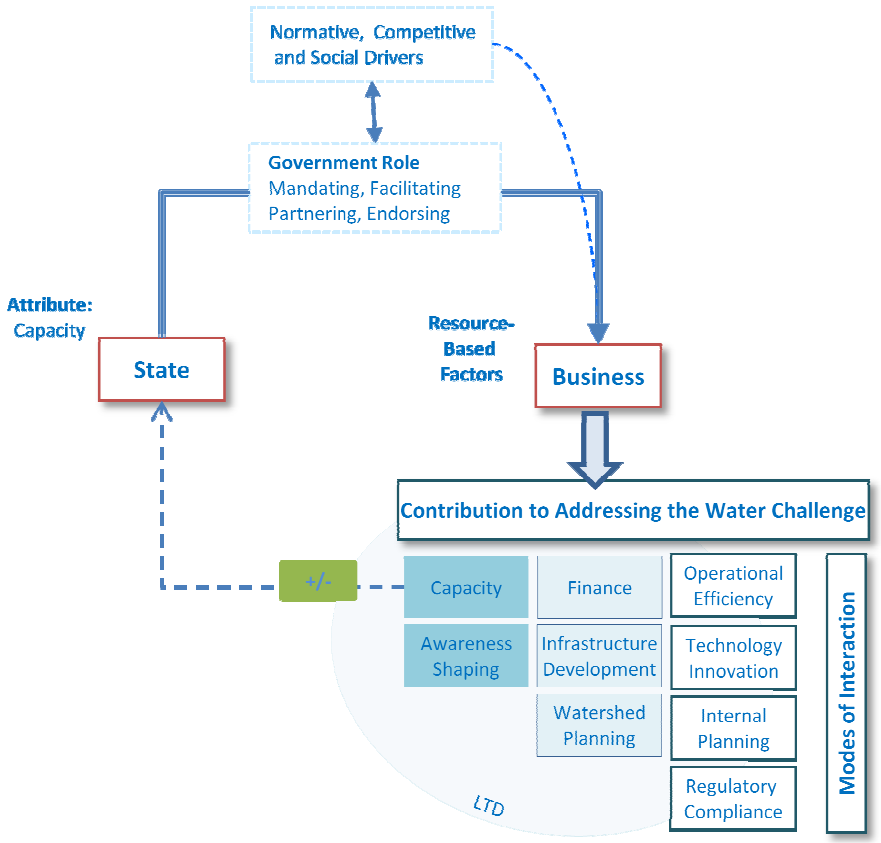

Figure 3: Preliminary Model

The model consists of the following elements. The focus is placed on potential contributions of business actors to addressing the water challenge and the underlying motivations and drivers, that lead to the respective activity.

Possible contributions are conceived to have several dimensions, reflecting the type of the contribution as well as the respective mode of interaction between business and other relevant actors in delivering the contribution. In addition, potential long-term dynamics with view to sustainable water management are taken into consideration (LTD). As part of long-term dynamics, the model depicts the governance feedback between firm contributions and government actors; this would be considered 'positive' in the case that business activities support capacity-building and learning among government as well as other actors, which would lead to higher effectiveness and performance with view to sustainable water management. The linkage would be considered negative in case that the feedback loop leads to state capture, i.e. the case where government as well as other actors are co-opted by business interests, which might turn out to be detrimental to government capacity.

Looking at drivers, the framework makes reference to firm-internal or resource-based variables as well as institutional factors. In terms of institutional factors, the model refers to the role of

government and the specific capacities vested in this actor as well as the role of other independent variables, such as normative, competitive and social drivers. The model proposes several ways of interaction between different driver categories. In the first place, institutional factors are investigated with view to their role as direct drivers for business behavior; secondly, the interaction between government and other institutional drivers as well as internal factors is subject to further analysis. The role of government might critically depend on the influence of other factors; while at the same time government activities might lead to an enhancement or weakening of the influence of other drivers.

The overall framework thus also suggests a somewhat circular interaction between government and business actors. Government actors, vested with certain capacities, take on certain roles in order to elicit certain behavior from corporate actors. This type of interaction takes place, first in a context determined by a variety of other drivers, which not only have a direct influence on corporate but interact with the policy tools employed by government, and second against the background of firm-internal factors. Some components of firm behavior elicited then potentially reflect back on government capacity to take on the respective roles.

While this preliminary framework provides a possible rendition of the phenomenon analyzed, it is still under-determined with regards to the actual manifestations of the aspects discussed above, the micro-level interactions between the different actors as well as the potential long-term dynamics with view to sustainable water management.

The conceptual model developed above guides the analysis conducted in the context of this thesis and is applied to the case examples in the South African mining industry and their respective water management challenges.

C. Research Design and Methodological Considerations

C.1. Approach

The purpose of the research conducted in this thesis to identify business contributions and drivers for business behavior with view to addressing water challenges in South Africa. In order to derive a robust model for investigating this question an empirically-grounded method is chosen, applying an approach followed by Bansal et al. (2000).

Selecting from the inductive methodologies that exist, namely grounded theory and analytical induction (Glaser & Strauss, 1967; Strauss & Corbin, 1994), the latter is most applicable to the research interest of this thesis. According to Manning (1982), analytic induction allows for the consideration of existing theories and involves an iterative back-and forth approach between literature and empirical data in order to refine existing theory.

This process is commenced with a review of the available literature, which leads to initial assumptions. In the second step, case study data is collected and further documentation investigated in order to challenge and enrich the initial assumptions. Subsequently assumptions are assessed, altered and validated anew against the data collected. This approach is warranted for the question addressed in the context of this thesis, as ample literature exists with regards to the separate segments of the framework, while the connection between these elements has not been established yet. In addition, theoretical concepts have not yet been applied to the specific empirical context of water management and emerging economies, which also recommends an inductive, empirically-grounded methodology (Glaser et al., 1967).

The analytical framework introduced above represents the initial assumption about the determining factors for business contributions and drivers with regards to the prevailing water challenges. This model is used to operationalize these factors. In a third step, case study data collected in the course of this study is utilized to verify and possibly alter the initial assumptions, thus leading to a more comprehensive and accurate picture of these interactions and relationships (Eisenhardt, 1989; George et al., 2005). Where applicable, the case study analyses employ process tracing elements, e.g. by detailing the emergence of certain governance arrangements and interactions between business and government over a longer period of time. According to George et al. (2005), process tracing allows for detecting intervening causal mechanisms between interdependent and dependent variables. In this regard the study employs different methods as well as different sources of data

C.1.1. **Key Research Questions and Operationalisation**

Based on the analytical framework a number of research questions can be identified representing different aspects of the model.
Starting with the role of business actors, the following considerations are relevant. Conceptually, the contribution of business actors to addressing the water challenges is considered as the dependent variable. Since there is variation of the independent variables, it is investigated whether and how this variance influences business behavior. In a first step the manifestations of the dependent variable are considered.

Dependent Variable

What and how do business actors contribute to addressing the water challenge?

For an operationalisation of the type of the contribution, I make reference to the typology of business contributions suggested in section B.4 and collect evidence for these contributions from the interviews conducted as well as other sources (see section C on sources).

Table 5: Evidence for Business Contributions

Contribution	**Indicative evidence**
Compliance	Absence or evidence of fines for violations of legal requirements Compliance records maintained by government or firms
Retroactive Responsibility for Impacts	Measure to address damages occurred due to corporate activities Acceptance of liabilities
Operational Efficiency	Company internal reporting on water efficiency and total quality management Records about the continual improvement of operational efficiency
Technological Innovations	Information about the development of technological innovations Collaboration with researchers on innovations and improvements
Monitoring and Planning	Reported monitoring activities conducted in collaboration with science and/or government Documented planning at the firm level Availability of plans for other users
Infrastructure Financing	Infrastructure projects, which also benefit neighboring communities Evidence for financial contribution to the development of municipal infrastructure Leveraging financial backing from financiers
Capacity	Transfer of know-how about technologies and processes to other stakeholders
Awareness and Shaping of the Policy Field	Dissemination of monitoring data Initiation of learning processes Awareness-raising and information campaigns Participation in government-led for a Issuing of best practice guidance

The relevance of the contribution is estimated based on the importance attributed to the contribution by the interview partners as well as the frequency the contribution was mentioned by most/some/none of the interviewees representing firms as well as other stakeholder groups. In

addition, secondary sources were consulted in order to provide for an assessment of the respective contribution. On this basis, the relative occurrence (number of firms engaging in the activity) and prevalence in each case study area was derived.

In addition, I map the type of interaction, by making use of the respective typology of interactions.

Individual	**Supply chain (Supply and demand management)**	**Collective (association, cluster)**	**Multi-stakeholder platforms**	**Bi-partite or tri-partite partnership**	**Capacity-building Lobbying**
	Hierarchical	Horizontal	Dialogue	Multi-lateral	Bilateral, unidirectional

Companies might choose to make their contribution on an ***individual level***, i.e. through activities and measures taken at the own production site, within the company structure. In a further step these could be extended along a firm's ***supply chain***, i.e. though working with firms and actors upstream or downstream the supply chain, the introduction of specific standards or best practice guidelines are typical in this context.
Other possible forms of interaction are ***collaborative structures*** between various business actors, such as business associations and clusters, which are joining forces in order to deliver a certain contribution together. Other variations are for example ***multi-stakeholder platforms*** involving additional stakeholders in developing and/or delivering the contribution. ***Partnership agreements*** between two or more different kinds of stakeholders have established more formalized structures, which are directed at the provision of a certain contribution. In terms of more unilateral relations between firms and government interact in the context of ***lobbying*** activities. Finally, ***capacity-building*** involves the transfer of certain knowledge from private actors to government representatives.

In addition to determining these two aspects, further questions emerge with regards to the following issues, which for the most part relate to the long-term dynamics of the contributions provided.
In the first place, I ask about the intensity of the contribution; i.e. to what extent is there actually a contribution to addressing the water challenge? While a quantification of this aspect is challenging, an approximation is undertaken by taking into account the relevance of the engagement as viewed by non-firms interviewees. Along the same lines, long-term impacts are taken into consideration, building on assessments and estimations provided by interview partners.
Focusing on two specific aspects in this regard, integration and governance feedback, evidence is furthermore collected which hint at the degree to which impacts on other environmental, social and economic factors as well as the needs of other actors are taken into consideration. Furthermore, the effect of business behavior on government actors, i.e. the 'governance feedback' is investigated. This question refers to the feedback loop between private actors and public actors. Indications are once again derived from evidence taken from interviews with government representatives as well as external observers.

Table 6: Evidence for Long-term Dynamics

Aspect	Indicative statements in interviews conducted (supportive and contesting statements)
Time (Uncertainty)	"we have a planning horizon of 20 years " "pumping will go on forever..." "the model will be self-sustaining and operate without the involvement of the mines" "we are working on models to transfer the operation of the water treatment plant to the municipality" "water supply options over a longer period of time remain uncertain" "the involvement of the mining firms with water management is difficult to assess" "long-term impacts of dam construction are rather unpredictable"
Integration, Consideration of impacts on other sectors, resources	"the impacts of the dam on biodiversity cannot be assessed at this moment" "infrastructure development will contribute to the overall development of the region" "striking a balance between the needs of the farming and the mining sectors is increasingly difficult" "the implications for the surrounding communities have not yet been assessed"
Governance Feedback	"capacity-building activities assist municipalities in building management capacity" "it is difficult to involve municipalities in decision-making due to limited capacity" "we intend to work with the municipalities in order to enable them to fulfill the necessary key functions" "overall stakeholders became more aware of the situation and actively contributed to the dialogue" "government official developed more confidence in interacting with the mining firms" "one could observe an increasing dependence on business-sponsored initiatives"

Independent Variable

When considering the independent variables of the above-mentioned relationship, this involves the range of possible business drivers adapted to the water context as proposed in section B.5. To reiterate, this list consists of drivers identified in literature, including external drivers, such as competition, norms and social aspects as well as firm-internal processes.

What drives business to make a contribution to addressing the water challenge?

What role does government play (at different governance level) in driving business' contribution towards addressing the water challenge?

An assessment of the intensity of the respective drivers is conducted based on the qualitative interviews and evaluations provided by the interviewees. Following the set-up of the analytical framework, the role and behavior of government is chosen as a central independent variable. Following the logic introduced above, the first government-related question denotes the actual role of government. The categories suggested by Fox et al. (2002) and discussed in section B.5.3 are used as a reference.

In looking at the effects of government activities, specific attention is placed on the interactions of these and other factors in driving business behavior as proposed in section B.5.4.

How do government-related drivers interact with other business drivers identified?

Through this question the link between effects of government activity and other drivers is established.

Table 7. Evidence for Independent Variables

Independent Variable (Driver)	Indicative statements in the interviews	Other evidence
Government	"we are driven by the requirements of the MPRDA" "the company strives to comply with the Water Act" "there is a problem with the water licensing process" "the department seeks to engage in a dialogue with the companies in the area"	Regular compliance mechanisms Monitoring visits
	" we recommend waste water treatment facilities as a best practice reference"	Best practice guidelines
	"it is difficult to work with local authorities" "we entered in a strong partnership with local government"	Indicators of local government capacity (see following section)
Normative Drivers	"we obtained ISO 14001 certification for all our production sites" "we report on our environmental and social performance according to the GRI guidelines"	Corporate reporting in reference to international initiatives
Industry Pressure	"the WEF brokering initiative raised awareness for the necessity to collaborate" "we have a strong interest that all firms in the mining industry adhere to the same standards"	Industry-wide standards, e.g. issued by the Chamber of mines
Competitive Drivers	"product marketability was one of the main incentives for us to become involve with water responsibility" "in developing sustainable water treatment the aspect of water pricing was decisive for us"	Marketing material
Social Drivers	"there is no strong NGO community in this area" "we are closely cooperating with the community on these issues" "we strive to contribute t overall development in the region where we operate"	Awareness raising campaign, public opinions
Resource-based factors Internal factors	"water is of key relevance for our production processes"	Relevance of water for key production processes; replaceability of water for production
	"the activity was guided by the individual engagement of Mr.-"	Organizational structures and communication channels
	"there is generally a strong awareness for sustainability issues with company X"	Company sustainability reports Tracing of learning processes
	"we are now addressing this issues in a different way"	
	"we consider this an investment in a future stable production environment"	Annual turnover and overall development of the respective commodity market

Determinants of Government Capacity

In addition, the underlying determinants of government behavior are investigated by looking at the issue of capacity as introduced in chapter B.5.5. To reiterate, this involves the availability of resources (financial, capital, human and knowledge resources) as well as management and engagement capacities.

Table 8: Evidence: Government Capacity

Capacity Element	Indicative evidence
Resources	Availability of financial resources, based on analysis provided by (Magketla, 2007) Human, capital, information and knowledge resources based on interview data
Management of Resources Planning Implementation	Ability to allocate resources Access to grants and financial management capacities Evidence of implementation, failing implementation of legislation
Engagement Capacity, Interaction with business	Testimony by business actors and other external interviewees

These questions and indicators are specifically addressed in the context of four distinct case studies, which will be described in more detail in the following section.

C.2. Case Study Selection

An important feature of the applied methodology is case study-based research. Eisenhardt (1989), in drawing on Glaser (1967) and Strauss, Miles and Huberman (1984) and also Yin (1984), emphasizes the relevance of case study-based research for a research strategy aiming at theory-building through a constant comparison of theory and data. Case study-based research focuses on understanding the dynamics present within single settings. Accordingly, approaches can comprise single or multiple cases and address multiple levels of analysis (Yin, 1984).

As introduced in chapter A, this study makes use of a small number of cases to allow for an in-depth description of the inherent dynamics, taking into account detailed case characteristics as well as context factors. George and Bennett (2005) point to four distinct advantages of case-oriented research design, including a high potential for the generation of hypotheses, the identification of causal mechanisms, a high degree of conceptual validity and a capacity to grasp causal complexities.

Theory-testing case studies, such as employed in this study require a combination of data collection methods including archives, interviews, questionnaires and observations. The respective sources used in the context of this thesis are outlined in more detail in the following section.

Based on these considerations, the universe of cases for this thesis is built as follows. In detailing the reasons for selecting case studies, first South Africa is introduced as the country background for all case studies; I then proceed to elicit the mining industry as the sector background. These are the common characteristics of all case studies, which are introduced in the third step, detailing the selection logics as well as the foundations for case comparison.

<u>Country Case South Africa</u>

All cases are set in South Africa, thus representing a constant country setting. With selecting South Africa as a country case study, the focus was placed on an emerging economy, which also displays typical sustainability challenges as discussed by Hart (1997).

- industrial emissions, contamination of (water) resources and insufficient treatment of effluents,
- overexploitation of renewable resources (overuse of water),
- urbanization,
- lack of skilled workers, inequality in terms of income as well as access to resources and services.

All these phenomena can be found in the South African context. While the detailed characteristics are described in most detail in chapter D, a brief overview is provided here.

Pollution of environmental resources is a major concern in South Africa. In the wake of the massive development of extractive as well as related industries over the last 150 years, pollution is particularly noticeable in heavily industrialized areas. The four case study areas investigated can be considered such pollution havens: the gold mining area in the Gauteng province, the coal fields in the Mpumalanga province as well as platinum mining region in the North West as well as Limpopo provinces. In addition to water contamination, scarcity of water resources constitutes an imminent problem in these regions.

From the social perspective, South Africa is quite different from other African countries in terms of the level of urbanization, a phenomenon which is often enhanced near mining operations, leading to an overly dynamic growth of urban settlements, in a formal as well as informal way. This growth creates further challenges as additional strain is placed on infrastructure for service delivery. A

serious backlog is currently emerging in this regard as there has been a lack of attention to the augmentation of existing infrastructure in the past. Both problem scenarios, pollution and service delivery problems, are closely related to a lack of capacity with those parts of government, responsible for managing resource use as well as infrastructure development.

Industry Sector Selection

As already indicated above, within South Africa, I have chosen four mining areas as core case studies. Following the argumentation of Eisenhardt (1989) that 'cases might be chosen to replicate previous cases or extend emergent theory', the mining industry offers several advantages in this regard.

From the perspective of challenges relating to sustainable development and specifically water management, the mining industry combines a variety of factors of relevance (Ashton, Love, Mahachi, & Dirks, 2001). Keeping the industry sector constant thus allows for controlling influences originating from these factors.

This is of importance when taking into consideration the inherent 'non-sustainability' of the mining sector. Mining operations are mainly temporal activities, which as Graulau (2008) states in her discussion of scholarly analyses of the mining sector, are considered to have mostly detrimental effects on environment, development and equality, mainly due to their export orientation as well as exploitative practices.

More recently however, the discourse is dominated by a more reconciliatory approach, which points to the role of mining as development drivers[35]. While this specific discourse is not the main focus of this thesis, it is however instrumental to consider the potential of the mining industry for providing some input, whether positive or negative, along the process towards sustainable development (Coetzee, 2008).

In terms of the impact on water resources, the mining industry features high impacts with regards to blue water footprint, i.e. water use in all processing steps as well as in terms of grey water impact, i.e. the of production of waste water or the pollution of natural watercourses (Morrison, 2009). At the same time, the mining industry, is very much dependent on massive infrastructure investments and thus also potentially plays a role with regards to municipal infrastructure development.

Thus following the approach of deliberate, theoretical sampling (Eisenhardt, 1989), the following case studies in the mining sector were identified. The selection of case study regions represents three distinct mining commodities in four mining regions in South Africa.

[35] According to Graulau (2008), this is for example manifested by Structural Adjustment Program Loans, the Washington Consensus, and the Extractive Industries Review.

Figure 4: Location of Case Study Areas in South Africa (adapted from UNESCO (2006))

Explaining the underlying motivations for the selection of case studies provides for an indication of the explanatory power of the applied research design. Especially when aiming for a 'controlled' comparison, case study selection is guided either by the similarity or difference with respect to the operational (independent and dependent) and context variables.

Mills' logics (1973 (1843)) resulted in the method of agreement and difference for deriving causal mechanisms through comparison. Most notably they have been taken up and applied empirically by Przeworski and Teune (1970). Two research designs, most-similar-systems and most-different-systems designs have emerged as ideal types for comparative inquiry.

Most-similar systems share a large number of independent variables and display variation of the dependent variable. Strong causal relations can be established between varying independent factor(s) and the resulting outcome (Gerring, 2007). Most-different systems on the other hand however display significant variation with regards to the context and independent variables, while the outcome is held constant.

These ideal cases are hardly ever found, especially when striving for a most-similar-systems set-up, rendering the endeavor of controlled comparison considerably demanding, especially in cases where of multi-causal relationships or equifinality.

Consequently, the approach followed in this study is thus borrowing from these concepts, while not meeting strict design requirements in their entirety.

While the overarching context variables, country and industry context, are held constant, there are considerable differences in terms of other variables, such as industry composition and commodity market dynamics. Also independent variables, such as stakeholder attention and the role of government differ significantly. Effectively, the case selection thus follows a 'most-different' systems design, aiming to identify those factors leading to the observed outcome in terms of firms' contribution to sustainable water management.

Case selection logics are owed to the overall explorative character of this thesis, aimed at identifying those contributions that might emerge as well as those factors that might have an influence on them.

The explanatory power of the factors identified is thus rather limited compared to a strong adherence to the case selection logics discussed above. This problem is partly mitigated by applying an identical structure in describing all cases guided by the research questions presented above, following a structure focused comparison (George et al., 2005).

In the following section, the key characteristics of the four case study areas are presented. The brief portfolios demonstrate the variance of the context variables in terms of the set-up of the industry in each mining region, main water challenges and government capacity (specifically at the local level) in the respective provincial context. The latter aspect is introduced and discussed in more detail in the chapter on government capacity in South Africa (see section D.4.5). These factors represent key characteristics affecting a.) the resource-based drivers and b.) the key institutional drivers, as discussed in the previous chapter.

Case 1: Gold mining in the Witwatersrand in the Gauteng Province represents an aging and financially struggling industry (Coetzee, 2008), which has and continues to have major repercussions in terms of social and environmental impacts, specifically with regards to water.
Within this region, the analysis focuses on five companies, of varying sizes, ranging from large international players, via large South African to smaller companies. All of the companies considered have some exposure to water issues to a greater or lesser extent and engage in some form of activity. In terms of government representatives, national departments play a crucial role next to municipalities. Gauteng province can be furthermore considered as a province with relatively high government capacity at the provincial as well as at the local level.

Case 2: Coal mining in the Mpumalanga Highveld is a relatively stable and currently well-established mining sector (Coetzee, 2008). This case study combines mitigation of water pollution with a water infrastructure component. Analyzed are four companies, two of them subsidiaries of mining multinationals, two of them emerging BEE companies, which play different roles with regards to water management challenges. Several government levels, municipal, provincial and national, play a role in this case study. In terms of government capacity, Mpumalanga province in comparison to Gauteng has an overall lower government capacity with view to financial as well as human resources available, while on average performance can be rated as medium in national comparison.

Case 3: Platinum mining in the Western Limb of the Bushveld complex in the North West Province, represents a growing mining sector, with high impact and high expectations in terms of future growth (Coetzee, 2008). The water impact is mostly related to water scarcity, access to water and infrastructure development. The companies considered in this case study are three large mining firms and one emerging firm. In terms of government actors, municipalities feature prominently, while national and provincial levels play 'supportive' roles. Local government capacity is somewhat comparable to the level achieved in Mpumalanga province.

Case 4: Platinum mining in the Eastern Limb of the Bushveld complex in the Limpopo Province represents an emerging stage of platinum mining development and the related water challenges. Firms considered are almost identical with those in the Western Limb. Again the focus is one the role

of municipalities, while capacity constraints on their part are most pressing. Government capacity in the Limpopo province is considerably low.

To summarize, case studies, were chosen based on the following criteria; regional variation representing different mining commodities and thus different development stages within the industry as well as a different situation in terms of local government capacity.
Within each region, different companies were selected to create a representative sample – to the extent possible of large and small firms, as well as transnational and local firms. At the same time, the activity level of the companies was also an important criterion, differentiation very active, somewhat active and not active companies in terms of their corporate social responsibility approaches. For each region selected, combined company cases represent a large share of the key players, in terms of market share as well as impact on water resources. Following Eisenhardt (1989), the cases selected are thus sufficiently, but not overly different.

It is expected that the following variables emerge as decisive with view to determining contributions to addressing the water challenge: first, the viability (i.e. the resource base) of the respective company and second, the strength or degree of government capacity in the respective region. In cases, where firms devise of sufficient resources, they are more likely to engage in beneficial activities. This is also the case where government at all levels is vested with sufficient capacity to regulate and/or engage with business to facilitate and effect sustainable practices. Equally, where these variables are less pronounced the outcome is expected to be considerably less beneficial. Thus, while there is not the expectation of a huge variation in terms of the outcome dimension across cases, still nuances in contributions will be mainly attributable to the factors outlines above, rather than any of the other variables suggested.

At this stage, it is advisable to fill this model with data, to not only test the model assumption above, but also go beyond this rather schematic approach and pay due attention to the empirical richness of the cases, which will allow for a better understanding of the intricate interactions between various drivers and the nuances of the contributions. The following section details how the data for this analysis were collected and processed.

C.3. Data Sources

Several data collection methods have been used in the context of the empirical work, catering to the objective of data triangulation to allow for stronger substantiation of concepts (Eisenhardt, 1989).
The different data collection methods were used in a systematic, whilst also flexible way, allowing for additions to collection methods during the research process and 'controlled opportunism' in making full use of the empirical richness of each individual case (Eisenhardt, 1989).

Interviews

Interviews constituted one of the main data sources for illustrating the individual case studies and for supplementing documents reviewed for the thesis. In order to cover a broad spectrum of actors in the process, a broad range of interviewees has been included in the study.

Basically, two types of interviews were conducted.

A. Internal perspective

   Interviews with representatives from actors, involved in the process, i.e. local and provincial and national government officials, traditional authorities, mining companies as well as companies from other sectors, non-governmental organizations, unions, and local community organizations and community groups in the different case study areas. Key informants were chosen based on their involvement with the actual process and also their perceived knowledge of the respective situation.

   Primary contact persons with the corporate actors were those individuals concerned with

   - Aspects of sustainability management, in many cases environmental managers of companies, but also corporate social responsibility/sustainability officials, representatives from stakeholder liaison departments,
   - Infrastructure development and planning, water resources management.
   - In some cases, representatives from general management have been included in the survey. In order to reflect the organizational dynamics, representatives reflecting different levels and departments within a company were interviewed, where possible.

   As for government representatives, those directly involved with the interaction with corporate actors and/or other societal actors were preferred interviewees. In order to account for multi-level interactions within government, local, provincial as well as national government levels were included in the survey. A focus was placed on those government units concerned with the management of water resources, water services provision, local government and infrastructure development.

   As for the other actor groups, interviewees were chosen based on their involvement with the respective process as well as upon recommendation by other survey participants.

B. External perspective

   In order to complement interviews conducted with those directly involved, additional interviews were conducted with observers to the process, i.e. actors which were not directly involved, but who were knowledgeable about the process and could provide for an outside perspective. This includes for example representatives from trade associations, independent consultants, scientists and analysts.

In total, 125 interviews were conducted during field research conducted in South Africa mainly between March 2007 and December 2008. An overview of the number and types of people interviewed is provided in the following table[36].

Table 9: Overview of Interviews Conducted with Relevance for the Respective Case Study

	Coal Mpumalanga	Gold Gauteng	Platinum North West and Limpopo	Total
Companies	8	19	21	48
Associations	2 (SANBI), 2 (CoM), 2 (others)			6
Local Gov. incl. traditional authorities	6	6	13	25
National Gov.	5 (DWAF), 4 (DME), 2 (others)			11
Civil society & NGOs	1	2	3	6
Consultants (case-specific)	3		6	9
Others	14 (science), 6 (consultants, intern. NGOs, others)			20
			Total	125

All interviews were conducted in person; in some cases follow-up interviews were administered in person or via phone. Of the total number of 125 interviews 67 interviews were tape-recorded. In some cases interviewees required that their interviews be not be recorded due confidentiality concerns. Detailed notes were taken for the interviews not recorded.

43 interviews were transcribed afterwards for data analysis. Type A interviews were given preference for transcription, while some background interviews were not transcribed owing to time as well as financial limitations. All interviews were conducted in English.

The interviews were conducted in two ways. For those interviewees directly involved with the process interviews were conducted in a semi-structured way and were guided by a questionnaire (see Annex) addressing the key aspects of the interaction, such as main motivations and driving forces, the outcome of the interaction as well as the respective perception of the process by the interviews. In the course of the interview, the questions were structured in way so as to proceed from a general overview of the process to cover more specific aspects.

In addition to using the questionnaire to elicit specific answers from the interviewee, the interview technique used allowed for the interviewee to make comments over and above the structure of the questionnaire, thus allowing for the inclusion of alternative explanations and approaches.

In some cases, interviewees were also asked to directly comment on the framework developed in the context of this thesis in order to derive direct feedback to the proposed processes and connections.

The second interview technique used involved explorative interviews. This approach was mostly applied to elicit background information as well as for the identification of alternative explanations.

Field Notes

In addition to interview recordings and transcripts, extensive field notes were prepared on side observations during interviews, additional comments made by interview partners as well as specific context conditions for the interaction.

[36] A detailed list of all interview partners is provided in the Annex.

Participant observation

Further to conducting interviews, the author had the opportunity to participate in a range of meetings taking place in the context of the case studies. These meetings included the following workshops, informal meetings, conferences. In addition to the timing of the meeting a brief overview is provided of the type of participants and the purpose of the meeting.

Table 10: Overview of Meetings Attended

Date and Place	Title of the meeting	Type of Participants	Purpose of meeting
6 August 2008 Johannesburg, Chamber of Mines	Meeting of the Mining Interest Group	Representatives of mining companies, with operations in the West Rand area, consultants, activists and researcher	To discuss involvement of NGOs and research community
30 July 2008 Krugersdorp, Mogale City Town Hall	Western Basin Void Decant	Representatives of regional government department, DWAF, DME; GDACE, NGO representatives, concerned citizens, mining representatives, consultants and researchers	Presentation of CGS study on regional mine closure for the West Rand area, discussion of status of environmental monitoring, presentation of WUC strategy
15 November 2008 Krugersdorp, Mogale City Town Hall	Western Basin Void Decant	Basically same composition as previous meeting, albeit less attendance	Discussion of emergency reaction to rising water levels and ad-hoc determination of intermediary management option
25 November 2008 Westonaria, Municipality	Wonderfonteinspruit-/Loopspruit Forum Meeting Kroomdrai catchment forum	DWAF representatives, municipal representatives, NGOs and concerned citizens from	Discussion of monitoring data and work of the environmental monitoring group, feedback on suggested risk assessment on health impacts of environmental pollution
1-2 October 2008, Johannesburg, University of the Witwatersrand	Mining and the Environment Course with Cathy Reichardt	Young professional of larger mining companies, younger government staff, NGO representatives	University course about different mining techniques and environmental impacts, assessment and mitigation methods
20 August 2008 Johannesburg	Meeting at Mintails	Mintails representatives, Randfontein Environmental Action Group member, Mariette Liefferink	Discuss implications and impacts of Mega-Tailings with representatives of environmental activist groups
6 November 2008 Mooinooi, Kopano Conference Center	Bakwena Bulk Augmentation, First Project Steering Meeting & Seventh Joint Water Technical Task Team Meeting	Representatives of mining houses, municipalities, DWAF and consultants	Presentation of municipalities' needs, introduction of the criteria for options' collection
4 December 2008 Kroondal, Rustenburg Rec Club	Bakwena Bulk Augmentation Third Project Steering Meeting	Representatives of mining houses, municipalities, DWAF and consultants	Reassess status of Madibeng municipality buy-in, discussions of different options and prioritizations of options
29 October 2008 Johannesburg, Fourways	Sustainable Mining Reception	German and South African researchers, German and South African (national government representatives, environmental and human rights activists, other interested stakeholders, news media	Present new German – South African research projects regarding closure management in the Witwatersrand

Participating in these events, on the one hand allowed for observing some of the key actors in their interaction with each other as well as for collecting additional background information and feedback on the research design. During these workshops, extensive notes were taken, which were included in the respective case study description and analysis.

Document analysis

Interviews and participant observation were complemented by an extensive analysis of pertinent documents as well as presentation material provided by interviewees as well as other sources. Typical documents reviewed included company reports and sustainability and/or environmental performance reports as well as strategic documents. For the government side, main references include integrated development plans of the municipalities investigated, government programs and strategic documents publicly available as well as position papers.

C.4. Data Analysis

Data collected in the context of the above mentioned activities were processed and analyzed in the following manner (Bansal et al., 2000; Eisenhardt, 1989).

As a first step a 'within-case analysis' was conducted including a synthesis of data into extensive case study narratives including maps and other supporting illustrative materials. In addition, single case analyses include a more analytical section highlighting certain aspects of the interaction, guided by the research questions and their operationalization.

In a second step, cross-case patterns are investigated. The categories introduced above also guide the cross-case analysis. In addition, pair analyses as well as comparisons across the different units of analysis introduced are used in order to identify emerging relationships, interactions, drivers and distinct patterns of contributions.

Following the approach of triangulation, data obtained through interviews are then cross-checked with insights from literature, in order to reduce potential biases and the sole reliance on interview quotes (Mitchell & Bernauer, 2002).

D. Country Background South Africa

This chapter introduces South Africa as the country background for the case studies. It thus highlights the factors and conditions prevailing at the national level that have relevance for the local case studies presented in the following chapters.

South Africa is an example for an emerging economy. At the same time it shows instances of 'weak or limited statehood', mostly with regards to the implementation of regulation in selected policy fields. This constellation leads to a number of challenges with regards to sustainable development and specifically sustainable water management. It also points to the potential role that non-state actors play in causing, but also in addressing some of these challenges.

Following a brief discussion of the socio-economic situation, the chapter addresses the current national discourses and policies with regards to sustainable development and water governance. The second part discusses the independent variables of the analytical framework from a country-level perspective. This includes the role of government actors at different governance levels as well as other drivers, such as normative or social factors.

D.1. South Africa: An Emerging Economy, and Weak State?

South Africa is often referred to as the African economic giant. In comparison to other African states South Africa has a very high nominal GDP in excess of $ 213 billion and an estimated external debt of only 64 billion. It has displayed a steady economic growth over the past years (between 3 and 5.5 %) until the global financial crisis also hit South Africa by the end of 2008 (Campbell, 2009).

In terms of business, political and economic ratings, South Africa ranks top among other African countries and well within the peer group of other emerging economies, such as Brazil, China and India (Hughes, 2006). At the same time, South Africa is still one of the most unequal countries in the world in terms of income distribution, as demonstrated by a high Gini coefficient of 0.64[37].

South Africa has arrived at this stage through a moved and for Africa untypical history (Hughes, 2006). The most distinctive feature was the period of apartheid between 1948 and 1994, which sought to effectively separate the white and black population on South African territory and thus secure white supremacy. This was achieved through a high level of state control and social engineering measures designed to suppress the black majority.

While South Africa's wealth is largely built on the extraction of raw materials, the country has advanced to a relatively high level of beneficiation[38], which is also untypical for African countries. Partly in reaction to increasing international sanctions during apartheid, South Africa embarked on a range of state-driven industrial development projects, such as oil from coal technology as well as iron and steel manufacturing. Today a diversified industrial sector supports South Africa's stable economic conditions[39], boasting average growth rates of roughly 3 % (Gelb, 2005). This marks the current stage in the transition from an industry-focused to a service-oriented economy since the end of apartheid. It also reflects policies that have not only aimed at strengthening the service sector, but

[37] The Gini coefficient denotes income equality. While 0 represents perfect income equality; 1 represents a situation of perfect inequality in income distribution.

[38] Beneficiation refers to the process of value creation from ores and mineral resources. In the context of economic development this value is created within the country and benefits local communities.

[39] This denotes the situation until November 2008, before the South African economy was also affected by the 2008/2009 World Financial Crisis.

also at increasing beneficiation activities and value creation at higher levels of the value chain. Last but not least these policies promoted the reintegration of South Africa in the global economy[40].

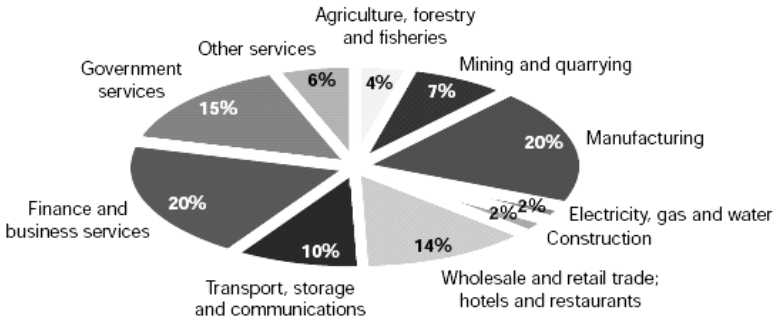

Figure 5: Contribution to GDP by Sector (OECD, 2005)

In terms of the type of business actors, South Africa features a considerable number of large domestic firms, which have characteristics of conglomerates, such as Anglo American, Sasol and banks such as Sanlam and Old Mutual. Taylor (2007b) points to the significant influence that these 'quasi' conglomerates have on political processes. In terms of foreign direct investment, albeit featuring a relatively good investment climate compared to other African countries, the South African track record has been somewhat slow, staying at levels averaging about 1.5 %[41] of GDP between 1994 and 2002. Mining, finances and services attracted most FDI, with the UK dominating as main source followed by Germany, other EU countries and the US (Arvanitis, 2005).

In discussing the current economic situation it is important to note that South Africa is still endowed with the world's largest reserves of a number of minerals, such as gold, platinum and titanium. Hence the mining sector has been a crucial force in the country's industrialization and modernization process, including state development and the shaping of the political economy (for a more detailed account of the interaction of the mining industry and the South African government see section D.4.4).

Mining in South Africa commenced with the discovery of diamonds and gold, in 1867 and 1886 respectively. This laid the foundation for the emergence of South Africa as a significant centre of this industry (Taylor, 2007b). Ever since, the country's dependence on mining has been significant, albeit mining was responsible for only 12 % of South Africa's GDP between 1950 and 1990, and even less in the following years (DME, 2007a). Today the overall relevance of the mining sector has even further diminished in comparison to manufacturing as well as the services sector. Following a constant decline, the contribution of mining to the GDP has fallen to a current level of 6 % (Statistics SA, 2007). Nevertheless, the mining sector still employs about 440,000 workers and contributes together with manufactured products to about 50 % to South Africa's exports. Most importantly about 27 % of foreign direct investment flows into the mining sector. Due to the dominance of Anglo American and

[40] The effect of this focus and the increase in efficacy has also led to the creation of a dual economy boasting a growing informal economy, which exists in the shadow of the first or formal economy (Devey, Skinner, & Valodia, 2006). The effects of this development have the most significant ramifications for the structure of the South African labor market. This market consists of formal and informal employment, which still reflects to a great extent race inequalities (Moloeke, 2006). In order to counter this imbalance, the government embarked on a Black Economic Empowerment (BEE) strategy, which seeks to increase participation and ownership of previously disadvantaged South Africans in the economy (Southall, 2006).

[41] This is about half of what Latin America or similar Asian economies have been receiving in FDI during that time.

bhp Billiton, mining companies are also responsible for about one third of the Johannesburg Stock Exchanges (JSE Limited) value (DME, 2007a).
The mining sector has gained in significance in the context of the societal transformation process through Black Economic Empowerment (BEE). In an effort to redress inequalities and exploitation inflicted in the past, particularly by mining companies, influential positions in the executive boards of several larger and smaller mining firms have been filled with black individuals. In addition, the mining sector and here specifically the coal miners, have been at the forefront of the transformation process by transferring owners' rights to emerging black consortia (Southall, 2007).

The development of the South African industrial sector and specifically the mining sector reflects some of the main challenges faced by the South African government, which point to some of the state's weaknesses to the current day.
When the apartheid government collapsed towards the end of the 1990s and the first democratic elections were held in 1994, the challenges took shape. The task of paramount relevance was to reintroduce South Africa into the global economy. At the same time the inequalities inflicted during apartheid had to be redressed through redistribution and the elimination of poverty among the black majority (Pycroft, 2000).
To achieve this, Mandela's Government of National Unity introduced the so-called Reconstruction and Development Programme (RDP). This program foresaw the stimulation of economic activity and job creation through rapid service delivery. The RDP, while not officially discontinued was soon replaced with GEAR (Growth, Employment and Redistribution), which foresaw greater economic growth through improved international competitiveness. It also proclaimed the promotion of private investment, increased privatization as well as a reduced overall budget deficit, fiscal discipline and labor-market flexibility. It thus reduced government intervention and forbore government's ability to influence poverty reduction and income distribution (Nattrass, 1999). The achievements of GEAR however have been considerably disappointing; the targets such as GDP and export growth and the reduction of the budget deficit were largely missed. One of the most problematic failures however was the loss of millions of jobs, resulting in an unemployment rate of up to 40 % by 2002. Black South Africans were more affected by unemployment than the white population; rural areas were more struck by the negative consequences than urban areas. While it is most difficult for the younger generation to enter the job market, informal employment is on the rise, constituting a veritable Second Economy (Hughes, 2006). This is also confirmed by an analysis of poverty trends (Woolard, 2002), which shows that albeit South Africa is considered a upper-middle income country with a per capita GDP of around 3.900 (1998 dollars), one finds significant levels of food insecurity and poverty, particularly among the black population. Conca (2006) summarizes South Africa's socio-economic condition as a situation of rapid industrialization with a semi-peripheral status in the world economy and paramount domestic inequality (Rodrik, 2006).
Weighing in heavily on the development potential of the country is furthermore the HIV/AIDS pandemic leading to the highest prevalence of the disease worldwide (about 25 % for adults in 2001). Resulting in a considerable shortening of life expectancy, the disease is impacting negatively on human capital in terms of the availability of skilled labor for industry as well as the public sector (Van Aardt, 2002). The South African government has been heavily criticized for failing to address the pandemic and the overall denialism regarding the disease in the late 90s (Hughes, 2006). The government was only slowly giving in to public pressure from various parts of civil society. The most

prominent example was the Treatment Action Campaign, but pressure came also from trade unions and industry (Börzel, Héritier, & Müller-Debus, 2007). Government changed its course in mid-2000 by starting to roll out anti-retroviral treatment programs as part of the National Health Service. The effects of the slack reaction of the South African government will only be noticeable to its full effect in the coming years, but already skills shortage due to the disease is evident. Hughes (2006) argues that the effects of the pandemic might even aggravate South Africa's second largest issue: the high incidence of crime (DEAT, 2008), which is compromising social security and thus stifling development, particularly in the rapidly growing informal settlements (Hamann, 2008). Besides these obvious weaknesses of the South African state in the areas of stable and equitable poverty eradication, the provision of sustainable human settlements, and the combat against HIV/AIDS, other problems occur with regards to a stable and affordable supply of energy (see section F.1) and the maintenance of key municipal infrastructure (Lawless, 2007), let alone keeping-up the skill level necessary to address and manage these challenges.

The deficits in terms of service delivery are in stark contrast to the emerging debate and notion of South Africa as a 'developmental state'. This debate has been emerging prominently since the end of apartheid, especially in the context of urbanization and local government (Parnell & Pieterse, 2002). The 'developmental state' paradigm puts the state at the centre of economic and political decision-making. Another attribute of the 'developmental state' is the relative autonomy to implement the 'right policies' against vested interests that might capture it otherwise (Fine, 2007). The resurgence of the developmental state debate together with the paradigm shift in South Africa is expected to have further implications for the future development path of the country (Fine, 2007).

Considering the growth orientation implicit in GEAR, the 'developmental' discourse draws new attention to the necessity of inclusive development; i.e. addressing worsening levels of unemployment and impoverishment rather than catering to the interests of relatively small elites. During the past ten years, South African industrial policy was mostly targeted at fostering export-oriented growth through serving the interest of big industrial players. While South Africa has been considerably successful, Fine (2007) argues that long-term success will only be possible, if these actors are eventually driven towards contributing to economic diversification as well as the generation of finance for infrastructure development and social welfare. The degree to which this interventionist path will be followed crucially depends on the formation of capacities at all government levels. It is particularly important to not only regulate the industry, but also to engage it in a productive way. The 'developmental state' discourse in South Africa might thus potentially lead to a reorientation of policies vis-à-vis business. By addressing some of the shortcomings outlined above, it however also spurs considerable expectations on the side of South African citizens particularly with regards to service delivery.

South Africa's status as an emerging economy, vested with considerable economic resources, but also as a state with stark weaknesses in terms of service delivery and policy implementation, finds its reflection in the current discourse on sustainable development.

D.2. Sustainable Development – the South African Discourse

In his 2002 account of an 'Unsustainable South Africa' (Bond, 2002), Patrick Bond and his co-authors demonstrate the at times deeply unsustainable practices followed in South Africa in the pre- and post-apartheid period. The authors cite inadequate access to water and other services, unsustainable modes of energy production, neoliberal tendencies with regards to granting access to services and

overreliance on foreign donors and their growth paradigms as symptoms for this unsustainable approach.

Albeit clearly compiled with a somewhat ideological intention, the long list demonstrates how deeply entrenched unsustainable behavior is with various actors in South Africa. Business emerges prominently in this regard, as the negative record of the mining industry demonstrates. Apart from substantial ecological impacts, the adverse social impacts of mining companies' practices, especially those related to the migrant labor system, have long been documented (Granville, 2001)[42]. In terms of the actual mining operations, worker health and safety as well as the issue of human rights emerged prominently (Stephens & Ahern, 2001). In addition, the severity of the HIV/AIDS pandemic in South Africa is partly attributed to the migrant labor system as well (Elias & Taylor, 2001)[43]. As Hamann and Bezuidenhout (2007) point out, the impact of mining on social and community aspects and its repercussions on the South African society are hard to grasp, rendering an assessment of the mining industry's merits in terms of job creation and economic development almost impossible. At the same time the mining industry epitomizes the challenge inherent to sustainable development in balancing the environmental, social and economic "pillars".

While unsustainable practices prevail in the country and are partly aggravated by major global trends, such as climate change and globalization (DEAT, 2008), the paradigm of sustainable development has been strongly received as a discourse in South Africa since democratization. Not only is the concept enshrined in the constitution[44], but the National Environmental Management Act contains a clear commitment to sustainable development as well (Fig, 2007). The concepts of Local Agenda 21[45] have been formally adopted by the South African government, which also highlights the role of the local dimension in achieving sustainable development (Urquhart et al., 2000)[46]. As a reaction to its commitment to paragraph 162 of the JPOI South Africa embarked on the development of a National Strategy for Sustainable Development. An intermediate step in the process unfolding was a National Framework for Sustainable Development (NFSD) (DEAT, 2006, 2008). The NFSD, in its first version of 2008, was intended to form a basis for progress with regards to concerted action across all spheres of government and other social partners. The framework furthermore sought to integrate sustainability considerations with the overall development discourse and spell out the national vision for sustainable development (DEAT, 2008)[47]. Accordingly, in the South African

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42 These comprise impacts at the actual mining site as well as repercussions in the sending areas, i.e. the home regions of the mine workers (Banerjee, 2001).

43 HIV/AIDS is particularly prevalent in the informal mine settlements, partly due to prostitution. Upon returning to their home areas, workers transmit the disease to their wives, thus contributing to a high prevalence of the disease.

44 At the core of the legislative apparatus in South Africa is the most fundamental legal provision, the Bill of Rights, Chapter 2 of the Constitution of South Africa (No. 108 of 1996). Among other rights it foresees a fair and sustainable management of South Africa's natural resources through the promotion of ownership and empowerment of the people and is therefore often used as a reference for policies documents in relation to sustainable development. Specifically, Section 24 of the Bill of Rights guarantees environmental rights to all people of South Africa by stating the following: Everyone has the right: to an environment that is not harmful to their health or well-being; and to have the environment protected for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development..."

45 Local Agenda 21 is an international program for the implementation of sustainability in local government. This program emerged from the Rio Summit in 1992 and involves strategic community based planning for development and the involvement of communities in decision-making through local level partnerships (Urquhart and Atkinson, 2000).

46 While these commitments reflect the international discourse in the 1980/1990s as outlined in section D.1, the concept received further momentum in the country with South Africa hosting the 2002 World Summit on Sustainable Development, which resulted in the Johannesburg Plan of Implementation. The plan comprises 37 targets for reaching sustainable development goals, including the Millennium Development Goals.

47 The process is designed to continue with the definition of sustainable development indicators, investments in capacity building as well as the development of a fully fledged National Strategy for Sustainable Development.

understanding, the term 'sustainable development' is determined by some distinctive features, which reflect the country's specific development challenges.

Sustainable development clearly carries the connotation of human well-being. That applies particularly to those most affected by inequality and poverty, thus defining sustainable development as a tool to redress shortcomings inflicted by the apartheid regime. Furthermore, a strong emphasis is placed on the efficient use of resources, intergenerational equity and the inter-linkages between economic, social and environmental systems. Particularly, the latter aspect is explicitly placed in the context of an emerging and growing economy and the ensuing implications and challenges for balancing growth and the other dimensions of sustainable development.

The NFSD also highlights the process character of attaining sustainable development and the necessity of fundamentally changing values and attitudes within society. It points to the rather unsustainable elements of South Africa's development trajectory thus far (DEAT, 2008). Inequality in access to wealth and services, degraded environments, lack of service delivery in poor communities and a relatively large disparity between the situation in rural and urban communities are mentioned as the most pressing challenges in this regard.

Based on a refined national vision for sustainable development, the NFSD details guiding principles and derives priority areas for strategic interventions in response to the major identified trends, at a global as well as national scale[48].

Implementation is discussed prominently in the context of the Framework, including necessary institutional mechanisms, planning, communication and monitoring measures.

Particularly, the issue of implementation points to one of the potential weaknesses of the NFSD process. As in the case of other ambitious government-led programs, implementation is expected to be challenging if not even impossible. In the case of the NFSD, complexities inherent to sustainable development are aggravated by the challenging task of implementing policies in the South African context. For once it proved to be very difficult to gain sufficient buy-in across various government departments. This led to the initial issuance of a framework rather than a full strategy (Fig, 2007b). Furthermore, the NFSD would have to be integrated with other development related strategies at the national and province levels. At the national level, the fate of the NFSD is probably most linked the so-called Accelerated and Shared Growth Initiative (Asgi-SA), which preceded the formation of the NFSD. Largely developed in 2005, the Asgi-SA spells out South Africa's economic growth targets for the period until 2014 at a level of 5 % on average per year. In addition to these concrete economic growth targets, Asgi-SA comprises social objectives, such as the fight against poverty and the reduction of unemployment as major goals (Presidency, 2005). As the strategy is issued directly by the president and key government departments, the initiative enjoys far more visibility than the NFSD[49]. There is no clear reference in Asgi-SA to the sustainable development paradigm, taken up by the NFSD. The latter however explicitly proposes the mainstreaming of the identified priority

[48] Against the background of this thesis, the priority areas "sustainable ecosystems and natural resources efficiency", "economic development through investments in sustainable infrastructure" and "enhanced systems for integrated planning and implementation" are of central interest. Other priority areas are "sustainable human settlements" and "appropriate responsiveness to emerging human development and environmental challenges".

[49] The Initiative identifies the major constraints for achieving these goals, such as a volatile South African currency, a lacking national logistics systems, skills shortage, barriers to investment in downstream industries, ill-directed legislation and deficiencies in state organization capacity and leadership. Based on these observations, a number of key interventions are proposed. This includes public sector investment (including bulk water infrastructure), industry-focused initiatives (tourism and biofuel production) a stronger focus on education and skills development and the elimination of the Second Economy. The Initiative furthermore acknowledges that the attainment of these targets requires the buy-in of all social partners, including the national development finance institutions as well as civil society. Asgi-SA makes explicit reference to the at times stifling effect of weak and inefficient local planning systems and the demanding Environmental Impact Assessment.

challenges in Asgi-SA and related programs. It remains questionable if the relatively new NFSD headed by the relatively weak DEAT will find equal consideration as the strongly promoted Asgi-SA is already serving as the main reference for any growth related discourse and activities in the South African context. This is also reflected by the relatively low profile of sustainability concerns with other government portfolios, such as the Department of Trade and Industry or the Treasury. It is therefore legitimate to ask, whether government follows and promotes the path of sustainable development itself, or whether the approach is rather fragmented and reflected by some rather marginal departments. Against this background, it is also necessary to investigate whether there might be too much institutional inertia and a lack of willingness to implement innovative policies that have been developed. It might be the case that unsustainable practices are merely hidden behind a 'sustainable development' rhetoric (Büscher, 2008).

At the same time, South Africa is carrying an almost overwhelming burden of unsustainable practices and their ramifications have not yet come to bear. This situation necessitates a fundamental change in order to embark on a sustainable trajectory. Is the business community in a position and willing to step in and contribute to sustainable development through their own means?

The NFSD points to the paradigm shift currently underway among business towards more responsibility with regards to environmental, social and economic issues. This is for example documented through the emergence and adoption of new codes and initiatives (DEAT, 2008). There is however a strong call for a more far-reaching involvement of business as part of a shared responsibility for sustainable development.

In order to allow for a more focused approach on the potential contribution of water to sustainable development, the focus of the analysis will be placed on water management, which takes a rather prominent spot in these debates in South Africa and thus grants further investigations in this regard.

D.3. Water: Component for Sustainable Development in South Africa

The management of water resources and services has always been of crucial importance throughout South Africa's history, thus occupying a pivotal position in the country's development discourse. Looking at the main thrust of GEAR, equity and economic growth, it becomes clear that these are difficult to attain without adequate management and supply of water (Mukheibir, 2008).

According to Turton (2008b) and more recent projections (Addams et al., 2009), South Africa's economic development might be severely constrained by limited water resources in the near future. Using a lower growth perspective than that proposed by Asgi-SA, water for all current uses can only be assured with a high reliability until 2010. The scenario of the 2030 Water Resources Group foresees a gap between projected demand and supply of 17 % across all sectors.

The introduction of new technologies, e.g. for water saving, efficiency improvements or the prevention of evaporation losses, might be needed in order to allow for more ambitious growth targets (Turton, 2008b). Considering the availability of water resources in South Africa's major river systems and the projected water use by key consumer groups, even more severe shortfalls for the period after 2025 are revealed. It is expected that rural communities are going to be affected the most, due to their high vulnerability[50], thus propagating previous inequalities (Ashton et al., 2008a).

[50] Vulnerabilities are expected to be highest among those communities which are the least resilient, i.e. which are immediately dependent on the availability of natural resources and do not devise of (financial) means to adapt to changing conditions in this regard (O'Brien et al., 2009).

In this context, one needs to consider that overall South Africa currently still devises of the technological knowledge and existing infrastructure to provide for a relatively high level of water security (Ashton et al., 2008b), which is mostly due to the existence of numerous large dams. This however bears the danger of overly optimistic developments with a higher potential for failure during adverse conditions, such as caused by climate change. This is expected to negatively impact the resilience of water management systems to an even higher degree, thus compromising water security and the ability of government as well as other actors to respond.

The careful management of South Africa's water resources therefore is of crucial relevance for sustainable (i.e. equitable) development of the country. While the continued scarcity might compromise much needed economic growth; heavy reliance on technological fixes might also put equitable service delivery at risk. Last but not least environmental sustainability goals are also going to be affected by water scarcity (DEAT, 2008). Accordingly, South Africa's water problem consists of following aspects: the overall shortage of the resource, quality deterioration and also a lack in service delivery.

Water Demand

Agriculture is one of the main water users (about 62 % of overall water demand), followed by urban/municipal water uses (23 %); power generation, mining and bulk industry account for about 8 % of total water demand. With a total water demand of 13 to 14 billion m^3 the totally available amount has almost been used to the maximum (Addams et al., 2009).

Water demand for household use is projected to increase significantly with larger shares of the population attaining access to water services. Industrial water demand is likely to double over the next 20 years (Addams et al., 2009). Specifically, meeting water demand for power generation constitutes one of the rising challenges as water-intensive coal combustion remains the main source of energy in South Africa for the years to come. Agriculture will continue to constitute an important element of the South African economy, thus necessitating the development of more water-efficient irrigation methods in order to enable increasing productivity under a constraint resource base to ensure food security.

The mining sector's water requirements are also expected to grow over the next 20 years. This includes water needed for production purposes as well as for diluting pollution impacts, such as acid mine drainage (Addams et al., 2009). These aspects also point to additional stresses imposed on South Africa's water resources due to mounting pollution originating from industrial effluents, domestic and commercial sewage, acid mine drainage and agricultural runoff (DEAT, 2008). Compared to other countries globally and also in the African context, South Africa is in a particularly dire situation with regards to its 'water capital'(Emerson et al., 2010).

Water Supply

Water currently is South Africa's most limiting natural resource. With an estimated total renewable supply of 15 billion m^3 South Africa ranks 120 out of 149 countries considered by a World Resources Institute survey (Revenga, Brunner, Henniger, Payne, & Kassem, 2000).

Most of South Africa's 22 major rivers have reached their capacity in terms of impoundments and abstractions to meet diverse uses. A large number of the rivers are shared with neighboring countries, thus bearing the potential for international conflict and related uncertainties. Water transfers between basins, to augment weak flows in key basins, constitute a critical part of South Africa's water supply. This is mainly due to the fact that South Africa is endowed with less than

average rainfall (average of 500 mm, about 50 % of the world average) and an uneven distribution of the resource across the country. The East receives proportionally more water than the Western parts of the country. In about 21 % of the country it even rains less than 200 mm/year. Rainfall displays a strong seasonality, which leads to relatively low stream flow levels of South African rivers for most of the year (Mukheibir, 2008). Groundwater is not available in mentionable amounts due to high levels of salinity. At the same time groundwater currently constitutes one of the main sources for municipal water supply. The further development of this source to augment overall water supply is however limited.

According to the 2005 Environmental Outlook for South Africa (DEAT, 2005), climate change is expected to lead to significant alterations of current hydrological regimes and thus limit the capacity to adapt to further climate-related and other impacts (Mukheibir, 2008). Following IPCC projections (IPCC, 2007), a further decrease in rainfall is to be expected for the Eastern part of the country. This is going to lead to a net reduction in available water resources leading to negative impacts on all water uses. Due to the high variability of rainfall and evaporation data it is difficult to identify clear trends; this leads to high uncertainties with regards to predictions regarding the behavior of water systems under increased climate stress (Mukheibir, 2008).

Water Services Provision

South Africa looks back to devastating conditions in water services provision immediately after the end of apartheid with almost one-third of the population lacking access to basic water services. In this light it is a considerable success that between 1994 and 2006 14 million people were given access to water[51] (Muller, 2007). In terms of the water-related MDGs South Africa is thus well on track, as there has also been an increase from 52 to 69 % in the number of people who have gained access to sanitation over the last 15 years. However, the legacy of apartheid with regards to access to these services is still noticeable. Most people without access to water live in those rural areas that formerly were apartheid homelands, high density rural population areas and dislocated settlements, largely underserviced by municipal services. Thus what has been referred to by Conca (2006) as 'hydrology of apartheid' not only derived from the access rights to water resources, which were tied to the ownership of land, but also from a segregation with regards to access to water services. The clear division between white and black communities was evidenced by the high connectivity of white areas to water in contrast to the situation in rural black settlements. The existence of municipal infrastructure however also indicates that the technical capacity to provide for these services at least in urban areas existed in the country.

In fact, water management in South Africa has always had a strong infrastructure component. This had also been closely related to the development of the mining industry as well. When the gold mining operations were established on the Continental divide (Vaal/Limpopo), technical solutions to provide for sufficient water supply to emerging settlements became necessary. This led for example to the emergence of the Rand Water Board, as a non-profit, statutory organization as early as 1903 (Muller, 2007; Turton et al., 2006). Rand Water is still serving approximately one quarter of South Africa's population and about three quarters of the South African industry (including mining, energy production, and the coal-to-fuel industry). Water infrastructure however, for a long time was only accessible for white-dominated urban areas.

[51] This is about one fourth of South Africa's total population.

With the transition to democracy, access to service and social welfare became a major concern for the ANC government. An important development was the decentralization of local government in order to promote the democratization of the country as well as to ensure access to water and other municipal services for all. As a consequence, local government has become the key actor with regards to water services delivery. This led to a number of challenges with regards to service delivery capacity from a technical as well as financial perspective, which is discussed in more detail in section D.4.5.

The discourse about reliable water services has always been a key element of the South African government's social welfare politics. In shifting politics from the post 1994 RDP, the policy of 'free basic water' was introduced in 2004 (Modsell, 2006). According to this concept, every household should receive up to 6,000 liters of water per month for free (Muller, 2007)[52]. Again, the delivery of this 'life-line-tariff' was to be implemented by the municipalities. The effectiveness in this regard is particularly limited in those areas, which had been disadvantaged during apartheid (Magketla, 2007). In a study on rural water treatment technologies for the Eastern Cape, the poorest province in terms of available municipal finance, Momba et al. (2006) showed that a considerable lack of skills and financial means leads to serious service delivery failure.

In the context of gaining and maintaining basic access to water, a very active anti-privatization movement has emerged in South Africa over the past years. This was clearly motivated by international drivers, such as donor policies, regarding the formation of public-private partnerships as a loan condition, multi-national water providers seeking to establish business in South Africa as well as a strong global network of anti-privatization activist (Conca, 2006). This was also fuelled by several cases, which demonstrated the shortcomings of public private partnerships in the water sector, albeit officially touted as the preferred way of improving the municipal water services. Two prominent examples are the Biwater involvement in Nelspruit in 1995 and the privatization of water service provision in Kwa-Zulu's Dolphin coast. In both cases the private involvement did not lead to easier access to infrastructure finance and – in the case of Dolphin Coast – even resulted in higher tariffs. The debate about privatization of water resources, albeit ceasing at the international level, was also heated up in the wake of the involvement of the French water company Suez with water services supply in Johannesburg. The company won a five-year trial contract in 2001 and promoted a policy of massive disconnections as well as the introduction of water meters. This policy was particularly enforced in townships and shack settlements and contradicted the Free Basic Water approach. This soon led to considerable social protest resulting in a court case, which was decided in mid-2008. All prepayment meters had to be removed and the amount of Free Basis Water that was provided per day was raised to 50 liters (Bond, 2009). In the midst of social protest, Suez's contract was not renewed; Johannesburg Water as the municipal water provider still maintains a rather commercial approach to water services provision, which continues to meet criticisms from social activists.

Privatization of water services has thus never gained significant relevance in South Africa – only five of 284 municipalities have decided to privatize their water services. However, due to the increasing deterioration of water and other crucial infrastructure, it is expected that there will be increased pressure for private finance of municipal infrastructure (Khosa, 2002; Muller, 2007).

[52] This equals 40 per capita and day for a four-person household.

At the same time, it needs to be considered that at the international level, the attention for the nexus of water and human rights is currently rising[53]. Considering the past inequalities prevailing in South Africa (Conca, 2006), this debate is likely to gain in relevance here as well.

Business and Water in South Africa

The failure of privatizations in the water sector provides for an indication of the problematic role of business with regards to this resource. It may be worthwhile to take a closer look at some other industries and their pollution impacts in order to show that business is very much part of the 'problem'. Businesses operate in the context of the water challenge and take on their respective strategies at the plant and company level.

As already indicated, there are several industry sectors that also feature prominently in the public water discourse. Next to energy production, steel manufacturing, food and beverage as well as apparel industries, the mining industry's impact on water is particularly problematic. Two impact areas can be differentiated: the biophysical impacts on water resources, and the role of the mining industry in shaping water supply schemes in the area where they operate. In terms of biophysical impacts, mining activities are in many cases large enough to be drivers of fundamental environmental change. In assessing these impacts, Ashton et al. (2001) point to the relevance of the commodity mined and the mining method used. Other important factors determining the magnitude of the impact are the scale of the mining activity, its duration as well as the sensitivity of the surrounding environment.

While the impacts during the exploration phase are small scale, considerable impacts occur in the start-up phase of mining activities. They can cause disruptions of natural run-off regimes and lead to the erosion of topsoil resulting in the pollution of natural water courses. The bulk of impacts however occur during the actual production phases of blasting, milling and refining as well as the stockpiling of intermediary and final products. The following table provides an overview of an in-depth study conducted by Ashton et al. (2001) on the impact of mining activities on water resources in three Southern African river basins.

Table 11: Impact Categories and Types: Mining and Water Management

Impact Category	Impact Types
Impacts on the groundwater environment	- Changes to local and regional groundwater dynamics - Impact on dolomitic groundwater resources: dewatering and water extraction to ensure deep-level mining - Lowering of water tables, formation of sinkholes and localized subsidence - Seepage from opencast mining or tailings dams - Acid mine drainage
Impacts on the surface water environment	- Pollution of surface water due to the mobilization of previously immobilized substances - Eutrophication, pH fluctuations - Cyanide and radionuclide contamination - Acidification - Siltation - Raised heavy metals concentration
Landscape-scale ecological changes	- Landscape alterations - Fragmentations of ecosystems - Alterations of stream flow patterns

[53] This for example became evident at the 2009 World Water Forum in Istanbul, where the 'Human right to water' was discussed intensively, albeit not officially introduced.

Impacts from mining on water resources continue to last long after mining operations have been ceased. Risks emerge from post-mining acid mine drainage originating from abandoned shafts, un-rehabilitated waste rock dumps, mine tailings dams and other features of old mining sites. These processes will find more detailed consideration in the case study descriptions.

Furthermore, it is necessary to consider the impact of mining operation on water infrastructure development. Mines often require large quantities of water for cooling purposes, underground operations such as hydraulic drills as well as processing steps, such as floating and leaching. In the case of larger operations, mines also provide water services for their housing complexes. As a consequence, mines are in direct competition to other water uses, such as agriculture and urban water supply. This competition might be heightened if the water quality is compromised due to pollution impacts originating from the mine.

In some cases, where the social and economic benefits offered by the mining operations were sufficiently attractive, additional water is brought in from neighboring catchments through water transfer. Surplus mine water, available due to pumping operations, can be used to supply other surface water uses.

Similar pollution and abstraction scenarios can be drawn for a number of other industries in South Africa, while the infrastructure component is particularly pronounced for the mining sector. The case studies presented in the section E to G provide for an impression of possible positive contributions of businesses to the water management challenges in South Africa.

D.4. Driving Forces: Independent Variables at the National Level

Following the framework developed in chapter B, this section discusses determining factors and drivers for business to make a contribution to sustainable water management. Focusing on the national level, the different roles of government, including legal provisions (i.e. mandating) as well as other forms of engagement are discussed. The issue of capacity at different government levels is also taken into account. Further, normative drivers as well as social drivers will be introduced to the extent that they have validity for the all case studies.

D.4.1. **Government Drivers**

In discussing government drivers, it is useful to differentiate between the protection of water as a natural resource and the provision of water services, while also acknowledging the interlinkages between both areas. South Africa has developed governance systems to address both areas separately. During the transition period following 1994, the existing water policy framework was invalidated in its entirety, providing the basis for 'washing away inequalities' (Conca, 2006) – at least in theory. All government portfolios underwent significant changes in the design, set-up and thrust of legislative provisions. Next to the domestic equality agenda, South Africa also aimed to respond to policy reforms at the international level. Specifically, developments in international environmental governance have significantly shaped South African environmental policy and promulgated the development of rather ambitious national policies, strategies, action and implementation plans in order to ensure compliance with international accords.

Building on the new South African Constitution, the governance framework includes legislation on water resources (National Water Act), water services provision, and environmental impact assessment as well as mining sector specific legislation. All these are of relevance to the regulation of mining firms' impacts on water management. Legal provisions are augmented by a number of national level initiatives and programs, which serve the purpose of facilitating and/or endorsing responsible firm behavior.

D.4.2. **Water and Environmental Legislation and Related Policies**

National Water Act

The National Water Act (NWA) of 1998 (Act 38 of 1998) (DWAF, 1998) is based on the Fundamental Principles and Objectives for a New South African Water Law and the National Water Policy[54].This policy introduced new approaches for managing the national water resources, reflecting the stipulations of the South African constitution as well as the characteristics of the water cycle. On occasion of awarding the prestigious Stockholm Water Price to the former Minister for Water Affairs and Forestry, Kader Asmal, South Africa was officially lauded for developing the 'world's most comprehensive and visionary piece of water legislation' (SIWI, 2000). This was also confirmed by a preliminary assessment conducted by Hamann and O'Riordan (2001) at the initial stage of implementation process. The NWA is the principal legal instrument relating to water resource management in South Africa. It contains comprehensive provisions for the protection, use, development, conservation, management and control of South African water resources. It is furthermore built around the principles of sustainable development, equitable allocation and

[54] DWAF. White Paper on a Water Policy for South Africa. 1997

efficient utilization for social and economic development (Pegram, Mazibuko, Hollingworth, & Anderson, 2006). After its adoption in 1998, a step-wise implementation process has been initiated[55][56].

The NWA proposes a whole suite of approaches to be implemented in order to attain the overall goals of the strategy. This includes the setting of water quality objectives, measures for pollution prevention as well as the establishment of a Reserve, which denotes the water needs for ecological sustainability and basic human needs[57]. Furthermore the NWA details regulations for the use of water, including authorizations and licensing, as well as matters of water pricing.

These stipulations are also of high relevance with regards to the use of water by industry and its impact on water resources. Specific regulations have been formulated to address the use of water in the mining industry[58]. These regulations stipulate preventative measures in order to avert any negative impacts on water resources through mining activities. As the custodian of water resources in South Africa, DWAF must not only be informed about any significant impact of the resource or changes in the approved use of water for of mining activities, but is also given ample powers to mandate certain preventative or remedial measures, including the installment of a monitoring system.

Water use licensing is the main tool for DWAF to control access to water resources for industrial use. The government has the right to review all existing water uses and issue new licenses based on the stipulations of the new Water Act. This is intended to support the equitable distribution and sustainable use of the resource and establishes a compulsory licensing process even for those users, which were lawfully using water before the new Water Act entered into force.

Mining companies need to obtain water licenses for their operations, detailing the amount of water used as well as the amount of water discharged into the natural system (Bopape, 2008).

Water licenses are based on water allocation plans for each catchment, which outlines all present and possible future water uses. Applications for water licenses are evaluated using criteria provided by the NWA (section 27), which are guided by the strategic importance of the respective use. Industries of strategic importance, such as power plants and oil-from-coal operations, receive water after ecosystem requirements, international obligations and social needs have been provided for. Mining operations might be classified as strategically important, for example when considered as crucial for employment in a certain area (Pegram et al., 2006).

The actual process to obtain a water license is lengthy and quite demanding on the side of the applicant. It is required to document the nature of the water use, as well as the impact on water resources from a local as well as from a catchment perspective. The applications for licenses are then processed consecutively by different government levels, starting with the regional DWAF offices. The official time schedule of this process is about three to 12 months, depending on the magnitude of the

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55 These more strategic objectives are stipulated in the National Water Resource Strategy (NWRS) (DWAF, 2004). The Water Resource Strategy is being developed in a consultative process with society at large.

56 The Minister of Water Affairs and Forestry is responsible for managing and administering water resources as the public trustee of the nation's water resources. The minister's responsibilities in this sense include ensuring that all water resources in every part of the country are managed for the benefit of all persons and that water is allocated equitably and environmental values are promoted.

57 In addition to a national planning process the NWA also foresees the preparation of catchment management strategies at the basin scale, which are tailored to the local level and related decision-making processes. The catchment management strategies had been envisaged to be managed and implemented by newly installed catchment management agencies, CMA. The installation of these new entities is however seriously lagging behind and original plans to establish an agency for each of the 19 South African catchment has been downscaled to 9 in a more pragmatic approach (National Treasury, 2009c).

58 DWAF. Regulations on use of water for mining and related activities aimed at the protection of water resources, GN 704 GN.

impact of the water use (DWAF, 2009). The implementation record of the water use licenses has been disappointing thus far. Pegram et al. (2009b) report a backlog of 1.300 applications, while 200 new licensing procedures are started every year. Representatives from various industry sectors have been voicing complaints about long processing times. As obviously water use licenses will only be granted after all assessments have been approved in favor of the applicant, the backlog leads to a situation where a number of businesses operate without a water license (Bloom, 2007; Lesufi & Möhr-Swart, 2007; Malan, 2008).

Water pricing is a further important instrument of the NWA, affecting the resource base of firms' operations. A core element of the pricing strategy is the raw water infrastructure charge for publicly-funded water infrastructure (Pegram et al., 2009b)[59]. Other provisions relate to the financing of water infrastructure development through off-budget funding schemes, which are managed through a specialized para-statal intermediary (TCTA). The financing approach is of high relevance for the mining industry, as many commercial infrastructure projects are financed through this model. Off-budget funding requires that off-take agreements are signed with the Ministry, on which basis TCTA can obtain funding from commercial markets. A newly introduced charging scheme for waste water discharges[60] is intended to force polluting industries to pay for the mitigation of costs and also contains a more incentive-oriented cost, similar to an environmental tax (Pegram et al., 2009b).

Best Practice Guidelines: Water and Mining

Complementing legislative provisions, DWAF has engaged in the development of 'Best Practice Guidelines for Water Resource Protection (BPG)'. The intention of these guidelines is to assist specifically the mining industry in addressing the most prominent impacts on water resources (Munnik, 2008). The guidelines acknowledge the significant impact of the mining industry on the quality of water resources and advocate the proactive management of these impacts in order not to compromise 'community and government' support.

The BPG emerged from a consultative process comprising a series of department-internal meetings and stakeholder workshops. They are 'in line with international principles and approaches towards sustainability' (DWAF, 2007) a address mine-specific water management issues[61] and appropriate strategies[62], techniques and tools to address these[63].

The BPG are intended to assist the mining industry in compiling water use license applications and other legal documents. In addition, the guidelines can also be used to inform interested and affected parties on the status of mining practices. The technical documents contain a specific limit values, process guidance as well as best practice examples. In that sense, the best practice guidelines can be considered as a facilitative tool of national government.

Water Services Act

Other legislation in the field of water management which complements the NWA is the Water Services Act (WSA) of 1997 (Act 108 of 1997) (DWAF, 1997), which needs to be considered in

[59] Mining users are charged operation and maintenance, depreciation and an Return on Assets cost on a monthly basis.

[60] The Waste Discharge Charge System was proposed by DWAF in 2006, its implementation is expected for 2010/2011.

[61] Integrated Mine Water Management, Pollution Prevention and Minimization of Impacts, Water Reuse and Reclamation, Water Treatment.

[62] Storm Water Management, Water and Salt Balances, Water Monitoring Systems, Impact Prediction.

[63] Small-scale mining, Water Management for Mine Residue Deposits, Water Management in Hydro-metallurgical Plants, Pollution Control Dams, Water Management for Surface Mines, Water Management for Underground Mines.

conjunction with the Strategic Framework for Water Services of 2003 (replaced the 1994 Water Supply and Sanitation White Paper). The WSA provides for the constitutional right to access of sufficient water and sanitation.

Whilst not directly pertaining to corporate actors in the mining industry, the Water Services Act establishes responsibilities in the field of water services provision. It thus defines those actors mining companies need to engage with in this regard. The WSA places the executive rights and responsibilities for the provision of water services with the local government. Therefore the main interaction between business and government is moved to the local level. Corporate actors engaged in water services provision are subject to municipal legislation, such as the Municipal Structures Act and the Municipal Systems Act. In addition, the Water Services Act also regulates industrial water use in urban areas by assigning the mandate to approve of any industrial water use or disposal of effluent to the water authority (i.e. the local municipality). The municipality is furthermore responsible for specifying industrial water use in the water services development plans and also for developing by-laws in order to control industrial use and effluent disposal. Water services development plans need to be developed by all metropolitan, district or local municipalities. These plans are to be included in the Integrated Development Plans (IDP) (see section D.4.5 for more information on IDPs).

Other important entities in the context of water services provision, which are of relevance for corporate actors as well, are the so-called Water Boards, established as national government business enterprises. As a commercial entity, they provide bulk water services to other water services institutions (e.g. municipalities), which then further distribute the water via the municipalities' reticulation systems. Likewise they are also mandated with providing water to industrial users[64], including the mining industry. In fulfilling this mandate they play a key function in ensuring service stability to municipalities and industry and balancing demand and supply by different users. The main Water Boards in South Africa have undergone recent restructuring in order to increase their financial viability. As demonstrated by the example of Rand Water, operating in the Gauteng/Vaal area, and Umgeni Water in KwaZulu Natal water boards are increasingly run as independent businesses[65].

One of the key challenges faced by DWAF as the main administrative body is the creation of sufficient interfaces and inter-linkages between the NWA and the Water Services Act. This includes the alignment of strategic planning for water resource management and water services provision. DWAF also needs to coordinate common regulatory and audit functions for both areas and promote partnerships for ensuring effective implementation, capacity sharing and common information management. In fact, avoiding divergent policies in this regard has proven to be a major issue in terms of government effectiveness over the past years.

National Water Resources Strategy 2004 & Water for Growth and Development Strategy 2009

In addition to legislative requirements, water policy development at the national level is very much driven by overarching strategies. The 2004 National Water Resources Strategy is the policy document framing the contents outlined in the Water Act in a way that lead towards their operationalization (DWAF, 2004). It has served as the main reference document for those working in the water sector and was recently augmented by the much touted Framework on Water on Growth and

[64] In this regard they are also different from water service providers and also water service intermediaries, which are required to register with the water services authority and are subject to respective monitoring and control.

[65] They need to have sound financial management around infrastructure development and meet other obligations related to businesses, such as good 'internal' governance and organization (National Treasury, 2009c).

Development. This framework outlines the direction of the South African water sector in relation to other economic sectors over the years to come. The 2008 Framework specifically addresses the role of water in achieving the projected economic and social delivery programs and is thus premised on the 6 % growth projection made by ASGISA. It aims to ensure water security to allow for the attainment of this target, while providing basic services and environmental sustainability.

In the context of these strategic issues, the South African government (DWAF) has convened a *Water Sector Leadership Group* of key stakeholders including large business associations (Business Unity South Africa, Chambers of Mines), civil society, academic institutions and the energy sector. The aim here is to receive advice on key strategic issues, such as resource protection, water conservation and demand management as well as institutional reform issues. In addition, annual high level advice is provided by a CEO roundtable of key companies, which is directly advising the ministerial level (DWAF, 2008).

National Environmental Management Act

In addition to water-specific legislation, the National Environmental Management Act, NEMA (Act 107 of 1998) (amended by Act 56 of 2002, Act 46 of 2003, Act 8 of 2004) is the central document in South African environmental law. NEMA provides for a co-operative framework of environmental governance by establishing principles for integrated environmental management. The Act furthermore details compliance and enforcement mechanisms, the provision of environmental information and foresees the incorporation of international environmental instruments in the South African policy context[66].

Environmental Impact Assessments (EIA) are the most relevant practical implications of NEMA for the mining industry[67]. At the end of 2008, the existing EIA Regulations underwent additional alterations, which were specifically targeted at achieving better integration and coordination of mining activities in the NEMA environmental impact management regime. Under the new system, environmental authorization under NEMA is required as a pre-requisite for a mining permit under mining law. As a consequence, the mining industry is subject to the same regulations as other industry sectors, including the appeal, refusal and enforcement provisions contained in NEMA.

In terms of mining activities and EIAs, the Minister of Minerals and Energy issues the environmental authorization and the Minister of Environmental Affairs and Tourism acts as the appeal authority[68]. These new provisions however, are not received without criticisms. The NGO community is particularly wary of the fact that now the DME will be responsible for the environmental assessment of the very industry they are expected to promote (Pretorius, 2008a).

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66 The creation of NEMA is exemplary for the participatory policy formation processes taking place after the democratization in 1994. In the framework of a Consultative Environmental Policy Process (CONEPP) a White Paper on a National Environmental Management System was developed in 1996. This marked a paradigm shift from a primary focus on green issues, i.e. conservation to a more encompassing concept of sustainable management. After a two-year consultative process the DEAT translated the concept developed in the White Paper into the National Environmental Act (Act 107 of 1998) and formulated a concurrent National Environmental Strategy and Action Plan. These policy documents detail the vision of South African environmental policy approaches, their principles, strategic goals and objectives as well as governance and implementation issues. The policy defines environment as including biophysical, cultural, economic, political and social dimensions and states that people are part of the environment and at the centre of concern for its sustainability. With this credo the South African environmental policy creates an explicit link between environmental protection and sustainable development and thus the joint and integrated pursuit of environmental, social and economic goals (DEAT, 2000).

67 EIA regulations were first introduced even before the promulgation of the NEMA under the Environment Conservation Act in 1998 and were then re-issued as NEMA EIA Regulations and became effective in 2006 (Sandham, Siphugu, & Tshivhandekano, 2005). Government Notices No. R 385, R 386 and R 387 in Government Gazette 28753 of 21 April (as amended by Government Notice R 613 in Government Gazette 28938 of 23 June 2006).

68 Speech by Marthinus van Schalkwyk, Minister of Environmental Affairs and Tourism delivered at the opening of the conference "10 years of EIA's in South Africa" Somerset West, 24 November 2008.

D.4.3. **Mining Legislation**

Legislation directed at the mining sector provides for additional incentives for the industry to conform to measures provided by water and environmental legislation. In some cases, this has led to a duplication of efforts, which again resulted in stifling of national governments ability to regulate the industry.

Mineral and Petroleum Resources Development Act

The mining law as it exist today is relatively young dating back to 2002. The new Mineral and Petroleum Resources Development Act (MPRDA) (DME, 2002) aims to address a range of negative impacts stemming from the mining industry. These impacts not only include environmental dimensions, but also social and human rights related issues. By claiming the state's sovereignty over mineral resources (private ownership was common previously), all companies needed to renew their prospecting or mining licenses. One of the key conditions for this renewal is the transfer of equity to formerly disadvantaged South Africans, referred to as Black Economic Empowerment (BEE)[69].

The second important feature of the new mining law is the introduction of the so-called social and labor plans (SLP) as prerequisites for the companies' mining license. The SLP is the company's vehicle to detail its contribution to communities, where they operate. SLPs are required to be aligned with the respective municipalities' integrated development plan (IDP).

The MPRDA also provides ample guidance on the environmental performance of mining houses, while NEMA is the main guideline for interpreting the environmental provisions of the MPRDA. Furthermore the MPRDA mandates that all mining operations must be conducted in accordance with the principles of sustainable development by integrating social, economic and environmental factors (Section 37).

The Environmental Management Program as well as the Environmental Management Plan (EMP)[70] are subsequently introduced as the main vehicles to assess the potential implications of mining operations for the natural and socio-economic environment. The owner of the mining right is fully responsible for the rehabilitation of the affected area and must make the prescribed financial provision for this rehabilitation (polluter pays principle).

Mine Closure is the second important aspect introduced by the Act. According to the provisions in Section 43, the owner of a mining right remains responsible for any environmental liability until a closure certificate is issues by the Minister of Mineral Affairs and Energy. The issuing of this closure certificate must furthermore be coordinated with the Chief Inspector at DWAF.

Sustainable Development through Mining Initiative

In order to address the linkages between mining and sustainable development as stipulated in the MPRDA and in reaction to a number of international as well as national discussions, the DME has embarked on a major effort to explore the determinants for achieving sustainable development through mining (GSDM) (DME, 2007b). The SDM initiative was launched in 2004 and establishes the

[69] The most prominent aspect of BEE has been the government's insistence that blacks should own significant company shares, which prompted fears of value dilution in established companies. After protracted and at times bitter negotiations, a new target was agreed on for equity transfer of 26 % within 10 years. But most importantly this was placed within a broader set of requirements by which to judge mining companies' transformation efforts. What is known as the BEE 'scorecard' includes such important CSR-related items as community development, improved employee housing and affirmative procurement. Companies are now assessed with respect to this scorecard in their quest for transforming their 'old order rights' into 'new order rights', and in competing for new exploration or mining licenses (Southall & Sanchez, 2007).

[70] Programs must be submitted in case of obtaining a mining right, while plans apply to the incidence of obtaining reconnaissance.

vision that mining should contribute optimally to sustainable development in fulfillment of South Africa's commitments at the 2002 Johannesburg Summit. The initiative focuses on the role of mining in facilitating the transition away from a resource-based to a diversified economy. In addition, mining is supposed to generate benefits through overall socio-economic development and empowerment (DME, 2007b). So far, the SDM has produced a background document that discusses the main challenges and targets of the mining sector with regards to sustainable development and compiled an initial list of indicators for monitoring the contribution of the mining sector (DME, 2007c). The momentum of the initiative has been weakened due to financial difficulties encountered by the mining industry in 2008/2009 and might not reach its projected targets by 2010. It remains to be determined, whether the platform will be accepted by the mining industry as a supplement to other international initiatives, such as the MMSD or the ICMM guidelines.

The following table summarizes the legal provisions and guidelines introduced above and thus provides for a categorization of the main regulatory thrust. Main issues addressed by each regulation are discussed with view to their relevance for the mining industry.

Table 12: Overview of Main Government Drivers at the National Level

Title	Type	Issues addressed/Implications for the mining industry
National Water Act	Legal act: mandating & to some degree facilitating	Water resources management, use of water by industry remedial actions by industry, monitoring and enforcement mechanisms, water pricing mechanisms and charge systems
Best Practice Guidelines: Water and Mining	Guidelines: recommendations	Water resources management and the mining industry, best practice examples and technical specifications offer orientation to the industry
Water Services Act	Legal act: mandating	Water services delivery, mainly addresses the role of municipalities in water service delivery; however mines are affected by regulation as water users and due to their emerging role as water infrastructure providers
National Water Resources Strategies	Policy guidance: endorsing	Provides the encompassing framework for water resources management and sets the overall resource management imperative
National Environmental Management Act	Legal act: mandating	Provides the legislative framework for environmental impact assessments, which also apply to water resources management and need to be aligned with provisions of the National Water Act
Mineral and Petroleum Resources Development Act	Legal act: mandating	Directly regulates all aspects pertaining to the impacts of mining activities with regards to social as well as environmental impact; needs to be aligned with legislation in these sectors
Sustainable Development through Mining Initiative	Platform/Initiative: endorsing	Initiative to develop a South African approach towards mining and sustainable development, drawing on previous initiatives in the international and African context

This section on the regulatory environment for water and mining in South Africa highlights the following aspects. The national regulatory framework for the interface of water and mining is considerably **complex,** with several acts from differing government portfolios addressing these interlinked issues. This also means that business is faced with this complexity. Furthermore, regulation is rather **advanced** with view to international standards as well as the regulatory approaches followed. This indicates that at least at the national level, there is (or was) considerable will to progressively address some of the most pressing challenges in this regard. Innovative

regulatory approaches were foreseen and partly also followed by government, complementing legislation with endorsing practices and discussion platforms.

The set of regulation discussed here also shows that business is not only directly affected, e.g. by mining or environmental legislation, but also by those provisions for other actors (e.g. municipalities) they have to deal with. An example here is the Water Services Act and its relevance for defining the role and responsibilities of municipalities, which then also impacts mining firms as well.

Lastly, this section also demonstrates, that mining companies are not only faced with a considerable amount of requirements (and these water-related acts only address a very small segment of all regulatory requirements), but can also make use of certain access points for having their interests reflected at the national level. The implications of this "access" must be judged against the historic dimension of the interaction between government and the mining industry in South Africa.

D.4.4. **Historic Perspective on the Business-State Relationship**

The current mining legislation is considered to be quite progressive. However when mining commenced in South Africa with the discovery of gold and diamonds in the late 19th century, the impacts of this industry remained largely unregulated. For quite a long period, the South African government, utilized the mining industry to consolidate its position and reap the benefits from mineral exploitation (Adler, Findlater, Funke, & Turton, 2007a).

The historic perspective reveals the close entrenchment of business and especially the mining sector with government from early colonial beginnings through the apartheid period and until the present day (Taylor, 2007a).

The colonial period saw the rise of the mining industry, which was heavily promoted by the British colonialists in an effort to cement their dominance vis-à-vis the Dutch settlers (Libby, 1987)[71]. In addition, this period laid the foundations to for two decisive developments: first, urbanization in the vicinity to the mining areas on the Witwatersrand and second, repression and subjugation of blacks, which culminated in the establishment of the apartheid regime in 1948.

According to Taylor (2007b), business initially supported and also benefitted from the apartheid regime. Apartheid policies allowed for access to a vast migratory work force. Furthermore subsidies and protective measures favored the local industry and led to an overall stability and substantive growth. There was also an increase in foreign direct investment as well as the formation of powerful business conglomerates. Particularly the extent to which mining companies colluded with or underpinned the apartheid state is still a matter of debate. As discussed by Hamann et al. (2007) some scholars suggest a dichotomy between the largely anglo-dominated miners and the boer-dominated ruling party (Lipton, 1985), which resulted in a somewhat adversarial state-business relationship. However, according to the same authors there appeared to be an agreement concerning the relevance of the migrant labor system installed by the apartheid government[72] for the economic success of the mining operations, the primary aim of which was to ensure the supply of low-cost labor to the mines (Crush, Jeeves, & Yudelman, 1991)[73].

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[71] This conflict line is propagated throughout the ensuing decades resulting in two Anglo-Boer wars as well as a continued hostility of the two different colonialist groups.

[72] The system comprises policies regarding the taxation of rural black population, which has the effect of pushing them into forced labor in mining areas.

[73] The final report of the Truth and Reconciliation Commission goes so far as to argue that: 'The blueprint for "grand apartheid" was provided by the mines and was not an apartheid state innovation.

The situation began to change in the 1970s. Business in general was affected negatively by the effects of apartheid, due to the cost incurred to control the black resistance movement as well as the sanctions installed against the country on international markets (Gelb, 1991). Coinciding with global recession, the exclusion of the black population from the economy constituted a major problem for South African businesses by the late 1980s. As a consequence, the white business community was considerably less supportive of the apartheid government and sought to approach the ANC in exile (O'Meara, 1996), while not voicing support for either side. Business remained in sort of a limbo situation until an ANC-led government actually became a veritable possibility. The end of the apartheid regime and the transition process thus also saw a shift in terms of state-business relationships, as business needed to define its position vis-à-vis the newly emerging ANC government (Taylor, 2007b).

Generally, there was only limited disposition of the ANC government to act as a driving force in the redefinition of the state-business relationship for a number of reasons:

- lack of experience among ANC elites on how to address, let alone confront business leaders;
- perceived dependence on the goodwill and the contribution of business in order to achieve the goal of the new government, i.e. economic growth;
- lack of expertise and capacity on the side of the ANC government in economic policy (Goldstein, 2000); but also limited suitability of 'old' white bureaucracies to address these challenges (Michie, 1997) and the subsequent increase in Africanization of government bureaucracies.

As a consequence, business managed to exert a significant influence in the formulation of all important policy decisions during the transition years, particularly with regards to pushing the overall economic agenda towards market liberalism (Michie, 1997)[74]. Such negotiations took place during transition in a number of economic policy forums.

In 1995, the formation of the National Economic Development and Labor Council (NEDLAC) epitomized this development and emphasized the ANC's heavy reliance on corporatist structures. It also 'embodied the state's commitment to business-state interaction' (Taylor, 2007b). This commitment was considered as a remedy to fears uttered by the white-dominated industry concerning their status. Last but not least the intention of NEDLAC was to provide prosperity in the 'new' black-governed South Africa, but also to promote an understanding of partnership among the different parties represented (Taylor, 2007b).

NEDLAC served as the main policy-making body during the time of transition, marking the height of neo-corporatism in South Africa (Adam, 1998). In the following years, with government gaining more expertise in terms of financial and economic regulation and an overall changing political environment, NEDLAC lost its impact. This can also be attributed to the failure to address the following pertinent issues: sustained economic growth, the challenge of BEE and the dichotomy between NEDLAC and GEAR (Gelb, 2005). While government re-asserted its own stance through the promulgation of GEAR and some conflicts between business and government occurred at that time, the dependence of government on business was rather re-emphasized though the new economic agenda (Taylor, 2007b). GEAR fundamentally favored big business, including mining, and thus business and government continued to be entrenched through numerous informal and formal coalitions and networks driven by partly quite powerful general and sectoral business associations (Taylor, 2007b). Particularly big and still quite 'white' business managed to maintain its political

[74] This pressure was supported by the strategies of international financial institutions and donors.

influence, increasingly through partnership-oriented associations. These associations often focused on social issues, such as small enterprise creation, crime prevention and general social security[75].
The persistent influence on the reform process and the economic framework of the country exerted by big business and particularly the mining industry becomes evident from this brief overview of the relationship over time. This sets the reference for interactions under the new legislation as previous interactions and entrenchment between business and government pervade the current engagement.

D.4.5. **Role and Capacity of Government Actors**

The previous sections provided an overview of the available regulatory and facilitative tools for the South African government as well as the potential legacies of previous government-business relationships. The question that emerges in this context pertains to the present day capacity vested in those parts of the South African government responsible for applying, implementing and enforcing these measures. Assessing the capacities provides for an indication of how well these government tasks are performed and thus the potential strength of government as a driver.
This section discusses indications for government capacity, focusing on the national as well as the local level. The provincial level also finds consideration as it provides for an important linkage between national level policies and local level implications.

The distribution of responsibilities between the different levels of government is particularly noticeable in the field of water management. In the first place water management is established as a matter of exclusive national competence. The provision of water supply and sanitation services however are a matter of concurrent responsibility (Pegram et al., 2006). While local government is assigned with executive authority (section 156 (1)), national and provincial government have the obligation to provide for the appropriate framework in terms of capacity development and oversight of local government (section 155 (6) (a)). Provincial government is empowered to intervene, where local government fails to deliver (section 139). This specific coordination of government responsibilities is also referred to as 'cooperative government', which determines the relationship as well as dispute management mechanisms between the different spheres of government and provides for a consideration of broader societal traditions.

National Level[76]

The two main government departments at the national level that are of relevance for the cases presented in this thesis are the ***Department of Water Affairs and Forestry (DWAF)*** and the ***Department of Minerals and Energy (DME).***

DWAF is the custodian of South Africa's water resources and also responsible for the provision of water and sanitation services delivered by local government. In performing this function DWAF has achieved some mentionable successes, particularly with regards to moving South Africa closer to

[75] According to Taylor 2007, these big players act as 'encompassing organizations' as described by Mancur Olson (1982).

[76] The structure discussed in this section represents the institutional set-up before the re-structuring of some government departments in the wake of the National Elections in April 2009. Under the new structure, DWAF has been transformed into a Department of Water Affairs; the Forestry portfolio has been transferred to the Department of Agriculture. DEAT was split up into the Department of Environmental Affairs and the Department of Tourism. The new Department of Water Affairs and the new Department of Environmental Affairs are led by the Minister of Water and Environmental Affairs. The Department of Provincial and Local Government was transformed into the Department of Cooperative Governance and Traditional Affairs.

meeting the water related MDGs. At the same time the department is faced with mounting internal as well as external challenges.
External challenges are those originating from the increasing pressure on South African water resources, such as climate change and a deteriorating infrastructure. Internal challenges derive from the governance structure at DWAF, other competence ministries and government authorities.
DWAF currently has to deal with one of the highest staff turnover rates of all South African government portfolios (Mail & Guardian, 2007). Furthermore the coordination with other government departments, such as the DME is difficult in some cases. In fulfilling its mandate regarding water services provision, DWAF is confronted with low capacities at the local government level, which is often impeding efforts and strategies developed at the national level. Implementing water quality standards remains difficult as enforcement mechanisms at the regional DWAF offices, which are in charge for this task, are usually weak (Bopape, 2008).

In addition to DWAF, the large Water Boards (e.g. Rand Water), play an important role in managing water resources. This is mainly due to their close interaction with municipal and industrial water users (Rand Water, 2007). Rand Water for example is involved in extensive monitoring activities of water sourcing areas and engages in partnerships with other governmental and non-governmental entities. In addressing these tasks, Rand Water often devises of a higher technical capacity than DWAF, such as better monitoring systems, but also a better skills for engaging with industrial users. For example Water Boards run the so-called water user forums in areas of high water demand (e.g. the Vaal catchment) and thus perform a balancing function between different users. In some instances, Water Boards thus also constitute a considerable driving force influencing the behavior of industrial water users, for example with regards to promoting resource protection. Similarly, in terms of infrastructure development, Water Boards seek to develop new customers among municipalities and thus engage in capacity-building measures for municipal administrations.

According to the official mandate, the **DME** is responsible for formulating government policy for the minerals and energy sector, providing for the sector's integration in the national and international economy as well as its effective regulation in order to promote growth, transformation and sustainability (National Treasury, 2009a). In this role, the department needs to strike a balance between promoting the minerals industry and at the same time regulating its considerable social and environmental impacts. The main tool for regulation is the mining license, which is granted based on a number of criteria stipulated by the MPRDA. However, regulation and licensing activities have taken off slowly due to capacity constraints (Mail & Guardian, 2007).
On the other hand, the department is considered 'senior' or high-profile due to the crucial economic importance of the sectors it oversees. In fulfilling this role the department has been struggling in dealing with well-established business interests and accusations of too close relationships with the mining industry. The impression prevails that the department is following a top-down approach internally as well as in interactions with key stakeholders. Every aspect is managed through the national offices in Pretoria, while the regional offices only have an implementation function. Consultation of stakeholders in granting licenses as well as the coordination with other government portfolios is usually considered insufficient.

Department of Environmental Affairs and Tourism (DEAT)

DEAT is the primary custodian of the environment and also oversees the implementation of the right of all South Africans to an environment that is not harmful to health and well-being. In this function, DEAT is responsible for administering NEMA, the EIA process and the National Framework for Sustainable Development.

Over the past years, DEAT has been considered a rather weak or junior department, compared to senior departments like the DME or also DWAF. As such, it has been criticized for simply giving the nod to environmentally controversial projects pushed by industry and those departments in favor of those developments (Mail & Guardian, 2007).

Similarly, it has been considered unfortunate that the NFSD has been left in the responsibility of this rather weak department, which is not expected to develop the necessary clout to create broad-based buy-in from other government departments (Fig, 2007b).

While DEAT is often criticized for being too slow in making decisions, it has a good track-record in other areas (Mail & Guardian, 2007). For example, the department has established the Green Scorpions, which as 'environment police' is supporting compliance enforcement with regards to air pollution incidents. With the formation of the new government in the wake of the 2009 elections DEAT and DWAF were re-organized and combined into a new Department of Water and Environmental Affairs.

Department of Provincial and Local Government (DPLG)

The DPLG provides policy advice and support on the collaboration between provincial and municipal government, integrated development planning and the integration of traditional leadership (National Treasury, 2009b). The DPLG thus does not regulate corporate actors per se; it is however instrumental in ensuring and creating capacity among local municipalities. The Department also oversees the Municipal Infrastructure Grant (MIG), which is designed for assisting municipalities in meeting their infrastructure needs. The latter aspect is also of interest for mining companies, which are dependent on or interested in water infrastructure investments and the collaboration with municipalities in this regard.

The department mostly operates through the *South African Local Government Association (SALGA,* which was established as an official representation of local government and a supportive agency in terms of hands-on interaction and advice for municipalities. Through this close interaction, the department managed to improve the use of infrastructure grants over the past years and has introduced several policies helping to improve governance and accountability at the municipal level (e.g. limits of performance bonuses for municipal managers). Currently, the considerable skill shortage and the infrastructure backlog constitute too great a task to allow for a higher performance level (Mail & Guardian, 2007). Furthermore, integration of traditional leaders in modern municipal systems remains a challenge and is to be addressed through the newly introduced departmental structure.

Provincial Level

At the sub-national level, South Africa is subdivided into nine provinces: Gauteng, Mpumalanga, North West, Limpopo, Free State and the Eastern, Western and Northern Cape. Each provincial government is led by a provincial premier and devises of own legislative power and according executive duties within certain thematic areas assigned by the constitution. In addition, the provinces

are tasked with the development of Provincial Growth and Development Plans, which details the long-term development trajectories for a period of ten years.

In the context of water management and the regulation of mining operations, there is a certain split of competences between provincial government departments for environmental and economic affairs and the provincial branches of the DME and the regional branches of DWAF. This leads to a situation, where corporate actors are faced with the necessity of dealing with a wide range of different government actors, when addressing certain aspects of the water challenge. Capacities of provincial governments vary between the different provinces and the capacity level at the provincial level often also provides indications with regards to the capacity at the local government level.

Provincial structures in South Africa are relatively recent and the 'legacies of apartheid' still determine challenges and problems of current provincial government (Picard, 2005).

Before 1994 South Africa was subdivided into several regional government unities that reflected the policy of racial segregation. The four white provinces were 'little more than bureaucratic extensions of the central government in Pretoria' (Picard, 2005). So-called 'Own Affairs' departments existed for Coloured and Indian groups. The majority of the African population however (45 %), lived in quasi-independent black-led territories, i.e. the 'independent' TBVC[77] states and the self-governing territories (homelands) (see annex).

The merging of these very different structures was a daunting task for the newly-elected democratic government. In addition, the government was also faced with the need to dismantle the structures of former homeland administration. These had been established in order to manifest separate development trajectories within apartheid South Africa. Over time they had evolved into a rather elitist, highly bureaucratic, inefficient and largely under-capacitated government structure that was prone to favoritism and patronage. Considered as highly corrupt, fragmented and largely anti-development, homeland government was often described as only catering to the needs of a small minority, while leaving other parts to underdevelopment and poverty (van Zyl-Slabbert in (Leach, 1987)).

Many of these problems and short-comings were carried over to the newly formed provinces. A lot of the former civil servants kept tenure in the new governmental structures or were promoted to higher posts immediately before the structural change. In addition to the continuation of 'old systems and practices', the new administrative units were suffering from a harsh deficit in skilled human capacity, i.e. those people who could 'do the job' in contrast to those on the payroll but not qualified to fulfill the tasks. As a consequence, the lack of capacity under the new democratic government was striking in the early years; almost all areas of skills were lacking, including project identification, design and monitoring, as well as crucial financial skills, such as financial analysis, budgeting and debt management (DPSA, 1997; Picard, 2005). In addition, there was no clear culture of accountability. In the following years, the composition of the newly formed provinces, i.e. the impact of their apartheid legacy, to a great deal determined whether a more effective administrative system would evolve.

Picard (2005) shows that provinces, which were faced with the challenge of integrating a large number of former homelands into their structures, encountered considerable problems in building an effective administration (Lodge, 2005)[78].

[77] Transkei, Bophuthatswana, Venda and Ciskei.

[78] Instead of allowing for higher discretion of policy design at the provincial level, provinces were assigned 29 areas of responsibility, most of them concurrent with those of national government. National government has the right to intervene with provincial policies.

Because of their diverse historic backgrounds and the heterogeneous financial basis, provinces have taken on different development trajectories over the past years. The following brief overview introduces the four provinces addressed in this thesis.

Gauteng Province, whilst considered as the economic powerhouse of South Africa, is still exposed to a range of development issues, including poverty and unemployment. It is specifically in this region, were the differences between these extremes become most obvious. This is evidenced by the split between the First and the Second Economy, as well as the co-existence of affluent well-served areas next to underserved townships (NDA, 2009). From a governance perspective, Gauteng appears to be on a good trajectory. Considerably unaffected by homeland legacies, the newly formed provincial administration managed to overcome apartheid provincial structures. The provincial administration is committed to continued staff training, the control of corruption and was quite successful in improving service delivery (Picard, 2005). In sum, Gauteng province disposes of a stable financial basis, combined with a well-performing administrative structure.

Mpumalanga Province devises of a relatively stable income base due to strong agricultural production, vast exploitable coal deposits and related industries, such as steel milling and power production, which are also expected to expand over the next years (NDA, 2009). EMalahleni and Middelburg as the industrial centers of the province attract a mix of highly skilled employees, but also increasing numbers of workers with no or little skills. This aggravates the need to provide services to a growing number of inhabitants. Large areas of the province are still underserved with regards to water as well as other services, especially in those municipalities outside the growth centers. Mpumalanga province is an amalgamation of the former Transvaal province, and the Kwa-Ndebele and Kwa-Ngwane homelands. As a consequence, the integration of different administrative entities leads to problems with low institutional capacity at the municipal level. This could however partly be mitigated by training and capacity-building activities. Also, Mpumalanga is fairly attractive as a workplace for well-trained municipal staff due to its proximity to Gauteng Province.

North West Province is dominated by the platinum mining industry. Due to the mineral wealth, the province was able to generate considerable growth. However, with up to 50 %, the unemployment rate still is very high. Disparities between the First and the Second Economy as well as between urban and rural areas are considerable. There is a considerable backlog in service delivery and high level of poverty in the region. Particularly, the burgeoning informal settlements in the vicinity of mining operations (Hamann, 2008) epitomize a range of development challenges, including a high incidence of HIV/AIDS (NDA, 2009).
Covering large portions of the former Bophuthatswana homeland, the province is faced with historic legacies of homeland administration and the need to create completely new administrative units. As a consequence, government at the local level is often struggling with capacity constraints. While the variance in government capacity at the local level might be comparable to the situation in Mpumalanga province, the service backlog appeared to be more severe in the North-West province.

Limpopo started out as one of the economically weakest provinces after democratization. Albeit economic growth has been considerable during the last 15 years, poverty levels are still unsatisfactorily high peaking at over 60 %. The economic growth can be credited to the

developments in the agricultural and tourism sectors as well as the discovery of a wide range of mineral deposits. In addition, Limpopo is affected by the HIV/AIDS pandemic to an extraordinarily high degree and suffers severe loss of skills due to the migrations of skilled people to other areas of the country (NDA, 2009). Compared to the other provinces, the overall problem pressure in Limpopo province is considerably higher. This is aggravated by the fact that location-wise Limpopo is far removed and difficult to reach for governmental capacity-building programs and economic development measures[79].

Limpopo was faced with the challenge of integrating the homeland administrations of Venda, Lebowa and Gazankulu with former white provincial government. The creation of new administrative structures and the build-up of adequate human resources is still underway (Picard, 2005). In comparison to the other provinces discussed, the capacity situation at the local level is particularly problematic in Limpopo. Most of the municipalities struggle to provide adequate services to their inhabitants.

The brief description of the four provinces suggests the following capacity gradient. The gradient ranges from Gauteng province with a relatively high capacity via Mpumalanga and North West, with a relatively lower albeit overall medium capacity to Limpopo with the lowest levels. As discussed in section C.2, this gradient will be taken as valid for the purpose of categorizing the different case studies presented in the following chapters. However, it is important to consider that local conditions may differ from the overall provincial picture. Whenever this is the case, it will be reflected in the case study descriptions. The following section provides a more detailed overview of local government structures.

Local Level

At the local level, government is structured into metro, local and district municipalities. There are about 231 local municipalities organized in 46 districts. The districts combine between three and five local municipalities. In addition, there are six metro districts, which maintain their own administrative system[80][81].

Apartheid legacy has not only impacted the formation and current performance of government at the provincial, but also at the local level. Government at the local level underwent a substantial transition and re-structuring (Wittenberg, 2007). New municipalities and district councils had to be formed; powers and functions had to be newly distributed. During apartheid, white urban areas basically boasted fully-fledged and well-capacitated municipalities to serve these areas. In the mostly rural black homelands no local government structure existed. Local chiefs represented traditional authorities. With the end of apartheid new national legislation (such as the Local Government Transition Act of 1994) and a completely new demarcation of municipal boundaries led to the emergence of spatially reconfigured municipalities (Houghton, 2005). The newly formed municipalities are designed to cut across former racial divides and are usually larger than the

[79] Mpumalanga and North-West provinces are easier to reach due to their relative proximity to Gauteng and thus to the country's administrative and economic centers.

[80] These are the larger cities of Johannesburg, Pretoria (Tshwane), Cape Town, Durban (eThekwini), Port Elizabeth (Nelson Mandela Metro) and Ekuhurleni (located in the vicinity of Johannesburg International Airport).

[81] The basic role and functioning is laid out in the Municipal Structures Act (Act No. 117 of 1998, amended in 1999, 2000 and 2002), which details the different categories of municipalities as well as the internal structuring. This also comprises the creation and composition of the council, the committees and ward committees as the political bodies of municipalities. It furthermore details the division of tasks between local and district municipalities.

previous ones. It was expected that the larger size allows for a sufficiently large tax base and for the effective redistribution of resources at the local level (Wittenberg, 2007).

Local Government Tasks

Local government restructuring and decentralization are broadly considered the main approaches towards democratization and the realization of the developmental state at all government levels. This supports the goal of not only removing the spatial separation inflicted by the apartheid regime, but also of identifying new approaches to service delivery (Parnell et al., 2002).

Consequently, the responsibility for social service delivery and the fostering of local economic development was transferred to local government. The Municipal Services Act (Act No. 32 of 2000, amended in 2003) empowers and guides local government in this regard (Pegram et al., 2006). For example, the provision of basic services, including water (Khosa, 2002)[82], to all members of a local community is established as one of the core municipal commitments which is to be achieved in an equitable and efficient way.

The **Integrated Development Plan** (IDP) constitutes the central document of planning processes at the municipal level and has become an important *leitbild* for participatory developmental governance, for a modernized and efficient administration and the cooperation of government at different levels (Harrison, 2006)[83].

IDPs are compiled for a duration of five years, which coincides with the duration of the term of local and district government officials. The IDP comprises guidance on all aspects of relevance for government officials in order to enable 'developmentally-oriented municipal planning', as described in the Municipal Systems Act of 2002 (DPLG, 2000). Accordingly, the IDP coordinates plans for development at the municipal level, provides the platform for linking local with provincial and national development agendas and forms the policy framework for budgetary decisions. IDPs are developed in a consultative process, involving not only the local community, but also other societal stakeholders, including traditional authorities (Section 29 of (DPLG, 2000)). The document is reviewed in regular intervals and is monitored at the provincial government level.

The water services plans required under the Water Services Act (see above) also form part of the IDP (Pegram et al., 2006). A further important aspect of municipal tasks in relation to water service provision is the management of financial assets and investments according to the Municipal Finance Management (Act No. 56 of 2003). Among other items the Act determines, how capital expenditures and assets are handled in a municipality and under which conditions municipalities can enter into public private partnerships. This is particularly relevant for water infrastructure development[84].

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[82] In order to achieve this goal most municipalities have opted for the 'internal' provision of water services, rather than the delegation model, where a separate entity, albeit wholly owned by the municipality, is managing municipal services.

[83] Core components of IDPs (DPLG, 2000)

- Vision for the long term development of the municipality,
- Assessment of the current level of development, identification of those communities without access to basic municipal services,
- Council's development priorities, including local economic development and internal transformation,
- Council's development strategies aligned with national and provincial sectoral plans,
- Spatial development framework, including basic guidelines on land use management,
- Council's operational strategies,
- Disaster management plans,
- Financial plan, with a budget projection of at least three years,
- Key performance indicators and performance targets.

[84] The Act furthermore mandates mechanisms for monitoring of municipal budgets through the national and provincial levels, disclosure requirements and transparency as well as public accessibility of financial information.

The IDP as well as the water services plans constitute the main terms of reference for corporate actors, seeking to get involved with municipalities on developmental issues in general and water management issues in particular. Also water requirements of industrial users need to be reflected in municipal water planning documents.

Local Government Structure

The Municipal Structures Act (DPLG, 1998) establishes the main municipal functions and structures. At the core of the municipality is the council as the main decision–making body. It consists of councilors elected at the so-called ward level, which denotes a certain suburb or neighborhood in a municipality. Local government is furthermore understood as the main interface between the state and its citizens and thus constitutes the platform for participative approaches and consultations. In order to fulfill this mandate, ward committees are established at the ward level (DPLG & gtz, 2005).

These ward committees, are chaired by the ward councilor and provide for the main linkage of community needs to decision-making within the municipal council. According to the legislation, the up to ten ward committee members should represent a broad range of different interests and should be elected by the residents in a ward area. Ward committees are expected to remain independent from party politics, which otherwise tend to dominate the set-up of municipal councils (DPLG et al., 2005). As main tasks, the ward committees are responsible for establishing communication channels between the citizens and the municipal council and facilitating the public participation process with regards to the Integrated Development Plans (DPLG et al., 2005).

District Municipalities are in the first place established to provide support services to the local committees. They are involved in strategy development and monitoring as well as the 'transboundary planning' according to the overall mandate (Pycroft, 2000). In cases of a huge lack of capacity at the local level[85] some service delivery functions are also vested with the district municipality.

Municipal structure set-up is of relevance for corporate actors as it determines the channels of communication with local government officials and renders the mode of interaction with local communities through official structures.

Challenges and Issues

Despite a clear mandate, the track record of (water) services delivery by municipalities has been mixed at best. This can be related to a major lack in capacity to address the complex task of water resources management (Khosa, 2002; Magketla, 2007). It is particularly the lack of performance, resulting from capacity constraints that constitute a considerable 'shadow of anarchy'. This anarchic shadow then prompts corporate actors to step in and become involved with performing municipal tasks, including those in the field of water management and water services provision.

Following the categories for assessing government capacity introduced before, local municipalities are constrained in all of these categories to a greater or lesser extent.

a.) Financial resources management

Especially when considering challenges related to water services, financing water infrastructure is an emerging concern (Moraka, 2008). This requires the management of grant funding provided by national government together with the appropriate and long-term planning of municipal

[85] This is for example the case in the Sekhukhune District, which will be discussed in Case Study 4.

infrastructure accounts (Olivier, 2008). In addition, the introduction and implementation of adequate water pricing schemes is crucial in order to achieve cost recovery of water services provision (Moraka, 2008). In this context, Magketla (2007) points to the difficulties of the municipalities with a high poverty rate. These municipalities are often not in a position to charge money for water use which then results in budget deficits. In addition to difficulties to raise sufficient financial resources, it is also the incapacity to efficiently allocate these resources to the necessary tasks that is hampering government performance.

b.) Capital resources management

Long-term infrastructure planning is a crucial task, particularly with regards to water services infrastructure. In South Africa, there is a serious backlog of new investments in this sector, as hardly any new infrastructure has been built after 1985 (Turton, 2008b). This is due to slack strategic planning at the national but also the municipal level over the past years[86]. This aspect also pertains to the management of existing capital assets in a sustainable manner. Infrastructure maintenance often requires a considerable technical skill level, which has not been nurtured systematically over the past years.

c.) Human resources management

The general lack of skills to address and manage the range of partly new and also sufficiently complex tasks is probably the most pressing problem with municipalities throughout South Africa (Moraka, 2008). In her assessment of the technical capacity at the municipal level, Lawless (2007) noted a significant decline of technical staff, which is for example needed to perform crucial tasks in infrastructure planning. This lack of capacity derives from several distinct processes, which are closely linked to the transition of government after the abolishment of apartheid. One widely cited element is affirmative action[87]. Under this strategy, a large number of mainly white, technically trained officials were asked to leave government. This created a considerable vacuum in terms of the skills needed to perform municipal tasks, especially since the training of young black officials to fill the gap lags seriously behind (Muller, 2007).

Moraka (2008) also notes that often municipal representatives simply lack the understanding on addressing the key challenges in the water sector. Municipalities struggle to manage and run their operations properly, let alone manage a liaison with a mining house, which has much better educated and trained staff (Moraka, 2008).

Traditional Local Government

Traditional government structures play an important role, when considering local governance in the South African context. Generally, there is a shared responsibility between the municipality and traditional local government for managing a specific area, following the stipulations of the Constitution (Republic of South Africa, 1996).

In many cases however, power sharing is disparate and creates overlap and redundancies to some extent (Cloete, 1997). This results from the situation that modern municipal demarcations oftentimes

[86] This has partly been mitigated through the Municipal Infrastructure Investment Plan.

[87] The term affirmative action refers to the preferential employment of black South Africans in order to achieve a better representation of black South Africans in public administration.

do not overlap with indigenous systems. This leads to the fragmentation of areas of traditional authority (Picard, 2005).

The degree to which traditional local authorities can or should be integrated into the new local government system of a democratic South Africa is a matter of on-going debate and concern[88]. Some argue that traditional authorities should be abolished due to their co-option with the apartheid, government. Ismail et al. (1997) however provide an overview of what elements of the Zulu and the Venda traditional systems in particular could prove conducive to the ideas and ideals of modern democratic governance. They also highlight the shortcomings of these traditional structures in terms of legitimacy and consultation. This debate is highly topical, as the influence of traditional leaders or chiefs is still very strong in rural areas and often constitutes the only system of local governance (Ismail et al., 1997).

Present day interactions and conflicts between traditional authorities and modern government as well as other actors highlight the on-going challenge of transforming and integrating traditional authority, without marginalizing chiefs or chiefdoms (Olowu & Wunsch, 2004).

Parallel governance structures at the local level are also of high relevance for corporate actors. Traditional authorities might voice their very own preferences and requirements vis-á-vis corporate behavior, which might only be insufficiently coordinated with the municipal administration. This leaves corporates with the tasks of mediating between these different instances of government (Bullock, 2007; Pretorius, 2008b).

On the other hand though, traditional authorities and leaders constitute important partners for business in terms of gaining access to more traditional communities in the areas where they operate.

This section provided for an overview of the different roles and responsibilities vested in government actors at different governance levels. It becomes evident that there is horizontal variation, i.e. across different (national) government departments, with view to the capacity to regulate and mandate corporate behavior. In addition one can observe a vertical gradient across the different governance levels, as capacity decrease at lower levels. Government capacity furthermore varies across the different provinces reflecting past legacies and the current state of the transformation process. This variance is often echoed at the municipal government level, which is not only faced with a complex set of tasks and responsibilities (e.g. with regards to managing water resources) but also displays significant variance in terms of available capacity to address these tasks. Capacity deficits occur with regards to financial and human resources, but also lacking knowledge of relevant management processes.

Government drivers for corporate behavior are thus by no means of homogenous strength throughout South Africa and its different governance levels, but display a significant variance throughout provinces and municipalities. While regulatory provisions apply unilaterally, it can thus be expected that implementation varies with government capacity. This is investigated in the detailed case analyses.

D.4.6. **Other Institutional Drivers**

While government drivers are expected to play a significant role, other independent variables were derived in the previous chapter, which are discussed with view to their relevance in the South African

[88] This is also reflected by the transformation of the National Department of Provincial and Local Government into a Department of Cooperative Governance and Traditional Affairs after the 2009 elections.

context. I commence with the adaptation of the international CSR discourse to the South African case, focusing on the mining industry. Other variables discussed include industry pressures, social drivers, such as labor unions, non-governmental organizations, community groups, media and science as well as competitive drivers, constituted by financiers.

Corporate Responsibility in South Africa

Current research addresses the effects of the previously close relationship between big business and government on current corporate sustainability and responsibility approaches and practices. Fig (2005) argues, that in some cases CSR is utilized in order to 'manufacture amnesia' and cover-up past malpractices.

Partly resulting from this situation is a relative maturity of the South African debate on corporate social responsibility. This manifests itself in the form of South African corporate governance guidelines, such as the King II report[89]. Furthermore South African business players have signed up to a number of national and international codes of conducts. A local platform of the UN Global Compact has been installed and international certification schemes, such as ISO 14001, find broad application, particularly with the more export-oriented industries in South Africa (Bezuidenhout, Fig, Hamann, & Omar, 2007). There is a growing awareness for the notion of corporate responsibility among South African business, as well as an interest in more guidance from side of government with regards to CSR (Du Plooy, 2006).

Nevertheless, the discourse on the manifestations of CSR in the South African context continues with view to the needs of an emerging economy, while also taking up tendencies from the global debates. For example, the 2002 World Summit on Sustainable Development helped to spur the debate on corporate responsibility among the South African business community by showcasing activities of international business. The criticism of national and international NGOs of business practices 'close to home' has been another impact of the Summit that activated a national discussion (Bezuidenhout et al., 2007). Currently, international politics and policies seeking to address climate change are receiving considerable attention among the South African business community. The development on climate change is seen as a risk and an opportunity at the same time (Du Plooy, 2006). This indicates that South African businesses are susceptible to the international CSR discourses.

Mining and Responsibility

Even more than the general discourse on CSR, the emerging international debate on the responsibility dimensions of mining has been taken up by the larger South African mining companies (Hamann et al., 2007). This can be related to the considerable impacts of the industry, the perceived risks to the license to operate (Parker, Van Alstine, & Dakin, 2008) as well as the dynamics of the business-state relationship in South Africa as discussed above.

The international discourse on the sustainability impacts of the mining industry commenced with the Johannesburg Plan of Implementation (JPOI). While the plan emphasized the relevance of the mining industry for the economic and social development in numerous countries, at the same time it mandated a further involvement of mining firms with broad-based stakeholder participation,

[89] The King report was issued by the Institute of Directors and represents a formal review of South African corporate governance guidelines and arrangements. It addresses financial as well as non-financial reporting criteria pertaining to health and safety practices, environmental governance as well as social investment (Malan, 2007). South African companies make use of the King code and in some cases also other internationally promoted reporting schemes, such as the GRI to report on their responsibility performance (Du Plooy, 2006).

capacity-building and local economic development in developing countries and emerging economies (JPOI, 2002). This claim is basically echoed by the Mining, Metals and Sustainable Development (MMSD) Report, issued by the International Council of Mining and Metals (ICMM), which stresses nine sustainability challenges for the mining sector and defines industry-wide sustainability goals (MMSD, 2002).

Walker and Howard (2002) discuss the relationship between sustainable development and corporate responsibility in the mining industry and emphasize the concentration of firm activities on the local level as well as environmental issues[90]. In the wake of the WSSD, the ICMM issued its 'Sustainable Development Framework' consisting of ten principles, supposed to guide business practice. According to Dashwood and Sethi (Dashwood, 2004, 2008; Prakash Sethi, 2005), the ICMM and its initiatives are a positive example for the acceptance of the notion of sustainable development in the international discourse with regards to the mining sector's impacts and contributions. At the same time, subsequent assessments point to the limits of this approach and its lack of implementation on the ground. Jenkins and Obara (2006) also relate to the danger of over-reliance of communities on mining companies' contributions.

South African mining companies began to engage in philanthropic activities towards the end of apartheid. These were continued as corporate social investment (CSI) in the following years and were mostly directed at funding for schools and hospitals in neighboring communities as well as other charitable causes. These contributions were mostly handled by dedicated companies or foundations, more or less detached or independent from actual business operations (Hamann & Kapelus, 2004).

Over the past 15 years industry leaders have taken on more comprehensive responsibilities. This occurred partly in response to listing and transparency requirements of foreign stock exchanges (see section on investors), but also due to domestic pressures outlined above and the debate created in the context of the ICMM initiative. Most major mining companies have developed comprehensive 'sustainability', 'sustainable development' and 'community engagement' strategies. While these strategies are presented impressively in annual reports (Reichardt & Reichardt, 2006), still criticism is frequently voiced regarding the implementation record (Benchmarks, 2008)[91].

Thus, in terms of constituting a distinct driver, international norms rather determine the overall disposition of firms towards sustainability issues and thus provide for the underlying motivation to address water challenges. Contributions however depend on additional drivers as will be discussed in more detail in the case studies.

Industry Pressure

Industry pressure can be exerted through loosely organized peer groups of firms of the same sector or operating in the same areas. Such dynamics will be discussed in the context of the case studies. At the national level however, business associations, whether representing the interests of specific sectors or the business community as a whole, play a certain role in terms of promoting responsible business behavior (Taylor, 2007b). Examples are the South Africa Foundation (SAF), Business Unity

[90] This is also confirmed by (Hamann, 2004).

[91] Liebenthal et al. (2005) analyze the shortcomings of the World Bank's initiative to support the transformation of resource riches in to sustainable development. They point out that 'good governance' is relevant. In this context, Danserau (2005) criticizes these initiatives as too industry-friendly as they support the replacement of state regulation with voluntary measures. These measures also form part of the sustainable development/governance discourse, without effecting actual behavioral change on the side of business. In its most recent assessment, the World Bank points to the importance of effectively addressing capacity constraints with host governments in order to provide for a 'fair and sustainable' investment framework (WBG, 2009).

South Africa (BUSA), the National Business Initiative as well as the sector representation for mining, the Chamber of Mines (CoMSA).

The South Africa Foundation represents the top executives of the most influential South African companies. It has sought to position itself in the field of social responsibility, whilst specifically promoting the merits of corporate social investment (South Africa Foundation, 2000). This is also an approach followed by BUSA, while this organization is also the main representation of South African business in the consultative Water Sector Leadership Group initiated by the South African government. There is however little activity in terms of actively promoting sustainable business practices among those companies represented. This is somewhat different with the National Business Initiative, which was formed in 1994, to actively promote and showcase those business efforts regarding environmental issues, crime prevention and small enterprise development. In the context of this work, the NBI has initiated projects on climate protection and human rights and business, bringing together member companies and thus spurring an active discussion on these issues in the business community. Much emphasis is placed on a partnership approach between business and government in conducting these activities and achieving these goals (Fourie & Eloff, 2005). The Business Trust, formed by SAF and NBI, was established to enable this type of partnership. Most recently the Business Trust has for example focused on facilitating partnerships pertaining to the financing and maintenance of bulk infrastructure (including water-related infrastructure). Thus, business associations can expedite business collaboration on sustainability and water issues, by providing platforms for exchange and collaboration and establishing best practice examples. This role is specifically interesting against the history of business associations in mainly representing those business interests, which were not necessarily conducive to sustainable development in the past. A classic case of this type of business association is the Chamber of Mines.

Almost 90 % of the mining companies are organized in the Chamber of Mines, which was formed as an industry representative body in 1889. It has since then grown into the role of the main representative body of the industry in South Africa. While membership comprises mining firms of different sizes and economic impact, it is largely governed through an executive board and dedicated commodity committees taking care of the interests of specifically the gold and coal mining industry.

The Chamber provides guidance on a wide range of policy issues pertaining to mining. On the other hand it is communicating on behalf of the mining industry to outside stakeholders in promoting favorable conditions for the industry to operate in South Africa. This also includes maintaining a good reputation with government as well as other stakeholders.

More recent examples for these activities are the communication of the Chamber with regards to the 'Water for Growth and Development' strategy of DWAF, issued in March 2009 (CoM SA, 2008). Other issues addressed by the Chamber were the development of sustainability indicators for the South African mining industry and the closure provisions to be included in the EMP.

Policy documents are developed within a consultative process among the member companies as well as the most relevant external stakeholders. They are not binding but work through peer pressure and potential reputational damage (Lesufi et al., 2007). Accordingly, the Chamber is in a position to establish certain standards which are then 'binding' within the industry.

Social Drivers

In this section, I discuss social drivers, which are potentially influencing business behavior with respect to sustainable water management. The drivers are presented with view to their set-up and

structure in the South African context. Drivers at this level influence business decision directly; at the same time they also set the stage for social drivers at the local level, which will be described in more detail in the case studies.

Labor Unions and National Union of Mineworkers

The South African labor movement has been and continues to be a powerful force driving the agenda on social responsibility in South African firms.

This role hails from the apartheid years, when the South African labor movement had a clearly adversarial position towards both, the state as well as domestic and foreign capital (Habib, 1997).

Albeit the state tried to co-opt the labor movement, which grew quite strong during the early 1970, it continued to define its position and increase membership; a development that culminated in the formation of COSATU in 1985, supported by a strong statement on non-racialism and worker control (Mackay & Mathoho, 2001).

The South African labor movement furthermore managed to maintain substantial support from its international network and thus to strengthen its independence in the years before democratization (Habib, 1997). After 1994, COSATU played a key role in the negotiations about the nature of the post-apartheid society because of its close ties with the ANC and the South African Communist Party (SACP). COSATU managed to realize some of its goals especially with regards to workers' rights, labor standards and black economic empowerment (Bezuidenhout, 2000; Mackay et al., 2001). In the following years, a number of forums were established at the plant, sectoral and national level in order to facilitate a new co-operative partnership between labor, the private sector and the state. The most important forum was the National Economic Development and Labor Council (NEDLAC) (Wood & Mahabir, 2001).

The South African labor movement remains strong until today with membership still increasing. At the same time COSATU finds itself in a situation, where it needs to re-define its stance on the new direction of macro-economic policies in South Africa, as these are to some extent putting at risk achievements made by the unions in the transition period (Mackay et al., 2001). As the role of NEDLAC has weakened over the past years, the unions have found themselves somewhat constrained by their support to the post-apartheid government (Habib, 1997). This also led to a controversial relationship with the ANC over the past years (Buhlungu, 2003). It remains to be seen how the union movement will develop under the newly elected government as well as the increased economic stressors that put social standards at risk.

At the same time unions continue to play an important and influential role in shaping societal discourses in the country. Most of their work has focused on establishing minimum employment and civil rights standards. Unions also fight for the promotion of social justice and welfare, including struggles against HIV/AIDS. There is an emerging interest in environmental and sustainability issues, as unions discover an overlap with environmental advocacy groups[92]. This was for example the case, when the National Union of Mine workers joined forces with the Federation for a Sustainable Environment and launched a protest march against mining companies in the East Rand. The mines planned to stop pumping contaminated water at their operations, thus putting jobs and the environment at risk (Memorandum FSE, 13 November 2008) (see the Gold case for more details).

[92] In the late 1980's, the Thor Chemicals controversy displayed how environmental concerns can unite workers in an alliance of protest that included local residents, NGOs and local farmers. International protest against the UK-based multinational supported local protest involving the Chemical Workers Industrial Union (CWIU), Earthlife Africa, the local residents led by their chief and white commercial farmers from the region (Knigge et al., 2004).

Non-governmental Organizations

South Africa generally features a considerably large NGO community, covering a wide range of issues from human rights, to access to health services and also environmental concerns. However activities directed at corporate behavior and responsibilities are undertaken by only a few.

Furthermore, it is possible to differentiate between larger organizations, which are also active at the national level, as well as smaller and more community-based groups, which are discussed in the following section. At the same time, there are also examples for alliances and linkages between these two levels. Overall networking and coordination among NGOs however, is rather limited and activities are fragmented due to a competition over funding sources and differing ideological foundations. Ballard et al. (2006) discuss the emerging opposition between the NGO movement and the ANC government, which has impaired the NGO-movement's ability to engage with government processes as well as with those organizations that support government positions (Munnik & Wilson, 2003).

A further characteristic of environment-oriented NGOs is an imbalance towards white membership, which in many cases leads to an over-emphasis of conservation issues as opposed to a more comprehensive sustainable development approach.

Of the nationally active groups confronting or engaging business, one of the most prominent is the Durban-based group Groundwork. This group has conducted expansive research on corporations and environmental justice issues with regards to the dynamics in the pollution haven of Durban and in support of the South Durban Community Environmental Alliance (Hallowes & Butler, 2004; Hallowes & Munnik, 2006). Durban is furthermore home to smaller initiatives, such as the South Africa Water Caucus and the Centre for Civil Society Research, which supports civil society movements throughout South Africa. One of the most prominent activities involved the support of the anti-privatization movement of poor urban communities in Soweto (Bond, 2009).

WESSA, the Wildlife & Environmental Society of South Africa, focuses on educational campaigns and is following a more cooperative approach in terms of their interaction with business. In this regard it somehow resembles the South African branch of the WWF. Representing the internationally active World Wildlife Fund, the South African group is working on industry relevant aspects in the country through its trade and investment program, but also in the context of other conservation-oriented activities (Du Plooy, 2006).

Earthlife Africa should be mentioned as the key NGO with regards to the current activities to address problems in the energy-climate nexus in South Africa. Werner (2007) discusses the implications of a radicalization of this group, which can serve as reference for assessing the behavior of NGOs in the specific case studies. Van Eeden (2008) has conducted expansive research on the role of NGOs in the gold mining areas of the Witwatersrand and describes the fluctuation, competition and challenges for the civil society actors in this region.

In recent years the Benchmarks Foundation has received considerable attention through their campaigns against the mining industry. Their activities will be featured prominently in the cases on Platinum mining in the North West and Limpopo Provinces.

Community Groups and the General Public

Community protest against environmental degradation and pollution, including water resources, but also air and other environmental goods, have taken place fairly frequently in South Africa (Lund-Thomson, 2005).

Still different perceptions with regards to environmental protection and sustainable development prevail among predominantly white and black communities. Among the more affluent white communities, there is an increased awareness regarding conservation issues and protecting environmental resources as a natural asset. Community activism originating from less wealthier and in some cases previously disadvantaged communities is motivated by redressing effects of environmental apartheid as well as in terms of gaining access to natural resources in order to maintain livelihoods (Houghton, 2005).

Media

The media, including newspapers, is playing a substantial role as a driver for corporate responsibility in South Africa. There is at least one print medium – the Mail and Guardian – which provides for critical analyses of corporate conduct. On the other hand, the NGO community also makes use of the news-media in order to voice their concerns. This has become quite evident over the past two years with regards to the impacts of gold mining on water resources in the Witwatersrand. Most of the major regional as well as national newspapers picked up on the issue (Bega, 2008).
In addition, there is a number of investigative and informative TV magazines – for example 'La Carte Blanche' as well as the more environment-oriented 50/50 aired on SABC2, which have prominently featured the issue of mine water contamination in October and November 2008 (50/50, 2008).

Scientific Community and Consultants

Turton et al. (2007) introduce science as the third relevant actor cluster in their trialogue model of water governance. They discuss different types of research: such as basic or fundamental research, applied research directed at solving practical problems experienced by society as well as research with regards to technology transfer and the application of knowledge.
There is an expansive scientific community in South Africa, particularly of the latter kind, covering issues of pertinence for water, mining or a combination of these two fields. In addition to South African universities[93], the Council of Scientific and Industrial Research (CSIR) in close collaboration with the Council for Geosciences (CGS) has been heavily involved with water and mining-related research. Both institutions are to a large extent government-funded, but receive funding from other non-governmental sources as well. Of relevance is also the Water Research Commission, which is the implementing government agency for water-related research and thus oversees water-related research in South Africa.
The research provided covers the following areas:

- Analysis of government policies, regarding water management and mining,
- Legal assessments of newly introduced mining and environmental legislation,
- Development and evaluation of measures for integrated water resource management,
- Geological surveying, water analytics, pollution tracking,
- Research on technological innovations, regarding waste water treatment processes, sludge treatment, etc.

As the environmental or water impact of mining companies in many cases can only be mitigated through technological innovations, technology providers constitute an important factor in this regards. As a result, mining companies have sought to cooperate with these technology providers in order to gain access to knowledge and resources.

[93] The most notable here are the University of Cape Town, Witwatersrand, but also North West University.

While all of the above thus perform consulting functions for government, there is also a large number of private consulting firms offering their service.
Due to limited human resources at government, consultants often take on a considerably important role. In fact, many government officials after leaving public service have opted to join or set-up consulting firms. While this system allows for keeping government functions at a high level with limited staff and capacity, the trend has not gone unnoticed (Moraka, 2008), which led to criticism regarding the independence of the consultants. They have considerable influence on government, because they are practically advising their former colleagues, while they often also receive funding from private companies. Especially in the area of water resources management, there is an over-reliance on consultants, which assist government as well as business actors, or even both sides with regards to tasks ranging from monitoring to identifying technological solutions.

Competitive Drivers – Investors and Banks

Investors constitute a major driving force for businesses in South Africa (Roussouw, Watt, & Malan, 2002). There are different types of financiers, which are of relevance for a company's strategy.
First and foremost, there are of course equity providers through the stock exchanges for those companies listed at domestic or international exchanges. Sustainable investing as such is gaining in significance nationally as well as internationally as demonstrated by Jongh et al. (2007).
Socially responsible investment in South Africa took its first steps with the establishment of the Community Growth Fund by the unions in the 1980s (Roussouw et al., 2002). While these early beginnings did not manage to develop much clout, the further development then culminated in the establishment of the Sustainability Index at the Johannesburg Stock Exchange (Bezuidenhout et al., 2007). Firm listings are subject to the assessment according to a set of constantly revised performance indicators (JSE Limited, 2005). Socially oriented funds are however only emerging rather slowly.
A specific segment of investment incentives emerges with regards to (water) infrastructure finance. Financing needed for infrastructure development or maintenance is provided either by private banks or development institutions, such as the Development Bank of South Africa (DBSA) or international donors. These actors are increasingly applying sustainability screening criteria in order to direct their investment decisions. On the other hand private banks are also becoming more interested in developing business opportunities in infrastructure finance. An example is ABSA, which has been financing a water augmentation scheme to supply the Tshwane municipality. While such investments are attractive due to their long-term return periods, financiers also play close attention to cost recovery. While this sets the right incentives for project design, it might also favor urban areas, since cost recovery is more likely here than in rural areas. The ways that these considerations and mechanisms unfold are discussed in more detail in the Platinum case studies.

D.5. Summary and Transition to Case Studies

This chapter serves two purposes. **First,** it demonstrates the relevance of water in the South African discourse on sustainable development and provides for insights on the relationship between the state and business from a historic perspective.
The following main conclusions can be drawn from these considerations. There are numerous challenges in the South African water sector, which can to some extent be related to business actors.

Considering the role of business over time, firms have been inclined only to a limited extent to contribute to alleviating these challenges. However, more recently the issue of water resources management is gaining in attention among the business community.

Second, the chapter discusses the variety of drivers at the national level. The overall impression that emerges is that legislation exists at a relatively high level of sophistication with regards to water and broader environmental issues, but also in terms of mine specific regulation. National legislation clearly defines access and property rights with regards to water resources and assigns responsibilities as to the mitigation of pollution impacts as well as service provision (Somanathan & Sterner, 2006). It is therefore to be expected that a considerable shadow of hierarchy (Graham & Woods, 2007; Mayntz & Scharpf, 1995a) emanates from the regulatory framework.
On the other hand however, it also becomes evident that government at certain levels and in certain instances is lacking the capacity to implement and enforce this legislation. Especially at the local level, this capacity is severely constraint, due to several reasons. Against the background of South African history this can be related to historical disparities and respective legacies, particularly in peripheral provinces. Other deficits derive from a lack of coordination among different governance levels and lastly also political will to regulate and enforce existing regulation.
These circumstances could result in lax behavior on the side of business (as a negative driver or spoiler); or constitute a driver according the logic of a shadow of anarchy (Börzel, 2010; Mayntz & Scharpf, 1995b). There is however a number of other drivers, which have a potential influence on business with regards to their water performance. However, the strength of these drivers as well as the interaction among each other and with government and the respective results in terms of firm behavior cannot be gauged based on the analysis of national level drivers. A more detailed analysis in the individual case study context is therefore warranted.

In the following four chapters, the case studies are presented in more detail. The chapters follow the same basic set-up, catering to the approach of a structured focused case study analysis (George et al., 2005).
After a brief introduction of the mining sector and the region under investigation, the characteristics of the mining firms included in the sample are presented.
The following step portrays the contributions to addressing the water challenge occurring in the respective case study regions according to the analytical framework developed in chapter B. Respective drivers are then presented as the independent variable of the proposed model.
As a final step, a summary is provided, highlighting key interactions, major contributions as well as dominating drivers. The assessment of long-term dynamics concludes the case study description.

E. Witwatersrand: Gold and Water

South Africa still is one of the main producers of gold in the world, while gold has mainly driven economic development in South Africa throughout the last 150 years. Mining activities have mostly taken place in the Johannesburg region, where the world's largest deposits were found on the Witwatersrand in 1886. Mining operations spread along extensions of these deposits in the Central Rand, West Rand and East Rand gold fields and beyond. While gold mining is still continuing in these areas until today, the gold mining industry in South Africa is in a mature state. Considerations about mine closure and the legacies of mining operations take a prominent position among government as well as corporate actors. In this context a range of water-related challenges have emerged, which are currently featured prominently in the South African public discourse on the long-term environmental and social impacts of the mining industry. Thus, South African gold mining offers an interesting case study for investigating the interaction between public and private actors with regards to sustainable development.

It is important to mention that in addition to gold, the case study area is also known for Uranium mining activities, which occur in conjunction with auriferous reefs and bear their very own environmental risks. The case study, while primarily addressing impacts related to gold mining touches on the issues of Uranium-mining to the extent necessary due to the numerous linkages between these minerals. This also demonstrates the difficulty in investigating the issue of sustainable development, as issues and sectors are often inextricably linked. Decisions that are made with regards to a specific natural resource or a specific mining commodity will most likely also affect decisions and processes with regards to water management and gold mining and vice versa.

The following section will outline the main characteristics of the gold mining sector and the case study area to the extent that they provide for the environmental and socio-economic background, including an account of the challenges for sustainable water management occurring in the Witwatersrand region.

E.1. Sector and Region

For the past 120 years, gold mining on the Witwatersrand has been the backbone of the region's and also the country's economic growth, producing as much as 35 % of the world's gold. This mineral wealth has contributed to South Africa's relative wealth in comparison to other countries on the African continent (Adler et al., 2007a). Johannesburg as the largest city in Africa owes its origin to the discovery of the Witwatersrand gold reefs. The city has developed from a mining town in the early 20th century to the economic hub of the country as well as one of the most important economic centers of the African continent (Turton et al., 2006). Today the Witwatersrand area is home to more than 11 million inhabitants. Most people live in Johannesburg as well as a number of towns and cities that have sprung up in the wake of mining activities all across the reef (Turton et al., 2006).

For a long time South Africa held the position of the world's largest gold producer. More recently however, China took this position, with South Africa ranking second together with the USA and Australia. Gold production in South Africa has been declining steadily over the last 30 years, reaching an annual production of 232 tons in 2008. However, gold is still accounting for an estimated 37 % of South Africa's dollar revenue (Benchmarks, 2008).

In addition, while world market gold prices have been declining compared to price levels during peak production for a long time, more recently prices have been rising again. This increase originates from a variety of price signals, such as a rising oil price and the 2008 world financial crisis. Gold has often served as a risk minimizing commodity and is usually popular with investors across the world in times of economic instability and high inflation (Heinritzi & Sedlmaier, 2009)[94]. This holds true for private investors as much as for governments, which use their gold reserves as instruments to influence price stability and markets. While analysts have identified a strong link between major crises and conflicts and a rising gold (commodity) price (Aden, 2009), a further important factor determining the gold price is demand from high growth economies, such as China, Russia and India. Consequently, overall prospects for South African gold reserves appear to be more favorable than indicated by the decreasing prices over the past couple of years. More and more gold mines have been re-opened and mine dumps are becoming increasingly interesting for re-mining activities. Both possible development trajectories, a decline in the demand for gold as well as an increasing demand are likely to have profound repercussions for water issues in the mining areas.

This is particularly the case in South Africa, which is still disposing of more than 40 % of the world's gold reserves. The Witwatersrand basin, albeit having produced over 41,000 tons already, is considered the largest un-mined gold deposit in the world. At the same time, gold mining in South Africa has the highest cost of production in the industry. This is mostly related to the deep level of deposits, which requires shafts that are up to 4,000 meters deep. With the current favorable market conditions, ultra-deep level mines with depth of up to 10,000 meters are being discussed. These mining techniques bear two main risks. First worker safety can only be guaranteed to some degree at such deep levels and second, there are long-lasting and major impacts on underground hydrology. This is due to the pumping necessary to enable mining, the results of which can be observed in the context of existing as well as abandoned mines[95].

The viability of the gold mining industry is not only a key element of the South African economy until today, but has determined South Africa's economic fate over the last two centuries. Due to this fact it has also been a political matter since the very beginning of mining history in the country and has significantly shaped South Africa's legislative environment (Benchmarks, 2008). The mineral wealth not only provoked the outbreak of the Anglo-Boer War, but later provided the foundation for the formation of the 1910 Union of South Africa. The subsequent development of the gold mining industry gave rise to the stratification of the South African society and eventually to the emergence of apartheid politics half a century later (1948) (Turton et al., 2006). Also the transition to democracy must be considered in the light of the interests of the gold mining sector, which had an interest in securing access to world markets. Today the gold mining sector is used as the prime vehicle for restitution, black empowerment and societal transformation (Benchmarks, 2008)[96].

All this hints at a deep entrenchment of the industry with governmental processes (see also section D.4.4), which still leads to repercussions in the current state-government relationship, This is especially the case with regards to water management as will be outlined in section 0.

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[94] Thus, the gold price is likely to decline with the international financial system gaining in stability again and succeeding in controlling inflation.

[95] Recent sector analysis however shows that despite rising gold prices, gold mining in South Africa is further declining, mostly due to the costs involved.

[96] Uranium mining commences on the South African Witwatersrand with the launch of the US Manhattan project. Whilst Uranium production has decreased over the past years, there has been a renewed interest in Uranium with spot prices rising significantly over the past four years, prompting for example Harmony to re-structure its Uranium operations in the West Rand.

A look at the current industry structure reveals that the South African gold mining industry has undergone major changes over the past ten years. Due to considerable purchasing and merging activities, the set-up of the industry has been reconfigured. The efforts to achieve a consolidation of the industry in order to maintain its international competitiveness led to the emergence of a number of larger producers, such as Anglo Gold Ashanti, Gold Fields, Harmony Gold as well as DRD (Durban Roodepoort Deep) and a number of smaller operators, including BEE ventures, such as Mintails and Pamodzi Gold. These companies also form the basis for the case study investigations in this chapter.

In terms of geographic locality, gold mining takes place across the entire Witwatersrand basin, depicted in Figure 6 below, which includes the Central, East and West and Far West Rand as well as the KOSH[97] areas.

The area under specific consideration in the context of this case study and the processes covered is the West Rand. This is a mining area in the triangle between Krugersdorp, Roodepoort and Randfontein, west of Johannesburg, as well as the Far West Rand, near the town of Carletonville.

Examples from other areas in the Witwatersrand, such as the East Rand and KOSH areas, will be used in order to illustrate certain aspects of the case. Thus in contrast to the other case studies, the considerations are less guided by municipal boundaries. It rather looks at boundaries established by the dominating commodity mined and the specific water challenges in this area.

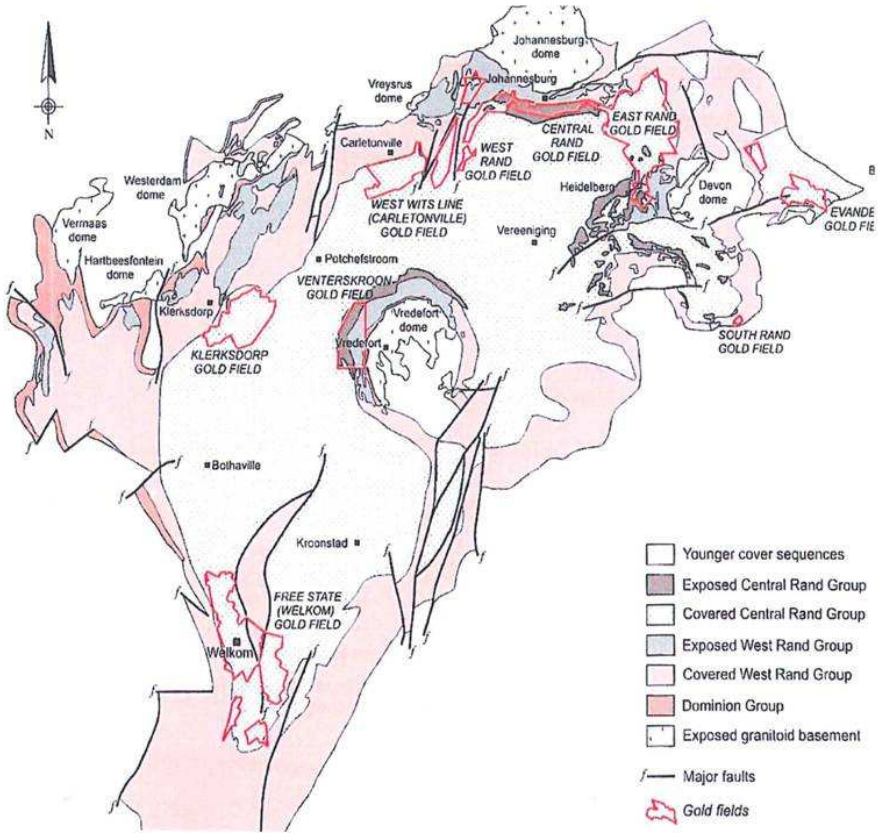

Figure 6: Overview of the South African Gold Fields; (Robb & Robb, 1998).

97 KOSH denotes the area in proximity to Klerksdorp, Orkneyville, Sterkfontein and Hartbeesfontein.

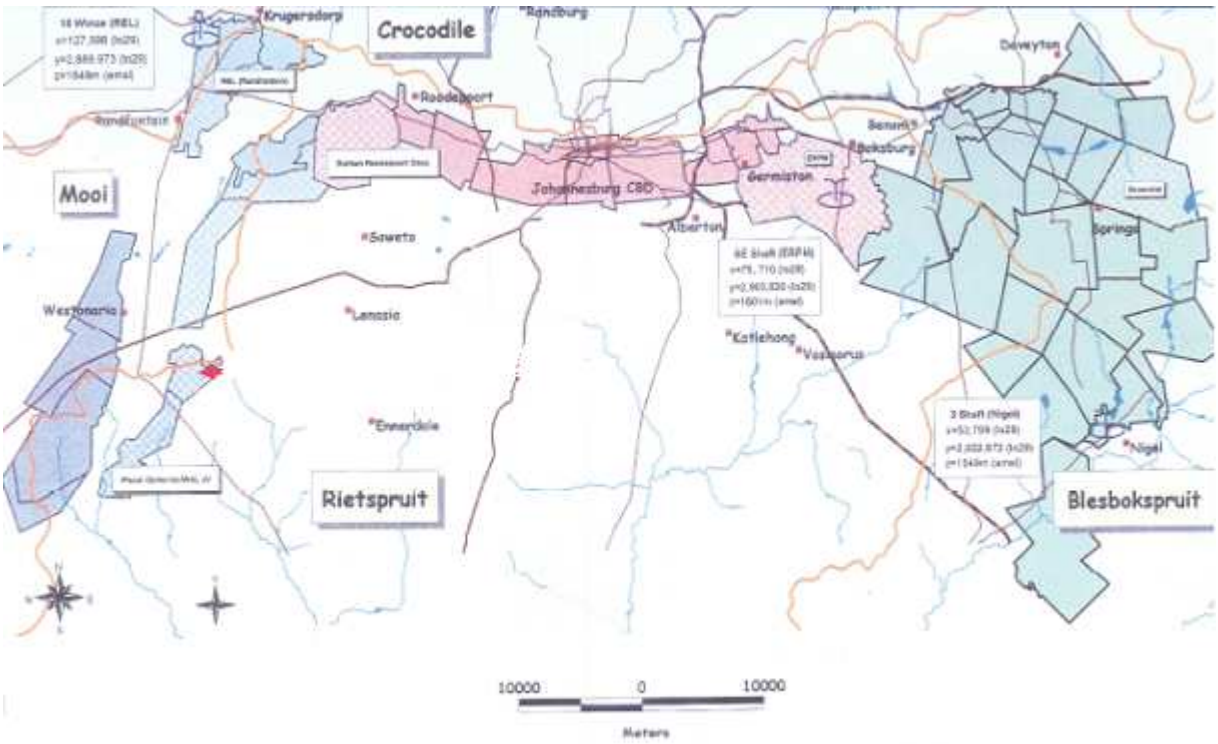

Figure 7: Witwatersrand Gold Mining Area[98]

The overall socio-economic situation in the case study area is characterized by two distinct features. On the one hand, the Witwatersrand used to be the hub of economic development and growth fuelling the economic powerhouse of Gauteng and the entire country. On the other hand, however, with more and more mines closing, economic activities have only continued in those areas, which managed to build and maintain a diversified economy independent from the mining industry. Johannesburg is often referred to as the shining example of a mining town that has grown into a veritable city and a diversified economic hub (Turton et al., 2006). But Johannesburg is also considered an exception in this regard. Other areas throughout the Witwatersrand are ridden by a number of social problems. There are a number of places where no adequate substitute for the dwindling mining industry could be found and no diversification took place.

Informal settlements are ever present in this region. Unemployment rates and poverty levels are relatively high, especially in comparison to the very wealthy metropolitan regions Johannesburg and Pretoria. At the same time, people are not only confronted with economic difficulties, but also with manifold legacies of intensive mining, compromising their health and livelihoods. This situation then compounds already problematic conditions due to the high prevalence of HIV/AIDS. As a result the Witwatersrand area epitomizes the discrepancy between dynamic economic growth and the accumulation of extreme wealth in the Johannesburg region and the negative impacts of mining leading to poverty, social and ecological degradation in the peripheral former and current mining areas.

In the recent past, social unrests, such as the uprising in the Khutsong area in the Witwatersrand periphery have been related to the deleterious social conditions in some areas. With regards to the mining companies, this becomes relevant as they are mandated through the MPRDA to cater to

[98] Designating the East Rand (green), Central Rand (red) West and Far West Rand 'basins' (blue), limits of mining concessions (farms), decant points of Acid Mine Drainage (AMD) and affected water catchments (map provided by WUC).

municipalities needs; at the same time there is an increasing discrepancy between community needs and municipal services delivery.[99]

E.2. Main Water Management Challenges

Against the background of the introductory remarks on the mining sector and the region under consideration, this section details the specific challenges occurring in the area from a water management perspective. The following aspects become evident from the ensuing descriptions:

- the locality of the water resource issue as well as the interdependence with other environmental resources,
- the uncertainties involved due changing conditions over time and linkages to other pollution phenomena, such as air pollution and soil degradation,
- the considerable impact that mining activities continue to have on water resources, even after the cessation of operations.

This broad range of different conditions and challenges sets the stage for the interaction between government and businesses.

Hydrological Situation and Water Use

The Witwatersrand is a major continental watershed, with rivers rising to the east flowing into the Indian Ocean through the Limpopo river basin and rivers rising to the west flowing into the Southern Atlantic through the Orange River basin. Both rivers are of high importance to South Africa as they both provide the basis for intensive economic activities (Turton et al., 2006). In addition, the Witwatersrand is an important headwater to the two above-mentioned river systems and thus of significant importance for the quality of water downstream. This also implies that local impacts on water resources will have negative repercussions downstream.

Mining had a considerable influence on the water balance in this region. Whereas the first mining operations were only conducted as open pit projects, deeper lying gold reefs required the sinking of shafts, which would eventually reach a depth of four kilometers. Mining at greater depths entailed the pumping of water from underground aquifers as well as large underground compartments (also referred to as voids) as well as mining shafts in order to allow for the progression of mining operations (Hobbs & Cobbing, 2007). Reflecting the complex hydrogeology, these underground compartments in the prevalent dolomite[100] are largely interconnected allowing for the water to circulate within a relatively large area. This makes predictions regarding the movement of the water rather difficult. Other geological features combined with the impact of the underground mine workings, which have partly led to the removal of natural hydrological barriers, have enhanced the interconnectedness of the different watersheds in this area.

The situation is then further complicated with the cessation of mining operations and the stoppage of pumping, which has led to an uncontrolled rise of groundwater and the so-called ‘decanting’ of water at the surface in the northern part of the West Rand basin, beginning in 2002. The acidic

[99] While no direct link has been established in this regard, other incidences point into the same direction. An example would be the activities of the Minerals and Energy Forum in the Free State Community of Kuthluanong, which generated a major protest movement against Harmony Gold in that area in September 2008 in order to receive better service delivery in the nearby township as well as better consideration of the local community in terms of employment at the mine. While Harmony responded to the protest movement and made the respective concessions to the community, the municipality was also criticized for not getting involved ad failing to deliver the respective services.

[100] Dolomite is a calcium and magnesium-rich, water-soluble rock formation.

properties of this water constitute a major risk to human health and the environment as will be described in more detail in the following section (DME, 2008).

Description of Main Problems and Issues

The impacts originating from gold (and also uranium) mining in the case study area are partly related to the on-going operation of mines. In addition, abandoned mines pose a considerable threat to the environment. Mine closure happens either due to the complete exploitation of the minerals or as a reaction to the variation of commodity prices rendering mining in inaccessible areas unattractive.
The entire area has been exposed to a wide range of impacts in the wake of intensive mining over the past 150 years. In addition to impacts on water resources, which will be described in more detail later on, other impacts relate to further significant environmental pressures, which are for the most part connected with each other and interrelated with impacts on water resources. Some of these impacts can be directly attributed to the mining activities; with others a clear differentiation is no longer possible as different industry sectors as well as increasing urbanization are equally contributing to these pressures.

- Air and specifically dust pollution poses a significant problem related to past and present mining activities in the area. While air pollution mainly originates from the operation of smelting facilities and thus mostly aggravates emissions by other industries, dust pollution is more directly linked to mining activities. Massive tailings dams, probably the most visible results of mining activity, are suspected to lead to continued dust pollution due to insufficient tailings maintenance (DME, 2008).
- Other impacts recorded relate to land use in the area, which is not only impaired by direct operations, i.e. opencast pits, but also by the occurrence of mine tailings dams.
- Soils and river sediments have been found to be contaminated with radionuclides and heavy metals, posing a major risk to food supply, especially with regards to the needs of the growing urbanized areas.

In terms of distinct water challenges, one can roughly differentiate between impacts on ground- and surface water in terms of the impact pathways and implications. While both issues are yet again interrelated, it is possible to identify two case scenarios, which are to some extent representative of the entire situation. Both scenarios emerged as prominent examples in the discourse between government and businesses. In terms of surface water-related impacts, I discuss the pollution of the Wonderfonteinspruit river catchment (WFS). Groundwater impacts are represented by the decanting of acid mine drainage (AMD).

Wonderfonteinspruit 'Hot-Spot'

A report by Coetzee et al. (2006), authored on behalf of the South African Water Research Commission, for the first time comprehensively outlined the pollution sources and pathways affecting the so-called Wonderfonteinspruit (WFS), the eastern catchment of the Mooi River. The WFS epitomizes environmental degradation originating from mining activities. It has been subject to numerous studies on the variety of impacts and continues to draw significant attention from environmental and community activists. While it is not the goal of this case study to explain at full length past and current struggles concerning the WFS, nor specific geological features or impact

scenarios, some of the defining characteristics will be presented as this provides a basis for discussing the behavior of firms currently operating in this environment.

The WFS catchment has been at the centre of South African gold mining activities since its beginning, numerous mines were running in the West Rand and Far West Rand sections, many of these mines have stopped production over the past years, only a few are still in operation.

In terms of **quantitative** impacts, the dewatering of the dolomitic compartments covering the auriferous reefs in the catchment area led to a complete diversion of natural water flows, an overall reduction in water availability and a subsequent change of land use patterns. Agricultural activities became largely impossible due to the continued extraction of water. In addition to the lack of surface water available for agriculture, the formation of sinkholes in the wake of dewatering activities continues to pose one of the most problematic legacies of mining-oriented water management in the area (DME, 2008).

Discussing **qualitative** impacts, it is important to note the relatively high concentration of uranium in the auriferous reefs. Numerous studies have investigated the causal relationship between mining activities and elevated concentrations of radionuclides in the catchment and the sediments, as well as the potential mobilization of the radionuclides and related environmental and health impacts (Coetzee et al., 2006).

Apart from the very problematic uranium pollution, mining has also had additional impacts on water quality either through controlled discharge or diffuse pollution, leading to a high concentration of sulphates, but also heavy metals.

Tailings deposits originating from previous mining operations also constitute a major source for this type of pollution. Some of the impacts are also directly related to acid mine drainage entering the catchment. Numerous farmers in the area depend on contaminated water and soil for cattle-herding; at the same time there are concerns that a considerable number of informal settlements depend on the water for drinking purposes (Anvi, 2007). Although the evidence for this dependence is inconclusive, the concern adds a further dimension to the complexities in the Wonderfonteinspruit catchment.

Figure 8: Locality of the Wonderfonteinspruit near Johannesburg and Mining Areas (Hobbs et al., 2007)

Acid Mine Drainage

The occurrence of acid mine drainage mostly affects the West Rand basin and has only recently emerged as a problem (Hobbs et al., 2007).

Acid Mine Drainage (AMD) refers to the uncontrolled discharge of contaminated water (or decant) from abandoned mines and constitutes one of the most critical environmental problems related to mining in South Africa (Naidoo, 2009). Due to the irreversibility of damages to the environment and the potential repercussions for human livelihoods, AMD has also been considered as the second biggest ecological risk after global warming and stratospheric ozone depletion (EEB, 2000).

AMD is water with low pH level, i.e. high acidity, high salinity levels, elevated concentrations of sulphate, iron and aluminum and manganese, high levels of toxic heavy metals, such as cadmium, cobalt, copper, molybdenum and zinc, and occasionally even radionuclides. AMD occurs when sulphite minerals, such as pyrite that occur in most metal sulphite deposits and associated mining waste, are oxidized in the presence of oxygen and water (Oelofse, 2008). Such process can take place at the surface, i.e. in connection with gold tailings/slimes dams and waste rock dumps and in a subsurface environment when old mines are flooded thus bringing acidic water to the surface; other complications emerge with regards to the pollution of groundwater resources due to AMD (Banister, Van Biljon, & Pulles, 2002).

Groundwater in the Witwatersrand is severely impacted by acidic water as a result of pyrite oxidation and also displays elevated heavy metal concentrations. Polluted groundwater has reached surface waters in the region, at times contributing up to 20 % of stream flow (Naicker, Cukrowska, & McCarthy, 2003).

Acid mine drainage for the first time was observed in the West Rand basin in late 2002. It is estimated that between 18 and 36 ML are decanting per day (Hobbs et al., 2007). Receiving waters for the acidic water are the WFS and the Tweelopiespruit[101].

AMD is expected to have considerable impacts on the natural as well as the human environment. Socio-economic investigations in the West Rand Area near Krugersdorp point to an increased exposure to the risk inherent to AMD. This derives from drinking contaminated water, which mostly occurs in the informal settlements lacking access to water supply facilities. Also, in the case of farming and especially subsistence farming contaminated soil has a negative impact on food production (Adler & Rascher, 2007b). In addition to these potential impacts on the livelihoods of neighboring communities, there is also a veritable threat through AMD for a world heritage site, the Sterkfontein Caves[102]. From a more general perspective it is considered highly problematic to have a significant environmental hazard as acid mine drainage in close proximity to one of Africa's fastest growing domestic and commercial populations (Boyd, 2008).

As a consequence, AMD has become a highly politicized issue in South Africa over the past years, with mines, government and other stakeholder fiercely staking out their positions, responsibilities and liabilities (Khumalo, 2009). Due to the fact that the culprit for AMD is in most cases impossible to find, the issue of who should bear the cost for controlling and mitigating the problem/damage becomes elusive. At the same time, there is an increasing understanding that AMD also poses a considerable threat to secure water resources, that are necessary to support the government's growth and development agenda (Naidoo, 2009).

[101] This illustrates that underground waters are connected to surface water bodies.

[102] The Cradle of Humankind, which is located in close vicinity to the decant and potentially connected to the decant area through the dolomitic layers.

While preliminary treatment measures have been initiated by individual mines in the area (see below) and more comprehensive solutions are currently under investigation, there is still considerable uncertainty regarding the magnitude and the extent of the problem. Water quality in streams that are increasingly affected by AMD continues to deteriorate. In addition it is expected that the Central Basin will also be affected by AMD within the next three to four years with more and more pumping stoppages at abandoned mine sites (Naidoo, 2009), putting at risk already sensible water balances and ecosystems.

Historic Setting

The governance structures and actor relations in the area are nearly as complex as its geological and hydrological characteristics. The main processes leading up to the current situation will be outlined, offering insights into the specific interactions with regards to water management and the institutional environment for gold mining in the Witwatersrand basin since the beginning of the industry. It is expected that previous interactions between government and business actors are likely to have an influence on current interactions as well. In tracing the interaction over time, the changing behavior of government vis-à-vis the mining industry becomes evident.

According to Turton et al. (2006) the colonial phase was determined by the role of government as a facilitator and partner for the mining industry. This reflected British colonial water law and the interest of government to allow the mining industry to operate with high profit margins[103]. The Irrigation Act of 1912 set the basis for wide-spread dewatering of the dolomitic compartments in order to enable profitable mining (Voss, 1978). Despite early criticism by farmers regarding the dropping of water levels, there were no significant changes in government policies regarding water and mining (Adler et al., 2007a).

Only much later heightened concerns about the impacts of dewatering in the dolomitic mining areas prompted government to pass tighter regulatory provisions in form of the 1956 Water Act and to launch a number of studies, investigating the impact of pumping. The Jordaan-Report, an in-depth technical and economic study regarding the best water management options for the area was published in 1960, discussing potential long-term damages from dewatering. In addition responsibility was for the first time clearly assigned to the mining industry as it benefitted from dewatering (Jordaan, 1960)[104]. The reaction of the mines to this report is deemed typical for that period: objections were launched concerning the technical accuracy of the report in order to avoid liability. While initially concessions were made concerning the requirements of the report, the mining industry largely failed to comply with requirements as government had no effective regulatory and enforcement tools at hand. At the same time, the mines through their representation the Chamber of Mines, set up a number of associative agreements to handle damages due to dewatering (Far West Rand Dolomitic Water Association) and to investigate further dewatering options. Mines clearly used these commissions a way to deflect responsibility and instill an impression of confidence in government and thus avoid legislative steps. Government willingly accepted this behavior in order to support the mining industry for the sake of earning shares that were much needed to support the increasing pariah of Apartheid South Africa (Taylor, 2007b). This led to a situation, where large parts

[103] This is evidenced by legislation passed in the Transvaal region on water allocation, the Cape Colony and the Union of South Africa after 1910.

[104] The Jordaan Report was very progressive in terms of suggesting the establishment of a trust fund by the mines and the government to allow for sufficient compensation of farmers in the area, thus holding the mines fully accountable.

of compensation for damages due to dewatering had to be funded through government and only to a limited extent by the mining industry.
With the advent of democracy, government attempted to change the predominant paradigm of collaboration with the mining industry, now taking on the role of a regulator. This process is still underway as legacies from the past have not yet been addressed properly.
The mining area of the Witwatersrand is thus not only stricken by complex environmental and socio-economic impacts, but also by a web of interlinked committees to address this situation and clarify responsibilities and liabilities (Van der Walt, 2008). With a consolidation of mining operations in the area, it is becoming even more difficult for government to identify responsible parties for damages done (Zorab, 2008). Against this historic background I pose the question, what are the contributions that companies make to address the water challenges in the Witwatersrand area today? What are the main drivers and how have they evolved against the legacies outlined above?

E.3. Business Contributions – Firms and Activities

This section follows the categories established by the analytical framework in discussing the policies and strategies employed by companies in this area with regards to addressing the water challenge in the Witwatersrand. In addition, the long-term dynamics with view to sustainable development in this region are considered.
Companies of relevance are all major firms, Anglo Gold Ashanti, Gold Fields and Harmony as well as smaller operators, such as Mintails and Pamodzi. They represent but a fraction of the mining activity previously undertaken in the Witwatersrand. As current owners of mining operations and as those still active in the area, these companies are in a position, where they have to face liabilities for impacts, for which they have either only partial or no direct responsibility. The first section provides for an overview of the main characteristics of the mining firms considered in the context of this case study and discusses the contributions made by these to addressing the water challenge.

E.3.1. **Main Characteristics of Firms Investigated**

The characteristics of the individual firms offer a first indication on internal dispositions towards contributions to the water challenge. These internal factors are interpreted as resource-based drivers where applicable in the following section.

The mining companies operating in the Witwatersrand area and specifically the West Rand cover a broad range of characteristics. There is a variation with regards to size, with some of the largest gold mines (Anglo Gold Ashanti and Gold Fields) still operating in this area next to smaller and BEE ventures (Pamodzi). There is also variation in terms of the ownership structure and the degree of internationalization. While some mines are also active in other parts of the world, most are exclusively focusing on South Africa. Most companies are majority held in South Africa, except Mintails.

Table 13: Production Data of the Mining Companies Considered in the Context of the Case Study

	Anglo Gold Ashanti[105]	Gold Fields	Harmony Gold[106]	DRD	Mintails	Pamodzi
Profit, m$	403	662	245 RM	167[107]	9	N/A[108]
Production Million ounces, in South Africa	2,3	2,4	1,4	0,3	0,02	1[109]
Workers, South African	37,000	48,000	48,000	7,600	N/A	15,000
Main Operations (Location)	West Wits, near Carletonville (Gauteng and North West Provinces), Vaal River (Free State)	Driefontein (Carletonville), Kloof, South Deep (Westonaria), Beatrix (Free State)	Randfontein Carletonville Mpumalanga, Free State	Blyvoor, Far West Rand, Crown, Reprocessing ERPM, East Rand, Ergo, Reprocessing	Mogale, West Rand, Ergo East Rand	East Rand, Grootvlei Mine

A first distinct grouping is made up by Harmony Gold, Gold Ashanti and Gold Fields, which are major producers and thus large employers in South Africa.

Harmony Gold is among the largest gold mining companies in the world with a production focus on South Africa. The company has a primary listing at the JSE and additional listings in Europe, catering to a diverse shareholder group in South Africa, North America, the UK and Switzerland. The company's difficulties in 2008 are somewhat typical for the challenges of the mining industry: production stoppages due to national power cuts and a high number of fatalities at their plants (Harmony, 2008a).

Anglo Gold Ashanti is a multi-national mining firm with a primary listing at the JSE in Johannesburg and additional listings in New York, London, Australia and Ghana. The company was headquartered in Johannesburg until the beginning of 2008, but has moved the key functions to Accra. In its current state, Anglo Gold emerged from the consolidation of the gold mining activities of Anglo American in 1998 and the subsequent merger with Ashanti Goldfields in 2004. In 2007, this company produced about 7 % of the world's gold output and was ranked third largest producer worldwide[110]. South Africa continues to be the primary production place with 40 % of the overall production, albeit experiencing constant declines over the past years (Anglo Gold Ashanti, 2007).

Gold Fields is an equally internationally active precious metals producer, originating from South Africa, with further operations and joint ventures in West Africa, Australia and South America.

A typical example for a medium sized operator emerging from several mergers and acquisitions is DRD Gold. This gold producer focuses exclusively on the South African Witwatersrand for production and operates open-cast and shaft mining in the Far West Rand as well as mine dump and tailings recycling facilities in the West Rand. Over the past years, DRD Gold has in undergone major changes.

[105] Data for AGA are on a 2007 basis, data for the other companies on a 2008 basis.

[106] Data for Harmony largely referring to South African operations as Papua New Guinea operations are currently in an exploration/ramp-up phase.

[107] Data for DRD Gold consider a major sell-out of assets in Austrasia (Papua New Guinea).

[108] No information could be obtained at the time of writing, due to financial instabilities at Pamodzi Gold.

[109] Expected production; however not met due to financial problems in 2008/9.

[110] Operating mines are located in such diverse places as South Africa, Ghana, Guinea, Mali, Namibia and Tanzania, South America (Brazil and Argentina), Australia and the United States.

Most of the major operations have been closed (ERPM, Durban Roodepoort Deep and West Wits), in addition DRD negotiated shareholding agreements with two BEE partners. In such consolidation and restructuring processes liabilities for tailings dams, abandoned shafts and running operations were passed on to other companies, or left uncovered completely. This led to the current problem scenario in terms of identifying those responsible for pollution.

Other companies have aimed to turn these challenges into a business idea. An interesting example in this context is Mintails. Mintails is an atypical 'mining company'. It is a start-up project focusing exclusively on the reprocessing of mining tailings in order to recover gold from the deposits of previous mining activities. The company's operations in South Africa commenced in 2006, when high risk capital was made available through the Australian stock exchange to restore the tailings recovery operations of Mogale Mining. Consequently, Mintails is listed at the Australian Stock Exchange, while based in Johannesburg. In total, Mintails holds the right to reprocess more than 330 million tons of mines' tailings in the West Rand. Furthermore the company holds share for additional 1.5 billion tons in the East Rand area (Mintails, 2008)[111]. As a new entrant to the area, Mintails not only faces the complex web of impacts of previous mining activities, but also the historic complexity and the respective legal legacies (Van der Walt, 2008)[112]. Pamodzi Gold as a relatively small operator and a classical BEE venture on the other hand represents a case of how challenging it is to react to these issues with relatively limited financial resources[113].

E.3.2. **Types and Modes of the Contribution**

This chapter details eminent contributions by corporate actors to addressing the specific water challenges in the Witwatersrand, guided by the analytical categories derived in chapter B.4.

Compliance

In this case study, compliance with South African water law as well as with environmental legislation is most relevant. Examples from selected companies will be discussed in order to show differential compliance behavior of firms. The following main themes can be identified: compliance with regulations, including those on monitoring, with the incidental breaches and ensuing clean-up activities, the issue of lacking water licenses, failure to comply due to lacking financial resources as well as a compliance to opportunity approach.

The main water-related concern for Harmony Gold is acid mine drainage occurring at the company's Randfontein production site. With regards to the containment of this pollutant, Harmony has received directives from the Department of Water Affairs concerning the treatment of acid mine water. Harmony has taken on interim measures to address the problem. Nevertheless in 2008 alone, Harmony reported eight ***major incidences*** in relation to the discharge of acid mine drainage or seepage from slimes dams leading to the contamination of ground an surface water (Harmony, 2008b). These water-related incidences are reported in response to a specific reporting procedure

[111] Currently, Mintails operations are still in the consolidation and commissioning phase, mostly for large-scale processing plants. Total expected resources to be extracted through the reprocessing of the tailing material amount to more than 3.19 mOz of gold and 25 mlbs of Uranium.

[112] Mintails is still in the process of securing the mining rights for its operations; the respective process has been initiated in early 2008, when the 'go-ahead' for the overall company was given. At the same time, Mintails commenced setting-up its executive team; drafting experienced mining professionals as well as legal staff in order to cover all aspects of the complex venture.

[113] The case also shows the spatial dimension of the problem. Pamodzi is mainly operating in the East Rand of the Witwatersrand Basin. While it is thus not located in the main area of investigation (West Rand), the company offers insights into some of the complications that occur in the overall Witwatersrand.

specified under the National Water Act and are also mentioned in the company's reporting material. Harmony is thus largely in compliance with these specific environmental requirements, while breaches occur regularly. A constant dialogue is however maintained with the regulator concerning the progress in addressing the breaches. As a compliance measure, Harmony has also taken on the challenge of dealing with the clean-up of the highly polluted Robinson Lake in the vicinity of the Randfontein operations. The lake has been used as a dump site for mining wastes over the past hundred years and thus represents a long term liability, which Harmony inherited from previous operators.

Anglo Gold Ashanti on the other hand maintains an expansive incident ***reporting systems*** in line with the relevant stipulations as well as internal reporting standards (Anglo Gold Ashanti, 2008). For 2007, several water-related incidents were reported. Those mainly happened at the company's Vaal River operations, for which action was taken accordingly, demonstrating the relatively high level of responsiveness to spills and other critical incidents of Anglo Gold Ashanti, which could also be found with Gold Fields for example.

DRD Gold, while largely in compliance with the main legal requirements in terms of water management audit and regular water monitoring activities on site, is lacking the necessary ***water licenses*** (DRDGold, 2008). Although the company has applied for the licenses, the issuing process with the Department of Water Affairs is considerably delayed. This is a problem faced by the majority of mining companies, including Gold Fields' operations. As a reaction to the slow issuing progress, Gold Fields is actively working with the responsible authorities, that 'all requirements of the catchment management process are facilitated through appropriate reserve determinations through the involvement and engagement of all relevant stakeholders' (Gold Fields, 2008a). This statement from the annual report points to the active involvement of Gold Fields in order to accelerate the legislative process and to limit the risk that is potentially originating from missing water use licenses.

An important issue, regulated by respective directives issued by the Department of Water Affairs, is the pumping of water from mining shafts in order to prevent the occurrence of acid mine drainage[114]. DRD Gold is involved with pumping activities of underground workings in the Far West Rand as well as the Central Basin. Some of the water is re-used, while most of it is currently discharged. This process is however rather cost-intensive and thus subject to constant debate between the company and the regulatory authorities. While the company is using each and every occasion to stop the pumping process, government steps in with new directives. In addition, environmental action groups in conjunction with the mine workers have issued a memorandum of understanding in 2008 to stop the discontinuation of operations and thus pumping activities at DRD Gold's ERPM mine (FSE, 2008).

Another example for a ***failure to comply*** is Pamodzi as one of the remaining operators on the East Rand. The company was mandated to pump and also treat acid mine water before releasing it to the surface[115]. However with the 2008 financial crisis, Pamodzi encountered serious problems with affording the treatment chemicals. Pamodzi was thus faced with the choice of either allowing the underground pumping station at their operations to flood or to release untreated acid mine drainage to a nearby wetland area. Several incidents of visible pollution of the Blesbokspruit catchment were reported in April 2009. Faced with this veritable potential threat to the nearby watersheds, DWAF

[114] The maximum allowed water level before acid drainage occurs is referred to as Environmental Critical Level.

[115] Grootvlei used about 25 to 30 tons of lime per day to neutralize about 75 ML of acidic mine water per day.

decided to subsidize Pamodzi's pumping and treatment activities with a R 7.5 million subsidy (Creamer, 2009)[116].

Mintails' venture on the other hand builds on the South African government's new approach to mining represented by the MPRDA. By reviving mining activity in the West Rand area the company considers itself in full compliance with the goals of the MPRDA (Van der Walt, 2008). At the same time, Mintails sees its operations as a way to turn an environmental liability into a 'sustainable solution'. This is also reflected by the company's interpretation of the SLP requirements, in which the company communicates its interest in contributing to the overall macro-economic development of the entire area. This includes the improvement of human settlements, the development of alternative industrial development as well as job creation. The so-called 'Kagiso Development Corridor' is part of Mintails SLP. In the first instance, Mintails' contribution comprises the responsible management of the tailings and slimes dams[117], but is in principle designed to have positive impacts beyond that, thus representing a '***compliance to opportunity***' approach.

Monitoring & Planning

While ***monitoring*** features strongly as an element of compliance as mentioned above, it also constitutes an important component of planning activities.

In addition to monitoring activities at the individual firm level, there have also been instances of joint monitoring efforts. An initiative by Gold Fields, which was then supported by government as well as other mining houses, for example led to the creation of a catchment-wide monitoring system for the Wonderfonteinspruit. Sediment sampling and other monitoring undertaken in the context of this initiative indicated that 'while there is evidence for heavy metals loading in the sediment, the water itself is not affected by radionuclides' (Gold Fields, 2008a). Similar activities are undertaken with regards to the decant of acid mine drainage. Companies produce their own measurements and monitoring of the pollution. Data is then compared, shared, validated and discussed with other stakeholders in the context of regular working group meetings (see section E.4.5).

Internal Planning is taking place to varying degrees of foresight and integration with the companies investigated. While in some cases water management planning merely forms part of planning activities for production purposes, some companies go further in their efforts and take on a broader perspective.

An example for the latter group is Gold Fields. Water is considered an issue of central concern at all of Gold Fields' operations (Gold Fields, 2008a). In addition to monitoring systems on water usage, water quality changes and the identification of potential water recycling opportunities, Gold Fields' planning activities also make reference to the specific water management challenges deriving from accelerating climate change, experienced in South Africa (Gold Fields, 2008a). This points to a rather proactive perspective maintained by Gold Fields, which can partly be found with other larger operators as well. However, it is lacking almost completely with smaller operators or those struggling with day-to-day issues (Van Niekerk, 2008).

[116] In addition, Pamodzi has also taken over the Orkney operations of Harmony and thus also inherited some of the liabilities in the KOSH area (see section on Anglo Gold).

[117] The 'proper management of the tailings dams' for the company also involves the combination of more than ten different tailings dams, in a 'Super-Dump-Facility'. This new Tailings Dam Facility, which is to be located near Witfontein is highly contested and was facing massive community protest at the time the interview with Mintails was conducted.

Foresight in planning efforts is also demonstrated by Mintails, which in addition to addressing the issue of acid mine drainage, is also dealing with the restoration of polluted wetlands on their lease area. In order to finance a sustainable remediation, there are currently plans to leverage re-development capital in addition to commercial capital generated through operations (Van der Walt, 2008). Finance will be procured on the basis of integrative plans, including not only Mintails operations, but also other sectors and developmental issues in the regions, such as agriculture, municipal planning and environmental justice considerations.
While planning initiative is thus demonstrated by some mines, in general the gold mining industry is considered rather reactive as compared to other commodities, such as for example coal or platinum.
This is also emphasized by the fact that, albeit monitoring programs are in place to evaluate aquifer and surface water impacts, it is not clear if the full impact of mining operations or mine closure is known, especially in cases where the capacity to model pollution pathways is lacking with some companies (Pulles, Banister, & Van Biljon, 2005).

Overall it can be said that compliance with legal requirements, monitoring and planning activities is taking place to varying degrees among the firms investigated. The level of sophistication is relatively high with some firms, especially the larger ones that also dispose of the necessary resources (e.g. Anglo and Goldfields) and follow a more future-oriented strategy (Mintails). On the other hand almost all companies frequently report pollution events in relation to tailings dams management, decant of acid mine drainage and other incidences, which documents the deficits in terms of controlling these incidences. This is particularly evident in situations of limited financial stability[118].
While compliance, monitoring and internal planning often take place at the individual firms level, one can also observe a tendency towards concerted efforts, which are to some extent also promoted by government, but also go back to company initiatives. This does not only include joint monitoring and planning activities, but also affects the potential contributions with regards to efficiency improvement, technological innovations and infrastructure development/financing to be discussed in the following section.

Efficiency Improvement & Technological Innovation; Infrastructure Development & Financing

A specific joint effort revolves around the development of a viable solution for treating mine effluents from operating as well as derelict gold mines in the Witwatersrand area to address the issue of AMD.
This process is embedded in broader activities and initiatives pertaining to the mitigation of water pollution impacts in several watersheds in the area, including the Wonderfonteinspruit. It also encompasses the regional strategy for mine closure, undertaken in the context of the 'Sustainable Development through Mining' program (see section E.4.5).
Both processes are inextricably linked and thus involve a wide range of actors from the mining industry, government and other organizations in that area. For better clarity I focus on the process concerning the treatment options for AMD. Where helpful, I am going to touch other relevant activities driven by the companies in order to highlight crucial aspects of the role of the gold mining industry with regards to water management and their specific interaction with government authorities at different administrative levels.

[118] DRDGold halted pumping at the ERPM mine in October 2008, leading to a potential decanting of Acid Mine Drainage in the Central Basin Section of the Witwatersrand.

The issue of AMD is relevant in terms of the reuse of treated mine water, and thus efficiency improvements, technological innovations to treat and redistribute mine water as well as the development and financing of the respective infrastructure needed. In the following, the process of setting-up the collaboration as well as the current situation will be presented in a narrative format.

The process started about 2002, when the underground voids in the Western Basin had increasingly filled with acidic water and AMD started to decant at a site near the Krugersdorp game reserve at a rate of 15 ML a day. The focus of government attention was immediately placed on the three remaining mining houses in the West Rand. One of them was Mintails (through its operating subsidiary Mogale Gold Mine), which had just commenced start-up for the tailings operations. Besides Mintails there were Harmony Gold Mining and DRD Gold (Durban Roodepoort Deep), which had been present in the area for about ten years.

The legislative requirements were quite clear: the National Water Act establishes the polluter-pays principle, thus enabling DWAF to issue a directive, stipulating that none of the mining houses would be allowed to reach closure until the issue of the AMD decant was taken care of (Keet, 2008). The mining houses initially contested this decision, claiming that the current situation was not solely their responsibility and that they could not be held liable for damage caused by 150 years of gold mining on the in this area (Zorab, 2008). The companies engaged in a few court cases over the following years, without any success for either side (Zorab, 2008). At the same time, the problem continued to occur and projections on the amount of decant were yielding increasing anticipated values. Harmony was the first company that implemented emergency measures in order to address the situation. This resulted in the construction of a water treatment plant by 2004. At this stage, liabilities for water-related impacts were distributed according to an apportionment model, assigning 46 % to Harmony, 44 % to DRD and 0.8 % to Mintails. The remaining liabilities were attributed to ownerless mines and thus fell into the responsibility of government (Schoeman, 2008).

As a next step, in 2006 a cooperation agreement was signed between two of the companies, Mintails and DRD. The latter does not have any operational mines in the area, but still holds mining rights; Mintails on the other hand needed water for its operations. Mintails thus officially confirmed its assistance for DRD in terms of addressing the issue of AMD at their lease. All three affected mining houses then set up WBEC, the Western Basin Environmental Corporation, in order to 'find a sustainable solution to address the issue of AMD in the Western Basin' (Schoeman, 2008). WBEC was established as a Section 21 company, i.e. as a not-for-profit, common purpose undertaking. The agreement foresaw Harmony treating some 30 % of the water, while 50 % would be treated at Mintails' Mogale operations, with Mintails and DRD splitting the costs for this arrangement. In a following step, WBEC then commissioned the Western Utilities Corporation (WUC) with securing the funding, management and construction of the technological solution to be identified in order to address the issue of acid mine drainage.

WUC[119] has been involved with securing funding for the construction of a 75 ML treatment facility to turn AMD into Grade II (industrial) grade water, i.e. water that would then be used for other industrial processes. Start-up funding in the order of 2.5 million Pounds is provided through the support of WUC's owner Watermark. The three constituting mining houses contribute to the project

[119] WUC is a wholly owned subsidiary of the London-based Watermark International, which is listed at London's Alternative Investment Market. Watermark, as a technology-oriented Investment Company, is interested in the prospect of a long-term revenue stream generated by an infrastructure-driven project such as the WUC treatment plant.

by transferring all the necessary fixed assets. This includes pumping stations and pipelines that are worth several billion Rands and necessary for getting the water to the WUC treatment plant.
A pre-feasibility study has been completed for the project. A bankable feasibility study is to follow funded by Watermark. After the approval of the second feasibility study additional money is to be provided by Watermark, while other sources are sought to complement this fund. WUC is thus firmly set on developing a long term solution, independent from the interests of the mines. Under the current arrangement, the moment the water treatment solution is workable and yields the expected results, the mines will be released from their responsibility stipulated in the directives issued in 2002. The WUC solution is designed to guarantee complete independence from mining operations, which are likely to cease within the coming ten to 15 years. This is going to aggravate the challenge of holding anybody responsible, not only for the damages occurred, but also for the maintenance of any infrastructure put in place for the treatment system (Schoeman, 2008).

In case of successful project implementation of the on-going project, the following contributions will be yielded from this joint activity. In the first place companies were able to design a financing model, under which it would be possible to leverage the necessary financing to build treatment facilities in a dimension necessary to treat the amounts of acidic water expected to decant. Furthermore, through the same arrangement they also support the development of new treatment technologies for treating acidic water. And third there is a potential contribution to efficiency improvements with regards to source minimization through the re-use of treated mine water by their own, but also other industrial operations. This contributes to alleviating the overall pressure on water resources in South Africa.
This process could lead the way for 'a successful and also sustainable solution to the challenge of AMD in the West Rand'. However, there are a number of issues that need to be addressed, especially with regards to the reuse of water.
In the first place, a viable solution depends on the design of the treatment plant and its ability to produce water of a suitable quality. Furthermore this process needs to be cost-effective in order to allow for on-selling to high-volume industrial users (Schoeman, 2008). This immediately raises the question concerning the price of the treated water; if the treated water is more expensive than the water provided by the water boards the entire project will be rendered ineffective[120]. Secondly, there is the issue of identifying users for the treated water. One possibility involves transferring the water to the platinum mining areas in the North West and Limpopo provinces (see Cases 3 and 4)[121]. Another other option involves the steel mills owned by Arcelor Mittal near Vanderbijlpark. The third possibility would require treating the water to drinking water standard and feeding it into the systems of the Water Boards (e.g. Rand water).
These questions highlight the complexity and dimensions of the challenge to be addressed and partly explains the joint approach chosen by the companies most affected.

[120] In order to reach a greater throughput and efficiency of the plant, WUC is considering the treatment of not only water from the mines in the Western Basin (of approximately 15 to 20 ML a day), but also in the Central and East Rand Basins. That would increase the daily amount of water to 150 ML, and bring down the cost of treated water. As for the situation in the Central Basin and the Eastern basin large portions are no longer mined; there are only two companies operating in these areas, Central Rand Gold and Pamodzi in the East. An apportionment model has been completed laying the foundation for the inclusion of these areas in the treatment effort, indicating a need for treatment capacity here as well.

[121] However, it is chosen, why this option is no longer viable at this point in time.

A similar example on such collaborative efforts can be found in the Vaal river region (Far West Rand), where Anglo Gold Ashanti has been confronted with a situation, where shafts were located in the proximity to closed and abandoned mines. Due to the cessation of pumping of these mines, Anglo's operations were threatened by the ingress of water into their operations, leading to additional risks and cost (Fine, et al. 2007). After the application of legal remedies, the relevant mines in the area, some of them under liquidation, entered into a settlement resulting in the formation of the Margaret Water Company[122]. This company is now responsible for pumping and treating the water. While this approach was in the first place targeted at ensuring operations at Anglo's mines, it helped set the precedence for collaborative efforts to address mine water issues. The case was used as model cases for arranging similar approaches such as the WUC (Rex, Hollesen, & Parsons, 2008).

Awareness & Capacity

In addition to these concrete on-the-ground measures, which involve investment in infrastructure and other engineering features, there are also a number of "softer" activities undertaken by companies in the area. They are directed at bringing together stakeholders and initiating a dialogue on the main issues to be addressed and the responsibilities to be assigned to the various actors. These activities can be undertaken individually, in the form of industry collaboration as well as partnership arrangements and platforms with other actors including governments and NGOs. A few examples will be presented in the following section.

Due to the location of most of its South African operations in the Wonderfonteinspruit catchment, Gold Fields has taken a very proactive approach towards addressing some of the pertinent water management issues in the catchment. The company took the initiative to form the Wonderfonteinspruit Action Group (WAG), which brought together mines, regulators, scientific institutions and community representatives in order to work towards a better understanding of the pollution situation in the WFS. The initiative for example led to the creation of a catchment-wide monitoring system mentioned above. The WAG also pursued the re-establishment of the Water Management Forums in the catchment (see section E.4.5). As a result, the work of the WAG was discontinued in order to support the functioning of the Water Management Forums. The interests of the mines were combined in the so-called Wonderfonteinspruit & Loopspruit Mining Interest Group (MIG). The members of the group include Anglo Gold Ashanti, Gold Fields, DRD Gold, Mintails and Harmony, the group is chaired by Gold Fields.

The MIG represents a concerted effort of the mines in the catchment to deal with allegations in terms of the pollution of the WFS. In addition, the MIG is the mining industry's vehicle of representation in the Water Management Forums. It also maintains the activities started under the auspices of the WAG, including monitoring and sediment sampling. The MIG, through which the mines also seek to bundle their experiences and resources, convenes on a monthly basis. In these meetings the activities of the mining industry in terms of the pollution of the WFS are being discussed and coordinated.

The main concern of the group relates to conflicting scientific reports on impact pathways and the actual status of the water resources in the area. A further challenge is the planning of proposed

[122] The Margaret Water Company was established as a so-called Section 21 entity. Section 21 of the South African Companies Act 61 of 1973 allows for the incorporation of 'not-for-profit companies'. These companies resemble business oriented (for profit) companies in their legal structure, but do not generate a distributable profit. In this case the company manages the pumping of the excess mine water and develops markets for the on-selling of water.

measures. These are the main stumbling blocks in identifying a joint solution for the problems encountered in the Witwatersrand from a companies' perspective.
Through their activities, MIG members intend to maintain the dialogue to other key stakeholders in a concerted fashion. They also want to contribute to a clear and mainstreamed approach towards the production and processing of information and data on pollution in the region.
The above-mentioned activities demonstrate the industry's involvement with outreach and awareness to some extent. However, it needs to be noted that the established fora are very much directed at showcasing the mining industry's position rather than engaging in a truly open dialogue. Therefore, this behavior somewhat has a connotation of lobbying and shaping processes according to the industry's understanding.
In contrary to the other case studies investigated, mining companies in this region do not explicitly engage in capacity-building efforts for government officials at any level. It needs to be noted however that the continued and rather intensive interaction between government, mining companies and other actor for example with regard to monitoring has lead to the building-up of certain capacities and know how.

To summarize, in terms of the contributions provided by the firms in this case studies, there is a mixed attention to compliance, monitoring, internal and external planning, with strong as well as weak compliance records occurring among firms. These activities relate to controlling, limiting and mitigating impacts on the Wonderfonteinspruit catchment, but also the decant of AMD. The latter impact is also addressed through technological innovations with a strong infrastructure and financing component, responding to the severity and large scale of the water problem. Notably, there is only little focus on capacity-building, but rather dialogue-oriented approaches, which caters to the considerable uncertainties inherent to the water problems as well as the complex liability situation. The involvement with these contributions varies quite significantly by firm type. Larger and better resourced firms appear to engage in more and also more qualitative activities than smaller firms, operating under tight financial conditions. Additional explanations for this differential behavior will be provided in the following section discussing the respective drivers.

E.4. Drivers

E.4.1. **Resource-based Factors**

The importance of ***water as key resource*** and of 'too much' water as a problem has been outlined above. Although companies show different exposure to these problems, awareness is exceptionally high among all firms interviewed, albeit for varying motivations. Water is an issue of 'major concern' for Harmony, due to its exposure to several water management challenges at their production sites (Zorab, 2008). Water is also explicitly mentioned as one of the main areas of concerns for DRD Gold, reflecting the specifically challenging situation in terms of water management in the area of operation (DRD Gold Limited, 2008)[123]. Anglo Gold and Gold Fields treat the issue as an important, but also only one of many environmental issues to be addressed (Rex et al., 2008). For Mintails activities are also motivated by resource cost considerations; i.e. the re-use of treated mine water for

[123] DRD has been involved in setting up the a joint initiative of companies operating in the Central Rand basin, directed at the identification of treatment and purification of contaminated mine water under a economically viable as well as self-supporting model.

own production purposes. In the second place, a further reutilization for other uses is considered as a market opportunity (see section E.4.3) (Van der Walt, 2008).
While all companies are somewhat concerned by the issues epitomized by the case of the Wonderfonteinspruit, so far only Harmony, Mintails and DRD are directly affected by the occurrence of acid mine drainage; other operating mines are more and more aware of the potential dimension of the issue (Rex et al., 2008). This to a considerable degree explains the companies' willingness to become involved with water management issues.

Indications with regards to resource-based factors, such as the ***deployment of resources and organizational slack***, which is also reflected in the organizational capacity to address water challenges, have been provided by the description of the main characteristics of the firms in this case study. Capital management capabilities are relatively well-developed among all mining companies, which explains the support for large-scale infrastructure-based solutions in the case of AMD. There is however a variance with regards to the organizational slack, i.e. the 'extra' resources to address issues of sustainable development. It could be shown that firms that are struggling to make end meets are less inclined to address sustainability issues, let alone comply with legal requirements.

A further aspect is the companies' ***awareness of and its disposition towards sustainable development***. Harmony for example considers itself a committed and responsible corporate citizen (Harmony, 2008b). From an organizational perspective, this position is supported by the establishment of a sustainable development committee at the board level with the mandate of overseeing Harmony's performance with regards to all key aspects of sustainable development. Similarly, Gold Fields has established a framework for sustainable development, which is to be integrated in all aspects of business. Anglo Gold's main areas of concern in terms of their understanding as a responsible corporate citizen pertain to worker health and safety, including HIV and AIDS as well as environmental performance. These issues are overseen by the Safety, Health and Sustainable Development Committee, which also develops overall targets and strategies. While these organizational arrangements only provide for a limited insight into the disposition towards sustainable development, they provide for an indication of the maturity of the structures established as well as the degree to which these have found reflection in the overall company strategy. DRD Gold for example issued its first sustainable development report in 2008. The company's internal governance structure with regards to the management of sustainable development issues however has not been fully established yet. It can be assumed however, that these structures at the corporate level are still in an emerging stage.
Pamodzi is a similar case. As a BEE company, the firm does subscribe to the main principles of corporate responsibility and maintains responsibility management functions within its executive committee (Lea, 2008). At the same time however the main focus of Pamodzi's engagement is placed on social empowerment and equity issues, which have a priority over environmental concerns.
Mintails represents a further variation in this regard. Although vested with relatively few resources and limited organizational slack, the company's business model is to some degree built on an entrepreneurial and innovative approach targeted at identifying technological solutions to the environmental problems caused by the gold mining industry.
These observations about the general disposition towards sustainability issues point to the inclination of mining companies to engage in the respective proactive planning activities and their

willingness to engage in problem-solving activities, as these would have to be aligned with the expectations with view to the sustainability performance.

A further and much related factor, which also plays a role for Mintails and comes to bear to differing degrees with the other companies, is the ***international orientation*** of the respective firm. Anglo Gold and Gold Fields are multi-national companies and also maintain operations in OECD countries. This is not the case for Harmony, DRD Gold and Pamodzi. In addition to the location of operation, also international stock exchange listings could play a decisive role (Rex et al., 2008). Investors constitute an important institutional driver affecting the resource-base of a company. In the case of Mintails the business idea was driven by the interest of Australian investors to explore business potential arising from new legislation and environmental challenges in the South African gold mining industry, since relevant experiences had been built up in the Australian mining industry (Van der Walt, 2008)[124].

E.4.2. **Normative Drivers/Industry Pressure**

In terms of international norm systems established to promote corporate sustainability and responsibility, the companies in the case study area have joined several initiatives in this regard.
Gold Fields for example has joined the Global Compact as well as subscribed to the ICMM Sustainability Guidelines and has also undertaken an extensive gap analysis as to its current status of compliance with the respective principles (Gold Fields, 2008b). Harmony is listed at the JSE Sustainability Index and fulfills the respective reporting requirements and also applies the GRI criteria. This is also the case with Anglo Gold. The company has also developed its own set of guidelines pertaining to environmental management issues based on guidance provided by the ICMM (Rex et al., 2008). While the international discourse finds its reflection at least among the more internationally active firms, they rather form a background condition than an actual driver for the companies' water strategies. More important in this regard are national sector-specific initiatives, such as the activities with regards to mining and water as well as mine closure spearheaded by the South African Chamber of Mines (CoM SA, 2008). These are mostly directed at showcasing best practices and at initiating a dialogue among the mining companies, thus creating some type of peer pressure, which however cannot be considered as particularly strong. Resulting contributions from this category of drivers thus mainly involve the interaction with stakeholders through dialogue.

E.4.3. **Competitive Drivers**

Market or competitive drivers play an important role in this case study, albeit there is a need to interpret them slightly different from the analytical framework.
In the first place, water challenges are related to considerable costs. Thus companies that are in better position to cost-effectively address those challenges can potentially reap a competitive advantage (Pegram et al., 2009a). This process clearly motivates the strong tendency of companies to collaborate on water management issues. Technological innovation can be shared and costs for the individual companies will be minimized.
A further aspect of competitive pressure is demonstrated by the WUC project, which was also clearly motivated by the prospect of selling treated mine water at a competitive price, so that the

[124] At the same time however, the venture had to be supported by substantial growth, which was realized through mergers and co-operation with other mining companies (DRD Gold) and last but not least by the commercial prospects inherent to a surface gold mining operation.

operations would basically pay for themselves in the long run. The effect of the price that can be achieved for the treated water is demonstrated by the unsuccessful predecessor of the WUC project. The so-called Amanzi[125] project was launched before the decanting started; five mines from across the Witwatersrand basin intended to treat the water pumped from their underground operations and to sell the water. However at that stage, no workable solution could be found and the Amanzi project was eventually abandoned due to problems with reconciling the water pricing issue with DWAF. The Department actually mandated the companies in the Amanzi project that they had to basically pay the government for the water they were planning to treat and sell. Since at that time the yardstick used was the water price in the Vaal/Orange river catchment, the resulting cost would have rendered the project non-profitable (Keet, 2008).

Thus Amanzi, while eventually a failure, constitutes an important reference for the current endeavor by WUC. The situation now is somewhat different, as the decanting occurred in the Crocodile catchment, where water is priced much lower than in the Vaal river basin[126]. While paying for the water would have constituted a major cost for WUC as an operator, the government decided to partly waive the fee in order to provide an initiation for the project. At the same time, government also allowed WUC to enter into negotiations on price with possible water users as a competitor to the water boards (Keet, 2008). Since treating and selling the treated water thus became a financially viable option, the project also received further support by financiers, regulators and companies.

This case is an example for government making use of competitive drivers to direct corporate behavior and thus also for the potential interaction and combination of different drivers.

E.4.4. **Social Drivers**

Apart from government, numerous other actors play an important role in shaping business behavior in the case study area. Specifically I address the role of NGOs and community groups and recently also organized labor as well as the input of science.

NGOs and Activists

Activists and concerned citizens play quite an important role as a driver in this case study. In the first place there are some associations of concerned citizens in the Krugersdorp/Randfontein area, who have been involved in monitoring the environmental impact of AMD as well as other impacts originating from slimes dams.

The Federation for a Sustainable Environmental is a newly founded South African environmental NGO. It is providing an institutional reference for its director Mariette Liefferink, who has been involved in a number of lobbying and whistle-blowing efforts in the area, based on a 'sole mandate' for the past ten years (Van Eeden, 2008).

Van Eeden (2008) maps additional NGO actors in the area, such as the Randfontein Environmental Action Group or the Potch Petitioners, both groups comprising mostly white concerned residents in the respective mining areas. Other national NGOs, which have addressed issues in the area on a sporadic basis, are WESSA, the Legal Resource Center as well as Earthlife Africa. Also, Van Eeden

[125] Amanzi means water in the Zulu language.

[126] Different water prices in these areas result from the existing infrastructure put in place in order to secure water supply in the different catchments. The Vaal river system, as part of the Orange system, is heavily dependent on several dams, as well as a number of transfers in order to bring in water from the Lesotho Highlands Water Project; the Crocodile has considerably less water infrastructure in place, rendering water prices of less than a third of those in the Vaal system.

(2008) points to the many cross-linkages between these different actors as well as their respective funding structures.

While funding through political parties is common, in some cases corporate funding also plays a role. Some companies, for example Mintails, have decided to work proactively with the activist-community, in order to mitigate the risk of criticism. These companies have an interest in making use the long-term exposure of these individuals to the situation in the West Rand, their knowledge of historical legacy issues and thus initiate a learning process (Van der Walt, 2008). Ms. Liefferink also receives funding from Harmony, which she is using to finance community outreach activities and protest marches, if necessary even against Harmony.

As Keet (2008) pointed out, these activists are constituting a true 'third power', as they not only put pressure on the mines, but also on government departments. Especially, Ms. Liefferink stands out as considerably critical of firm as well as government activities and fundamentally suspicious of the potential collusion of both groups' interest structures. Due to this role, the activists are considered as catalysts, which speeded up the processes currently underway. This applies to the remediation of the pollution of the Wonderfonteinspruit as well as the solution currently under negotiation concerning acid decant in the Western Basin.

NGOs made intensive use of the whistle-blowing principle through seeking close collaboration with the print and broadcast media. Critical articles appeared throughout the past five years in magazines, such as Beeld (Afrikaans), Sowetan and Citizen, Sunday Tribune and Cape Times. In addition SABC[127] progams, such as Carte Blanche and 50/50[128] were used in order to reach broader audiences (Van Eeden, 2008). In addition, activists made oral and written submissions to ministers as well as the parliamentary portfolio committee and collaborated with prominent environmental lawyers, such as George Bizos, as well as international colleagues. In pursuing these activities, activists strived to maintain a high scientific understanding of the complex issues at hand. It turned out to be inevitable to stay abreast with the latest scientific findings in order to reach an even negotiation ground with mining companies as well as government authorities (own observation). Finally, activists in some cases also managed to reach out to individual citizens who were affected by pollution incidents.

The activities of NGOs enhanced by media attention have contributed to improved compliance records as well as led to a stronger focus on monitoring and planning among those firms, subject and also receptive to this type of pressure. These mostly included the larger firms, which also displayed certain openness towards stakeholder interaction. While the initiative to address AMD and the deterioration of the Wonderfonteinspruit in the region cannot only be related to NGO activity, still they constitute an important element in the overall ensemble of drivers determining firm behavior.

Concerned Citizens and Township Communities

It is necessary to differentiate between two affected groups: individual citizens and township residents. The first group consists of residents in the area, more specifically farmers whose animals have presumably been affected by AMD or other pollution impacts originating from the mines. The members of the first group are mostly white and they are either individually or collectively voicing their concerns. They have the means to resort to legal remedies to threat mining companies and to

[127] South African Broadcasting Corporation: the largest public TV network in South Africa.

[128] Two TV shows following an investigative journalism approach. 50/50 refers to the ration human/nature and covers mostly environmental themes, while Carte Blanche is more focusing on uncovering scandals in any subject.

potentially leverage compensation. These individuals are in most cases well connected to the above-described activist community.
The second group is the much bigger. It consists of the large community of township residents, scattered all over the region. In many cases, these townships were set-up in immediate proximity to tailings dams, abandoned shafts or polluted water sources. There is a lack of awareness about environmental and health implications of mining activities among these communities. Although restricted, river water is frequently used for drinking and cooking purposes. In many cases township residents are exposed to hazardous materials and polluted areas.
Slowly, awareness is emerging, partly due to outreach campaigns of the activist community. Protest marches have been launched to address irresponsible firm behavior. Nevertheless, the township communities, similarly to mining hostel dwellers in the area, have a weak stance, when it comes to addressing company impacts.

Increasing community activism has lead however to an increased interest of firms in engaging in better dialogue and exchange with their immediate neighbor. Furthermore, community groups are increasingly collaborating and supporting NGO activities and thus indirectly contribute to increased compliance and improved diligence on the part of the companies.

Labor

While rather uninvolved with the issue of water pollution in the past, lately there has been an increased activity on the part of the labor movement. The National Union of Mine Workers (NUMSA) has discovered the issue of water pollution, since it often occurred in conjunction with mine closures and the subsequent retrenchment of mine workers. For example in 2008, the regional branch of NUMSA sought to identify parallel interests with the environmental activist community (own observation) (FSE, 2008). In this case, the respective interests are not alike, but to some extent aligned. Both parties have an interest in a continuation of the pumping of underground water, either to avoid pollution or to keep employment opportunities.

Thus, labor union activities have not yet directly led to a certain response on the side of business with regards to the water issue. Considering however the overall strength of the union movement in South Africa, the rising interest of the labor union in environmental and water issues must be considered as a veritable driver in future, especially if combined with NGO activities.

Science

Scientists have and are continuing to play a crucial role in determining and thus also framing the water problems originating from gold mining in the Witwatersrand basin. The Council for Geosciences (CGS), the Council for Industrial and Scientific Research (CSIR) and the South African Water Research Commission (WRC) have been involved in the discussion through numerous studies and assessments. These studies covered the impacts of gold mining and potential strategies for mitigation. The CGS also worked on water impacts from abandoned gold mines in the context of the 'Sustainable development through mining project' for the DME (Coetzee, 2008). Through these projects, science was given the opportunity to interact with government at a quite hands-on level, in a hybrid role of researcher and/or consultant.
Research has been crucial in revealing some of the so far undiscovered threats to water resources. In addition, pollution pathways as well as impacts from water pollution on the environment and

communities have been under close scrutiny. The following list comprises some examples of major reports on the main issues of concern in the Witwatersrand area:

Table 14: Overview of Key Scientific Publications Related to Water Problems in the Gold Mining Area

Title	Year	Authors	Main message
Tier 1 Risk Assessment of Selected Radionuclides in Sediments of the Mooi River Catchment	2002	(Wade, S., Morris, Vos, & Jarcis, 2002)	Provides indication on the extent of pollution with radionuclides in the Mooi river catchment
The Development of Appropriate Procedures Towards and After Closure of Underground Gold Mines from a Water Management Perspective	2005 WRC 1215 Report	(Pulles et al., 2005)	Assessment of the expected consequences of mine closure, identification of measures to address the main challenges
An Assessment of Sources, Pathways, Mechanisms and Risks of Current and Potential Future Pollution of Water and Sediments in Gold-Mining Areas of the Wonderfonteinspruit Catchment	2006 WRC 1214 Report	(Coetzee et al., 2006)	Dimensions of the pollution impact in the WFS catchment
A Hydrogeological Assessment of Acid Mine Drainage Impacts in the West Rand Basin, Gauteng Province	2007	(Hobbs et al., 2007)	Acid mine drainage poses a significant threat to the groundwater environment in the West Rand area
Regional Mine Closure Strategy for the West Rand Goldfield	2008	(DME, 2008)	Ways to provide for a sustainable approach to mine closure

While scientific institutions like those mentioned above are considered to be impartial and independent, a few critical issues have been raised in the past. This pertained to the impact of an increasing competition among scientific institutions for funding on the results and quality of research. In some cases, maintaining a critical distance between research and consulting appeared to be difficult, as research institutes would offer their services to government as well as corporate actors (own observation).

Still, the most severe issue around knowledge management is that the data produced by research entities is withheld, making it difficult to actually put together a complete picture of environmental impacts. Information is not made available to all actors involved, but often used as a tool to secure power. Information is also produced and used by the corporate actors in order to support their cause. In case of the management of the acid mine decant, a more inclusive approach has started with the establishment of a joint monitoring group involving government, industry, science as well as interested citizen groups. This process is also intended to account for the issue of conflicting information regarding certain issues, so as to mitigate considerable inherent uncertainties.

Science thus plays an intermediary role, since it advises government as well as corporate actors. It however also has a considerable potential to drive debates on water issues in the West Rand area due to their inherent scientific complexity.

While information and knowledge produced by science thus will eventually provide the basis for regulations and/or NGO and community activism at the current stage, the strong role of science has led companies to increasingly engage in dialogue and exchange.

E.4.5. **Government Drivers**

Of all drivers considered clearly government emerges prominently as the strongest.

Anglo Gold for example, is fully aware of the increasing government pressure exerted on the gold mining industry in terms of their environmental impacts. This pressure is often supported by public scrutiny, especially of those companies perceived to have the largest impact (Anglo Gold Ashanti,

2007). Non-compliance and production stoppages due to controls by the South African DME are perceived as major risk, which also applies to the gold mining industry in general (Rex et al., 2008). Similarly other companies also refer to legislation as a major regulatory threat (Van der Walt, 2008; Zorab, 2008). Directives issued for example on the basis of water legislation bind individual companies to a certain compliance level. Legal measures, such as litigation, are employed in case of non-compliance. Most companies are reluctant to take this step. Nevertheless, in some cases the problem cannot be addressed adequately, so that non-compliance and sometimes even legal consequences are unavoidable (Schoeman, 2008).
While thus mandating and enforcement thus appears to be quite well-established, the complexity of the water management challenges in the Gauteng region as well as the historic legacies that characterize the relationship between the mining industry and government, have prompted alternative governance approaches beyond mandating. New modes of governance are currently emerging complementary to legislation. Some of these will be discussed in the following section[129].

In order to coordinate government departments responsible for dealing with water and mining in Gauteng the ***Government Task Team on Mine Closure (GTT)*** was established in 2005, bringing together representatives from DWAF, DEAT, DME and the National Nuclear Regulator[130]. In addition, the GTT facilitates the communication of government with parliament and other stakeholders, such as NGOs and the Chamber of Mines (Adler et al., 2007a). The GTT also has the mandate to review existing guidelines with regards to mine closure and water management and develop new guidelines targeting the current situation (Coetzee, 2008).
However, serious shortcomings have become obvious with regards to this forum. Its ability to safeguard implementation in line with ambitious constitutional requirements and international best practice seems to be quite limited. This could partially be related to the lack of institutional integration of mining and labor representatives. Other reasons might be that no NGOs are represented in the government-driven GTT structures. Furthermore there has been insufficient consideration of previously existing committees, specifically in the Far West Rand. The mines, rather than feeding into this platform, try to influence the outcome of the GTT's work by commissioning their own research on pressures and impacts of the mining activities. Thus, albeit the GTT could have served as an important driver for the mining industry, its potential impact has been undermined by the limited buy-in of actors apart from government representatives (Adler et al., 2007a).

The situation of the Wonderfonteinspruit and the uncertainties inherent to the scientific findings of impact pathways have led to the establishment of the ***Wonderfonteinspruit Fora,*** which are hosted by the DWAF regional office. These fora bring together different stakeholders, including mining companies, municipalities, concerned citizens and activist groups, consultants and other government departments (DME, NNR). Issues discussed include water quality monitoring activities and complaints by affected citizens concerning the perceived impacts of pollution[131] (DWAF Gauteng, 2008)[132].

[129] This tendency also points to the convergence of dependent and independent variables: more inclusive governance approaches will lead companies to engage more in dialogue and stakeholder interaction.

[130] The National Nuclear Regulator (NNR) addresses all regulatory issues related to radioactive contamination, which became particularly relevant with regards to Uranium mining and consequent radioactive pollution in the Wonderfonteinspruit.

[131] Particularly the issue of radionuclide contamination and its potential effects on human health and livelihoods in the area has received heightened attention.

[132] In order to address the problem of radiological contamination and to steer the remediation process of the catchment, a Regulators Steering Committee was established in 2007. The National Nuclear Regulator was chairing this committee. In the beginning of 2008, a

Attendance of the fora varies with problem pressure and interest. Particularly the varying attendance of government representatives is subject to much criticism. The fora are, however, mostly platforms for exchange between the actors and mostly serve as a vehicle to disseminate and discuss data. Community members as well as mining representatives are given the opportunity to learn about government plans and voice their position. Although partly designed as a platform to enable the endorsement of good corporate practice, this is only happening to a limited extent.

A specific forum created to address the challenge of acid decant in the West Rand is the so-called ***Western Basin Void Decant Technical Meeting***. The meeting, which is technically part of the overall GTT process outlined above, is convened by DWAF every three months and again brings together a diverse range of stakeholders, including government, mining firms, scientists, community and NGO representatives. The set-up of these meetings will be briefly outlined to provide for some insight into the positions of the different actors.

The government, and specifically DWAF, not only acts as the convener, but largely also serves as a mediator between conflicting interests. At the same time, government representatives (DWAF Regional Office Gauteng) also follow their own goals and mandates, which complicates the interaction. Other parts of government are represented by the Regional Office of the DME as well as the Gauteng Department for Environment and Agriculture, representing their specific constituents' interests. Government efforts are for the most part supported by scientists from large government-sponsored research institutes, such as the CSIR and the Council for Geosciences. The representatives of the mines are those involved with the technical management of water at the mines including the treatment of acid mine drainage. They are supported by industry-appointed consultants and specialists on those topics. The NGO community is represented by the Federation for a Sustainable Environment, (Mariette Liefferink), and also larger NGOs, such as WESSA. There is no representation of the communities living in immediate proximity to the mining operation, other than through municipal representatives. NGOs and activists fulfill the role of watchdog, critically scrutinizing scientific reports and material provided by the mines.

The mines on the other hand use the meeting as a platform to present their own measurements and monitoring data and to discuss their efforts to set-up treatment capacities for acid mine drainage (Schoeman, 2008).

The character of the meeting ranges between quite controversial discussions, e.g. regarding the access to data, as well as the validity of data presented by the mines, to a more discussion style type of meeting[133]. The involvement of numerous stakeholder groups as well as the intensive interactions however are viewed very positively and the meeting, in comparison with the others presented above, is considered a successful example for a stakeholder platform, which allows for a continued exchange between government, mines and other stakeholder.

As a result of these various activities at the national and local level in the context of the ***Sustainable Development through Mining Initiative*** (see section D.4.3) ***Regional Closure Strategies*** for the entire

team of experts determined the priority hotspots where the remediation of elevated levels of radio-contamination needed to be undertaken. While many expectations were placed on the establishment of the Regulators Steering Committee, NGOs soon criticized the inaction of a number of government departments.

[133] This became quite in the discussion about the decision of what an 'environmentally critical level of pumping' actually is. This represents the complexity of the remediation undertaken in this area. Since there is scientific uncertainty as to how much water is safe to be pumped from the subsurface voids, a decision was taken by consent of those present at one of the meetings.

Witwatersrand area as well as for individual sub-basins, such as the West Rand Goldfield, have been issued (DME, 2008). These closure strategies aim to lay out and facilitate a concerted approach toward mine-related impacts in the Witwatersrand region, taking into account the interrelatedness of former and present mining operations. More precisely, the closure strategies address the interlinkages between mines and municipalities in terms of infrastructure development and rehabilitation. Monitoring also constitutes a major area of concern. While strategies foresee that the actual monitoring can be undertaken by other actors, government is considered responsible for ensuring the transparency and credibility of data provided. It is also the government's duty to monitor ownerless and abandoned mines (DME, 2008). Other provisions in the closure strategies pertain to the rehabilitation of former mines and the curation of data available on closing mining operations. Under the impression of past problems with access and transparency of research results, a wide availability of research conducted in the area is advocated. This is also reflected in the stakeholder engagement strategy. The responsibility for stakeholder consultation is delegated to the mining industry in terms of those directly affected by a specific mining activity; more encompassing activities are to be undertaken by local government. Future activities in the context of regional mine closure are allocated to the following four actors groups.

Table 15: Actors and Responsibilities in the Regional Closure Strategy of the West Rand Basin (DME, 2008)

Mines	Communities	State/Government	Science
Development of closure strategies in coordination with regional closure targets Commitment to closure plans Participation in collaborative closure fora	Input to closure targets Participation in collaborative closure fora 'Eye and conscience of closure structure'	Regulator: Establishment of standards and benchmarks, final arbiter on limit values Monitoring and enforcement, corrective action Facilitator: Impartial moderator and convenor	Government science councils (CSIR, CGS) provide impartial information

The allocation of tasks demonstrates that mines are encouraged to become an integral part, but not the only contributor to addressing mine closure. The strategy places them in the context of other relevant actors and seeks to activate the mines to engage in planning processes, while at the same time inviting them to maintain a dialogue with their key stakeholders. On the other hand the role of government is to regulate, set standards and monitor, thus creating a shadow of hierarchy, but also to act as a facilitator between the different actor groups.

The strategy is intended to serve as a blueprint for interaction with regard to mine closure. It is currently undergoing further refinement and consultations with all relevant stakeholders. The feedback to the closure strategy has been mixed. NGOs and community advocates have called for a more proactive behavior on the side of government and a more inclusive participation of all stakeholders in the region. The response by the mining companies has been somewhat haphazard and was eventually deferred with the financial crisis affecting many of the operators in 2008/2009 (FSE, 2009).

Nevertheless the strategy represents a comprehensive planning and endorsement approach by government, which also aims to build on positive impulses provided by business and establish this as best practice. While the buy in of mines as well as other actors will be necessary for successful implementation, still the strategy provides for a veritable reference framework. This has not yet

prompted mines to become active, still the considerations have already been integrated in strategic consideration at the more proactive firms.

Role of Government Actors

The previous overview not only reveals the complexity of regulatory oversight, but also the challenge of coordination among the different government departments with a mandate to cover different aspects of the overall problem. DWAF, DME and NNR all address some facet of the pollution scenario in the Witwatersrand mining area from a national perspective. Local government represents the link to the communities in the area and thus needs to make sure that no negative impact derives from pollution issues. On the other hand, inadequate municipal sewage treatment also adds to the pollution problem and even further complicates the task of identifying the responsible parties.

Mining firms interact with all government actors at different levels. On the one hand, this requires considerable resources in terms of covering all meetings and processes. On the other hand it also offers an opportunity for contributing own data and information prepared by the mines. Mines can also choose those processes and fora, which are supposedly most favorable of the mines' interests.

The focus in this case study is placed on the role of national regulators and their regional offices. The DWAF Regional office Gauteng emerges prominently as they not only steer the engagement process with the mines, but also with the other government departments.

The department has the ***capacity*** and technical know-how to address the key issues in this case study. This includes the necessary understanding of the complex interrelations of water management, hydro-geological factors and mining in the area. While there are well-trained individuals dealing with this matter, their capacity is generally over-stretched (Keet, 2008). In terms of data availability and management, limitations are mitigated through a coordinated monitoring progam targeted at validating data provided by different sources, including the mines. The ***performance*** of government comprises a mix of policy tools, varying with the problem addressed. In some instances, DWAF resorts to mandating. Examples are the directives mentioned above, which oblige mining firms to address a specific pollution, e.g. spill of AMD, and introduce sanctions in case the requirements are not met. A further instance was the assignment of responsibilities in the case of AMD through a liability allocation scheme.

At the same time, DWAF also entertains a more collaborative approach, by entering into a negotiation process with the mining companies to keep the momentum of the process as well as manage the input of other stakeholders (Keet, 2008). An important tool available to and partly employed by DWAF is also the water pricing signal for those projects interested in treating polluted mine water.

In discussing the role of government the historical dimension needs to be taken into consideration. Regulators often act against their legacy under apartheid, where the promotion of the industry's interests, particularly in mining was one of the key priorities. Until the present day, the DME is supposed to act as a regulator of the mining industry and at the same time its promoter. This leads to the perception that there is still no independent regulator, which is able to strictly enforce policies pertaining to the mining industry (Coetzee, 2008).

Municipalities play a less pronounced role than in the other cases studies investigated. At the district level there is interaction with the mines in terms of monitoring impacts. This however only takes place to a limited extent. The Western District Municipality is maintaining a regular dialogue with the

industries in the area concerning the environmental pollution. This however, seems to be a very weak engagement. This task is also performed by the Mogale City Municipality, which also provides monitoring data to DWAF Regional Office (Du Toit, 2008).

Municipalities are however represented in the regular meetings that are concerned with the decanting of AMD, as well as the WFD Forum meetings. They are expected to play a more decisive role when it comes to using the water treated by WUC, as there are different preferences in terms of the re-use of the water (Schoeman, 2008). Thus, the role of municipalities in the re-utilization of cleaned AMD is expected to leverage their profile as water authorities.

At the same time, municipalities constitute a major impact on local water resources as well, thus aggravating the impact by mine-related pollution. This is related to the lack of capacity at the municipal level to maintain water treatment infrastructure (Keet, 2008). It also influences their interaction with the mines: on the one hand, municipalities are turning to the mines for assistance in terms of water treatment facilities and at the same time they blame the mines for irresponsible behavior. On the other hand, mines often use the municipalities' incapacities as an excuse for their own deficiencies.

In summarizing the role of government drivers, it can be said, that national government constitutes a strong driver employing several modes of interaction, ranging from mandating to facilitation and endorsement. While this intervention displays some weaknesses, for example with regards to coordination, still government significantly determines company behavior in this case study, in terms of compliance, monitoring and planning. Where problem-solving is left at the discretion of companies, government intervenes with regards to the specific modalities of the approach.

E.5. Case Study Summary

E.5.1. **Contribution**

In reviewing the contributions provided by the mining companies in addressing the water challenge, the following aspects are of relevance. In the first place, it needs to be stressed that the gold mining industry is stricken with considerable water-related problems, which have many repercussions and impacts on the environment, neighboring communities and beyond. The negative track record of the industry is considerable, while specific future ramifications and potential solutions still need to be identified.

The contributions that seek to address these challenges and problems consist of two main components: at the basis there is compliance with government regulation, which also comprises provisions with regards to monitoring and planning. While compliance records are not flawless, a certain group of firms has improved compliance records in this regard. Secondly, contributions have a strong technological innovation and infrastructure focus catering to the mitigation of pollution impacts in the Wonderfonteinspruit and most notably the containment of AMD and related damages.

In terms of a general pattern, contributions have two notable characteristics. First, they do not occur in a systematic way across company characteristics. Larger and better resourced firms usually have better compliance and monitoring records; this is however not always the case with pollution incidences occurring with all firms investigated. Second, contributions occur in clusters. Compliance is flanked by planning and monitoring activities. Or rather the latter serve the purpose of supporting compliance. Technological innovations are linked to efficiency improvements and the installation of

these technologies through infrastructure development. Taking a more firm-centered perspective, the following supporting observations were made.

At the individual company level compliance with environmental regulation and reporting requirements poses a considerable challenge to some of the gold mining companies investigated. This is due to the legacy and complexity of the pollution impacts, but also the lack of adequate procedures, commitment and financial resources to address these challenges.

There are some cases however, where companies are engaging with internal planning as well as monitoring in order to better understand pollution pathways of tailings seepage and acid mine drainage. In this context, companies also contribute to fora set-up by government to address pollution impacts originating predominantly from the mining activity. They provide their own monitoring data and thus contribute to some extent to watershed management at the catchment level.

Industry collaboration, which led to the set-up of (not-for-profit) independent companies (i.e. the Western Utilities Corporation, WUC) that finance and manage mostly technological solutions to mitigate water challenges, in this case the occurrence of AMD, can be identified as further distinctive pattern. In the case of WUC, companies have facilitated the process leading towards the identification and financing of a technological solution to address the challenges. This is supported by extensive on-site monitoring and water resource planning, which is assisting government efforts to oversee the situation. As pumping and treatment activities are projected to continue 'in eternity' and are taken care of even after all mining operations have ceased, this also appears to be a reasonably 'sustainable' contribution. It is actually the dimension of time that casts a positive light on this solution. The current challenges are paramount and historic legacies can only be insufficiently addressed. However, transferring the management of acid mine drainage to an independent entity, which is not reliant on the mining business, appears to be a commendable solution.

At the same time it needs to be re-emphasized however that the contribution is patchy, provided by only a few firms, while others are for the most part reactive. This warrants the consideration of prevalent drivers.

E.5.2. **Drivers**

Considering the factors driving company behavior, government emerges as a significant driver for firms to actually address the water challenges in the Witwatersrand. The mandatory approach was however augmented by a more facilitative and endorsement-based approach. The shadow of hierarchy furthermore needs to be viewed more differentially. It has certainly led to compliance efforts on the part of most companies; but also to the development of more innovative approaches to water management challenges with some companies-

The actual type of the solution and the organizational set-up around it was to some extent driven by financial considerations, i.e. competitive drivers, and partly by normative considerations, NGO and community pressures. Companies were mandated to address the problem, treat the water and stop the decanting of AMD. However they could not afford to address the problem out of their own pockets. This led to a solution, which would allow them to finance water treatment off their balance sheets. The planned solution is also economically self-supportive, which releases the companies from an important closure requirement.

While legislation is clearly defined with regards to the mine water issue, other aspects of mine-related water pollution are regulated less clearly with some aspects being covered by MPRDA, others by NEMA. Conflicting provisions were to be eliminated during a revision process in 2008, but there is still considerable regulatory uncertainty, which is even aggravated by the complexity and uncertainty inherent to the water management situation in the region. This uncertainty constitutes a major concern for the mining companies. While they benefit from unclear regulatory provisions and weak implementation to some extent, they disapprove of the unpredictability of government activities and decisions (Coetzee, 2008).

While one could expect that regulatory uncertainty could act as a spoiler thus leading to lax company behavior, rather the overall regulatory uncertainty seems to drive companies to engage in numerous fora and platform activities, as this allows them to have some control in this regard. Government participation in these fora on the other hand demonstrates significant will on the side of government to facilitate a widely agreed solution to the water problems in the region, thus eventually leading companies to trust government actors and engage to some degree in a common solution (Keet, 2008).

While thus government and business actors engage in a type of negotiation with regards to water management responsibilities and options, NGOs and increasingly also local communities exert additional pressure, by pointing to corporate malpractice as well as through active participative in the respective participatory fora.

When considering the overall process one therefore finds a succession and actual interaction of different drivers. While regulation is the dominant driver in the beginning, mandating is increasingly supplemented by other government roles, such as partnering and facilitation (e.g. through the establishment of stakeholder platforms). Other drivers play a complementing role as well. Regulative drivers lead to a basic disposition, which leads to compliance on the one hand, but also other activities (innovation, efficiency improvement, dialogue), which are then shaped by other drivers. Examples here are competitive drivers with view to the reutilization of treated mine water, but also social drivers. In the latter case the considerable engagement of local and national environmental activists aided in strengthening the role of government. All these drivers resonate with the specific resource-based factors, such as organizational slack, international and sustainability orientation and also the salience of the water issues. The degree to which external drivers, especially non-mandatory approaches, become effective, is crucially dependent on the respective disposition of the individual firm. Resource-based drivers can thus act as drivers and spoilers alike.

E.5.3. **Long-term Dynamics**

Long-term trajectories of the contributions provided by the companies are vested with considerable uncertainties. While viewed positively in terms of the technological innovation and organizational arrangements to realize the mine water reclamation project (see above), the idea of treating acid mine drainage and selling this water for human consumption is quite controversial. This criticism is documented by a campaign launched in 2009 by the civil society group South African Water Action addressing the suitability of treated mine water for human consumption. This highlights the aspect of lacking broad acceptability of a solution, which appeared suitable to the mining industry without consulting the public.

In addition, it is highly uncertain to what extent the proposed solution to the pressing water problems will be supported by the struggling mining industry. Cases like Pamodzi Gold demonstrate

that mining companies in some instances might not even be in a position to set-up a joint initiative and significantly invest in infrastructure. In addition to difficulties in predicting the financial basis, other uncertainties derive from the technological viability of the water treatment solution as well as the on-selling of the water at an acceptable price. It is not unlikely that government will have to step in and regulate various aspects in order to provide guidance and reduce uncertainties.

On the other hand innovative approaches, such as followed by Mintails provide for an indication of how mine closure could go hand in hand with an overall rehabilitation of the former gold mining area, thus contribution to an integrative approach. To this end, again a further consideration of other water users, such as municipalities and farmers would have to be ensured. It is also remarkable that integrative efforts hardly occur except if prescribed and mandated through government programs, such as the mine closure program. Both observations indicate that government plays a particularly pertinent role in ensuring integrated approached in the long-run.

What effects does this interaction have on government actors themselves? Mining companies and government entities are embattled in a conflict-prone arrangement, where they are mutually dependent on each other, while attempting to realize their respective interests and responding to other actors' pressures. This has on the one hand led to an empowerment of government, particularly in instances, where they were able to enforce and successfully push through their interests. At the same time there have been instances where the position of government was undermined due to overlapping responsibilities of government portfolios, which were then exploited by mining firms. Criticism by NGOs with regards to a too close relationship between government and business has also limited government strength.

Overall however, the position of government was rather strengthened through the fora and platforms established. This is particularly relevant against the legacy of historic entrenchment between government and business in this region.

One could therefore argue that a learning process was initiated benefitting government, mines as well as other stakeholders. This is probably the most promising outcome of this interaction: a shared awareness of the most pressing issues, which could possibly provide a sound basis for identifying sustainable solutions.

F. At the Coalface: Coal and Water in Mpumalanga

Coal is a highly contested source of energy when viewed against the background of carbon emissions and its effects on climate change[134]. While this case study acknowledges the overall problematic sustainability record of this sector, it mainly focuses on the specific processes evolving around the coal mining process in terms of water impacts. This approach allows to focus on a specific aspect of coal mining operations in South Africa, while at the same time demonstrating the limitations of a 'water-only' perspective, when considering the sustainability impact dimension of a specific industry.

F.1. Sector and Region

Coal mining is the second largest mining sector in South Africa. It produces important input fuel to the country's main energy source: coal-fired power plants. It is also a crucial resource for other domestic industries (steel, chemicals). About 30 % of the total annual coal production is exported to international markets; mainly Europe (DME, 2007a).

South Africa currently relies heavily on coal as energy source; coal is used for about 90 % of energy production. Eskom, the para-statal power utility, is the largest producer of electricity in Africa and among the top seven utilities in the world. It operates several large coal-fired power plants; among those is Kendall power station in Mpumalanga, the largest coal-fired power station in the world. In addition, 23 % of South Africa's liquid fuel production relies on coal as an input commodity (FES, 2008).

In the wake of the South African energy crisis in 2007, which saw South African power infrastructure operate at its absolute limit, coal mining in South Africa has once again received heightened attention. Most of South Africa's coal-fired power plants have not been upgraded during the past decades and thus could not meet the increasing demand. Eskom is largely blamed for this deficit as well as the mismanagement of existing assets and resources and a lack of investment in alternative energy sources. The unstable energy supply continues to have a major impact on the growth trajectory of the South African economy. The mining industry was severely affected by power shortages and had to stop production on several occasions during 2007/2008. For this reason, the drive to built new power plants has significantly gained in momentum during these years. As coal is abundant in South Africa this situation is also leading to a raised interest in coal reserves in the Mpumalanga Highveld with all its ramifications.

While other coal deposits can be found in the Karoo System, the coal-bearing geological formation scattered throughout the country, the mining industry is concentrated in the Mpumalanga Highveld around Witbank. Here deposits are relatively easy to access and very prolific. The Mpumalanga Highveld constitutes one of South Africa most valuable assets and about 3.6 % of the world's overall coal reserves. Consequently, Mpumalanga province, located in the North Eastern part of South Africa, is home to about 80 % of South Africa's coal production (DME, 2007a) as well as a number of related industries, such as steel production and energy generation. The province is also located

[134] South Africa is the major contributor to Africa's greenhouse gas emissions. The coal mining industry critically supplies this energy segment, which is receiving massive criticism, particularly in the developed world, but increasingly in developing countries as well (Benchmarks, 2008) (Spalding-Fecher, 2002). South Africa has not been covered by the 1997 Kyoto protocol, it is however very likely that the country will be included under the next round of negotiations. South Arica represents the interesting case of an emerging economy with rich coal reserves. For this reason South African companies are pushing for the development of clean coal technologies. Coal-use for energy production as well as other uses is expected to dominate in South Africa for the coming decade.

favorably from a strategic perspective as it is connected to the main coal terminals in Southern Africa (Richard's Bay in Kwazulu-Natal Province) and Mozambique (Maputo) (Nkangala DM, 2008).

The main operators in this mining sector are Anglo Coal, bhp Billiton, Xstrata Coal and Exxaro mining, which is a BEE spin-off of Anglo Coal. Sasol, a world leader in commercial coal to liquid technologies, is also a major player in the coal mining industry, albeit the coal mined by Sasol is directly used to produce coal-derived fuels. Together these companies supply about 90 % of the saleable coal in South Africa.
In addition, there is a growing number of smaller mines, often the result of BEE deals with the larger operators. Many of these are currently starting or re-starting production, such as Optimum coal, which is a BEE initiative of bhp Biliton. It is expected however that their share in the production will increase over the years to come, as the coal mining industry is considered one of the most promising vehicles to realize BEE ventures. It is particularly these small mines that give reason for concern about environmental degradation as well as mis-management of mine water and related issues (Bopape, 2008).

The case study is focusing on two specific areas in the Mpumalanga Province, eMalahleni[135] and Steve Tshwete Local Municipalities. The main settlements in these municipalities are the towns of Witbank and Middelburg respectively. There are a number of smaller urban settlements in proximity to these centres, such as Bronkhorstspruit, Kriel, Hendrina, Kinross and Trichardt. Satellite townships are also associated with all of these towns and most of the mining operations and power stations.

Figure 9: Location of Municipalities (Nkangala DM, 2008)

From an administrative point of view, both municipalities are part of the Nkangala district council[136] and together make up about 41 % of the total population in the district. Due to the favorable economic conditions, population growth is relatively high in both municipalities, ranging between 3 and 5 % per annum (Nkangala DM, 2008). This creates severe challenges in terms of service delivery, including the supply of water to all users (Tshwete, 2008). It is particularly the boom of the coal-mining sector, which attracts numerous job-seekers to Nkangala district. About 12 % of mine related

[135] Meaning of eMalahleni in Zulu: Place where the coal is.

[136] Other local municipalities in the district are Delmas, Dr. J.S. Moroka, Emakhazeni and Thembisile. Delmas has gained an infamous reputation for poor groundwater quality, which as lead to the death of several people due to water-borne diseases in 2007.

jobs at the national level are in coal mining. In Mpumalanga almost 40 % of all employment opportunities are found in this industry (DME, 2007a). Economic activities are concentrated in the eMalahleni and Steve Tshwete local municipalities. At the same time, the district is characterized by considerable geographic disparities and dispersed settlements. Informal settlements in proximity to Middelburg and eMalahleni feature high poverty levels. While the entire district is faced with considerable backlogs in terms of access to water supply as well as sanitation services, deficits are most severe in remote rural areas, despite considerable investment in water infrastructure over the past years. For eMalahleni there is a projected demand of more than 8,000 households that need to be connected to water supply. The numbers are equally high in the more rural municipalities of the district. At the same time however, Steve Tshwete municipality is reported to be 'on track' in terms of the delivery of these services and achieves a cost-recovery level of almost 100 % (Nkangala DM, 2008).

F.2. Main Water Management Challenges

The case study region is located in the Upper Olifants Catchment[137]. This catchment is under considerable pressures due to water abstractions and pollution impacts. With an average annual rainfall between 700 mm and 1400 mm, the Upper Olifants Basin is relatively water scarce. In addition, water demand has grown constantly over the last years. In order to augment streamflow the catchment receives additional water via three inter-basin transfer schemes from the Vaal, Usutu and Komati systems; in addition relatively large discharges of treated domestic and industrial effluent from the two main towns add to the flow (Ashton et al., 2001). The catchment is furthermore characterized by a number of larger dams. These dams provide water for domestic as well as industrial uses, such as the numerous coal mining operations (collieries), several large power stations and intensive agriculture in the vicinity of Loeskop dam. The capacity of the basins to provide water to all these users is reaching its limits. For example, eMalahleni is currently over-abstracting from the local Witbank dam by 11 ML/day and is projected to reach 20 ML/day by 2015. This exceeds the permit issued by the Department of Water Affairs (Günther, 2008; Tshwete, 2008). Middelburg had already reached its abstraction limit by the end of 2008. On average the area has experienced an increase in water use of 3.5 % per annum (Günther, Mey, & Van Niekerk, 2006).

[137] Little Olifants – Riet sub-catchment of the Olifants river.

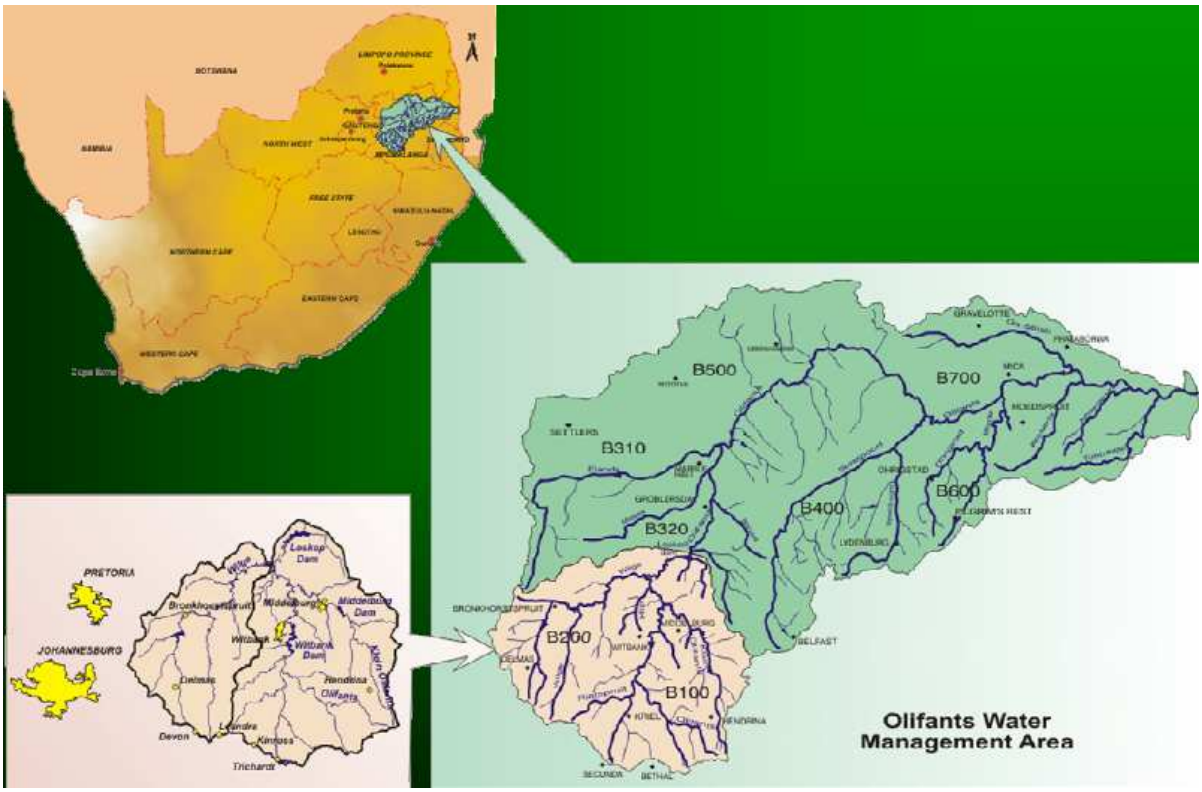

Figure 10: Location of Case Study Region within the Olifants Catchment

From the coal mining industry's perspective, the following two main water challenges emerge prominently: Extensive mining operations continue to have a significant impact on water quality as well as quantity issues in the region (Hobbs, Oelofse, & Rascher, 2008). In the first place, mining operations in the Upper Olifants (mainly coal mining) as well as in the downstream catchments of the Middle Olifants and the Steelpoort area (mainly platinum mining (see section G.6) are projected to expand rapidly over the years to come, thus increasing the demand for the ever scarce resource (Bopape, 2008; De Lange, Merrey, Levite, & Svendsen, 2005). It is expected to aggravate the competition for water between mines and other industrial uses, which are crucially dependent on water. As already mentioned, the demand of local municipalities and agriculture is expected to increase as well (Van Koppen, 2008). The relationship between these users has already been quite prone to conflicts over the past years.

In this context it is important to note, that at the same time some coal mines have a positive water balance in terms of quantity at their production sites. However, this water, which is often stored in underground mining operations, is of problematic quality. Most mines in this area have water of neutral pH-quality due to heightened Calcium-/Magnesium-Sulfate concentrations. In some cases however mine water is highly acidic, yielding pH values of below three and thus qualifying as acid mine drainage[138] (Günther et al., 2006). The impacts of acid mine drainage on the natural environment, which also have considerable ramifications in terms of socio-economic, political as well as financial impacts have been discussed in more detail in the previous section (Adler et al., 2007b). In contrast to the situation in the Gauteng gold mining area, where AMD occurs after mine closure, the situation is somewhat different in the Mpumalanga coal operations. Here, AMD impacts occur

[138] See the case study on gold for AMD in gold mining areas.

during running operations, which offers better opportunities for establishing cause-effect relationships. Nevertheless, acid mine drainage constitutes an additional pressure on already scarce water resources, not only in the Upper Olifants catchment but also downstream, where water pollution is a wide-spread phenomenon. Water pollution resulting from agricultural operations as well as uncontrolled releases of municipal sewage[139] adds to the problem.

In addition to effects generated by operating mines, additional impacts are expected to result from the establishment of new start up coal mining operations across the Mpumalanga province. A case that has emerged prominently is the development of open cast mining in the so called Crissiesmeer area, in the Emakhazeni local municipality. In contrast to the well-established large mining companies, which have been in operation for quite some time, new mines are established by small and emerging BEE ventures (Coetzee, 2008). The case has drawn considerable attention due to protests against the progression of coal mining, which is about to threaten not only local water resources due to uncontrolled acid mine drainage but also fertile and highly productive agricultural land in this area (Pretorius, 2008a).

F.3. Business Contributions – Firms and Activities

This section follows the categories established by the analytical framework in order to discuss the policies and strategies employed by companies in this area with regards to addressing the water challenge in Mpumalanga coal mining region. In addition, the long-term dynamics with view to sustainable development in this region and where possible and relevant beyond will be discussed.

F.3.1. **Main Characteristics of Companies Investigated**

The characteristics of the individual firms offer a first indication on internal factors and dispositions towards potential contributions, which will be further discussed as 'resource-based drivers' were applicable.

For this analysis, I will focus on the two major mining firms – Anglo Coal and bhp Billiton. I am also going to look at Optimum Coal, formerly operated by bhp, which is the mining company relevant for the process at Steve Tshwete Local Municipality. In addition, I will discuss the role of Sasol in more detail, as it is a major factor in the coal mining industry as well as with regards to water resources management in South Africa.

Table 16: Overview of Main Characteristics of Companies Considered in this Case Study[140]

	Anglo Coal	Bhp Billiton	Optimum		Sasol
Profit m$ (2008)	2,240	N/A	N/A		1393 Rm
Production, million tons pa	62	45	11		40
Workers South Africa	9,300	7,000	2,500		N/A
Main Operations/Locations	Emalahleni, New Vaal, New Denmark, Kriel, Isibonelo	Khutala Douglas/Middelburg Klipspruit/Witbank	Optimum Mine, Middelburg		Bosjesspruit, Brandspruit, Middelbult and Syferfontein near Secunda[141]

[139] Uncontrolled releases of municipal sewage are attributed to insufficient treatment capacity at municipal sewage treatment facilities. Investment in such infrastructure has been neglected over the past years, which is paralleled by lacking skills to manage existing infrastructure with municipal staff.

[140] Data collected from most recent annual reports of the companies (Anglo American plc, 2008; bhp Billiton, 2008), Sasol is a somewhat different case as its core business is not mining. Rather coal mining is undertaken as an input activity to the company's core business.

[141] Other coal mining operations are located near Sasol's Free State operations in Sasolburg.

Anglo Coal South Africa is a wholly-owned subsidiary of the minerals and mining multi-national Anglo American. Corporate governance at Anglo Coal is therefore to a large extent determined by its mother company. Anglo American is one of the largest mining companies in the world, while the stronghold continues to be South Africa. The company is listed at the London Stock exchange and has a secondary listing at the JSE (Anglo American, 2008). Anglo Coal is the sixth largest coal producer worldwide and also operates coal mines in North and South America and Australia. As the largest coal producer in South Africa, Anglo Coal maintains eight coal-mining operations in the country. The focus of the production is on thermal coal, which is exported and also used locally. Anglo Coal is a major supplier of Eskom and also Sasol, for which it maintains a long term 20 year supply contract (Anglo American, 2008).

Following a very similar pattern, albeit with a less strong connection to South Africa, bhp Billiton as the largest minerals and natural resources company in the world[142], manages mineral undertakings for several commodities across the globe, focusing on Australia (bhp Billiton, 2008). In South Africa[143], bhp maintains coal mining operations as well as titanium and aluminum smelters. The majority of the coal produced is sold to Eskom, the rest is exported. Current estimations forecast a production life of bhp's mines in South Africa of 12 to 27 years. BECSA contributes to more than half of bhp's energy coal production, albeit only constituting a smaller share to the overall profit of bhp[144].

The case of Optimum Coal offers insights into the transfer of mine assets to a smaller BEE venture, which then finds itself in a situation, where it has to face several water management challenges encountered by the coal mining industry. Optimum Coal is one of the larger entirely South African owned coal mining companies. It was formed when bhp Billiton sold its operations near Middelburg to a BEE consortium. Today Optimum boasts about 56 % black ownership and strives to become a viable business while living up to its empowerment agenda and mandate (Cogho, 2008). Optimum's main customers include Eskom's Hendrina Power Station under a long term supply contract as well as export markets through the Richards Bay Coal Terminal (RBCT).

The fourth company investigated is Sasol, a multi-national company with South African origin and a world leader in synthetic fuel production. The company's business model is not primarily mining-oriented. It however extracts raw materials, specifically gas and coal, and uses a proprietary technology to generate a number of different hydrocarbons, which are used as fuel as well as input material for a number of chemical processes (Sasol, 2008b).

F.3.2. **Type and Mode of the Contribution**

This section details the individual as well as the joint contributions of mining companies to addressing the water management challenges. Similar to the situation in the gold mining industry, companies engage in the delivery of contributions at the company level as well as in the context of partnership initiatives.

Compliance

The companies investigated have developed a number of mechanisms to ensure compliance. At Anglo Coal for example, a group-wide guidance assists individual operations to develop own water

[142] The company originates from the merger of Australian Broken Hill Proprietaries and British Billiton. The companies were merged as a Dual Listed Company, while maintaining their independent corporate identities as well as stock listings in various countries. Bhp Billiton Limited is listed in Australia, Germany and Switzerland; bhp Billiton pc is listed in London and Johannesburg.

[143] Bhp Billiton's South Africa operations are referred to as BECSA: Billiton Energy Coal South Africa.

[144] Approximately 500 million $ of 24 billion overall profit from operations (bhp Billiton, 2008).

resource management plans. It is expected that these guidelines will assist in not only meeting water-related legislation, but rather in exceeding regulatory requirements (AngloAmerican, 2008). In fact, Anglo Coal's activities in many instances go beyond the required level. For example, the company's efforts are not only targeted at meeting certain discharge levels, but eventually aim at treating the discharge to drinking water standards (Bopape, 2008; Günther, 2008). Similarly, BECSA in an effort to ensure compliance with the respective government regulations as well as in-house standards of the bhp Billiton group has embarked on developing new approaches to proactively address water pollution.

While thus the larger and well resourced firms display a good compliance record, the respective systems and strategies at Optimum, a smaller and emerging operator, still appear to be in an emerging state; several incidences of non-compliance have been reported over the past years (Cogho, 2008).

Nevertheless larger firms do not necessarily abide to their commitments more than smaller firms. Bopape (2008) notes that there is a fluctuating behavior in terms of overall compliance to water discharge levels and points to the relationship between performance and the respective manager in charge (see also section F.4.1). Government also does not dispose of the necessary means to enforce compliance (see section on Drivers). Thus many discharges remain unnoticed by the regulator.

Another example for this variation in corporate compliance is the behavior vis-á-vis the Controlled Release Forum (CRF), a platform established by DWAF. The CRF is mainly focusing on monitoring and enforcement of standards, particularly with regards to smaller mines. While the forum has a relatively strong buy-in from the major mining companies in the area, still the issues addressed by the CRF over the last ten years remain largely the same with companies using this forum also to drag out issues and to identify loopholes to avoid compliance (Bopape, 2008).

Monitoring & Planning

Monitoring and internal planning have reached a high level of sophistication among the major players. Anglo Coal for example is developing internal integrated water resources management systems, which are based on rigorous monitoring and aim at reducing inflows and supporting on-site water recycling and where possible the re-use of water. These planning and monitoring efforts thus provide for a robust water balance for each of the firm's mining operations. Optimum's long term water strategy on the other side still appears to be quite rudimentary and merely amounts to a general commitment to maintaining sound water management at its production sites. This reflects the situation with other smaller operators, which are not planning proactively for the most part and lack the appropriate monitoring systems to collate and process collected data (Bopape, 2008).

While monitoring and planning are often conducted at the individual firm level, larger firms, i.e. Anglo Coal and bhp Billiton are increasingly joining forces to support the development of comprehensive water resources mappings for the coal fields and their surroundings in the Mpumalanga highveld. These mapping results are made available to government authorities supporting the integrated management of available water resources in the watershed through a better understanding of potential water shortages in the region (Tshwete, 2008). This interaction has furthermore resulted in a regular informal exchange among the mining firms regarding water planning issues.

Technological Innovation & Efficiency Improvement, Infrastructure Development & Finance

Several strategies have emerged within the industry targeted at improving water-use efficiency. Other approaches involve technological innovations for water-saving and for addressing challenges deriving from deteriorating water quality. These are often related to investments in infrastructure and are thus discussed conjointly in this session.

Investments at the plant level are typical. Sasol for example has significantly invested in water-saving and efficiency measures at its production sites as well as in the development of water-efficient technologies (Ginster, 2008).

Similarly, Anglo Coal has been involved in investigating possibilities of mine water treatment since the mid 1990s. Originally, the company looked at mine water management from the perspective of mine water reclamation and treatment and piloted several technical processes to investigate the re-use of process water on-site. At that time, the company was already re-using all the occurring mine water on-site. This water however was highly acidic and also required desalination so that most technological innovations developed during this time targeted these problems. At that stage the goal of the company's activities was not to generate potable water, but rather to make the water better re-usable for production purposes. At the same time, the mines also needed to deal with increasing amounts of acidic excess water, which had to be released to the environment under a controlled-release scheme, monitored by government (Günther et al., 2006).

Bhp Billiton was following a similar strategy, focusing on water treatment as the strategy of choice at three of BECSA's operations (Clark, 2008). The two companies eventually realized they were facing similar problems and thus eventually entered into a collaborative effort in 2002. This joint initiative was targeted at assessing the feasibility of a water reclamation plant for 20 ML/day of excess acidic mine water. The reclaimed water was supposed to be reusable as potable water for the local municipalities, which were increasingly facing problems to meet increasing demand. The process described in the following section was launched to realize the reclamation plant.

In 2004 a pre-feasibility study was completed and was followed by a series of consultations with all relevant government departments in order to facilitate the regulatory processes. The environmental impact assessment for the plant was completed in late 2005. At the same time the local municipality was involved in order to negotiate the water supply agreement, which was completed in late 2007. The main issue in this context was the question about the security of drinking water supply, i.e. whether the same amount of water could be guaranteed now and in 20 years. Underground water modeling provided by the mine consortium could prove that water would be available in perpetuity from underground mine workings. Although coal mining is projected to come to an end in about 30 years, the planning horizon for the water reclamation project was thus expanded beyond the time of closure. It is expected that water will have to be pumped even after this time, since the contamination due to acidification is bound to continue. Careful planning in this regard however is necessary to manage underground water levels so that sufficient water is available to run the reclamation plant, while not compromising the qualitative and quantitative conditions of underground water sources (Garner, 2008).

The water supply agreement between the mining consortium and the municipality also set the price to be paid by the municipality for the ***water provided by the plant*** (Tshwete, 2008). In this specific case, the price is exclusively determined by the cost required to offset operation and maintenance of the plant. No additional levy is charged to compensate for the investment of about R 300 million

undertaken to build the actual infrastructure, which can thus be considered an ***infrastructure contribution*** by the mining firms (Günther, 2008).

The treatment process installed combines several technologies that were developed in the context of the joint project and tested in the run-up to the construction of the reclamation plant. The strong liaison with technology providers and consultants, e.g. the CSIR and the main consultant Golder Associates was instrumental in determining the best suited technical solution for this water management challenge. The entire testing process took more than ten years to complete and was to a large extent financed by the mining consortium. The ***technological innovations*** resulting from this collaboration affect all stages of the treatment process and are likely to trigger additional innovations in this field. In addition to new processes related to the neutralization of acid mine drainage through lime and limestone, particularly the large scale implementation of a reverse osmosis system to perform the desalination is considered as highly innovative (Günther et al., 2006).

At the current stage, water from four mining operations is treated at the eMalahleni Water Reclamation Plant, which has a total capacity of 25 ML/day. Additional collieries might be brought into the arrangement at a later stage (Günther, 2008). The water recovery rate for the plant is approaching 99 %, i.e. this share of the water treated at the plant can actually be re-used as potable water, thus ***minimizing waste output*** from the treatment process. Still, waste products from the treatment process, mostly gypsum, calcium sulphate and liquid brine, currently need to be land-filled. Although the waste stream is small, the consortium is looking into the re-use of these wastes. Anglo Coal has funded a 16 million R research project on the reuse of the waste product gypsum for building materials as well as treatment technologies for the brine (Günther & Naidu, 2008).

The eMalahleni Water Reclamation Plant thus constitutes an important precedent for a multi-faceted contribution that mining companies can undertake in order to address water management challenges in the area where they operate. It combines technological innovations with the actual financing and implementation of water infrastructure. This then leads to efficiency improvements as well as to the alleviation of water management challenges, that not only affect the company, but also surrounding municipalities. Treated waste water is used to augment municipal water supply options, thus relieving stress on natural water supply systems and allowing for stable service delivery.

A similar process is currently underway in the Middleburg area, as a water reclamation plant is to be built under the lead of Optimum Coal. The project employs an approach similar to the eMalahleni case (Cogho, 2008)[145]. Steve Tshwete local municipality as the designated water services authority will use the water generated by the Optimum reclamation plant. Again there is also a 'social component' as the water provided by the reclamation plant will be used to supply the Hendrina Township with water. The township is currently without water supply services. Furthermore the water will be used in order to stabilize overall water supply in the municipality.

Capacity & Awareness

Capacity building and to some extent awareness-raising also occurred in the context of the water reclamation project.

In terms of capacity-building, a partnership relationship has developed between Anglo Coal and eMalahleni local municipality. This led to an exchange on a range of issues, including technical as well as planning know-how at the management level. Furthermore, the project facilitated the transfer of

[145] In this case, the process is facilitated by a consulting firm, all key authorities have been brought together in an Authority Steering Committee, including regional DWAF and DME offices and MDALA.

concrete expertise to municipal employees and the training of local community members to serve as staff for operating the reclamation plant (Tshwete, 2008). This is expected to contribute to the longevity of the project (Günther, 2008).
With regards to the process of obtaining the necessary permits for the water reclamation plant, the firm consortium chose to follow an integrated approach in order to mitigate low capacities and the lack of coordination on the governmental side. An Authority Steering Committee was established, comprising the key government departments responsible for environmental impact assessments, water abstraction and water use licenses as well as the disposal of the byproducts of the treatment processes[146]. This concerted action ensured that all necessary licenses and permits are discussed and obtained in an integrated way. The Steering Committee furthermore established the platform for all necessary stakeholder consultations in the context of the project (Günther et al., 2006).
In this context companies reached out to local stakeholders discussing different water management options as well as issues concerning the acceptability of treated mine water for drinking water purposes. This has also led to a continued dialogue at the municipal level and aided in raising awareness for the dire water supply situation in the region (Tshwete, 2008).

Similarly, several companies in the case study region have initiated and engaged in stakeholder fora and other initiatives at different levels. At the catchment level, water management challenges and related environmental problems have led to the formation of the Olifants River Forum (Mutz & Korfmacher) as a multi-stakeholder initiative addressing management issues in the catchment. The forum's members comprise mines, industry and agriculture as well as the respective government institutions. Currently, the forum is chaired by an Anglo Coal representative (Lodewijks, 2008). Firms actively participate in discussing broader water management issues. As is the case in the Wonderfontein fora it is difficult to differentiate between support for integrated water resources management and the representation of company interests.

Sasol is very actively engaging in a dialogue with relevant stakeholders regarding water management challenges at various levels. This includes local stakeholders in order to pre-empt and resolve any potential conflicts with other users groups and manage related risks. Sasol is also part of the Olifants River Forum and is actively promoting and participating in catchment management forums set up by the water boards to manage rivers from a basin-perspective. The Vaal river basin is an example in this regard.
However, Sasol also participates in a number of high level advisory panels at the ministerial level, for example with DWAF. In the context of these activities, Sasol is in the process of aligning its water demand strategies with national priorities and particularly DWAF's Water for Sustainable Growth and Development, which focuses on infrastructure development and maintenance, water quality and water conservation (Sasol, 2008b).
In 2008, Sasol supported a joint dialogue forum for water-intensive industries in South Africa, which was hosted by the GTZ. At the international level, as one of the first South African firms, the company has signed up to the CEO Water Mandate of the Global Compact in March 2008 and is actively participating in the on-going debates in the context of this initiative (Ginster, 2008). In comparison to the other mining companies, Sasol is thus playing an eminent role in shaping the national as well as

[146] The relevant departments were the Mpumalanga Department of Agriculture and Land Affairs (MDALA), DWAF, DME and eMalahleni local municipality.

international policy field on water and business. The mining companies in this case study area have been less active. However, they have broadly advertised the reclamation project and thus managed to establish this technology as part of the best practice guidelines on water and mining.

To summarize, considering the contributions by firms in this case study, relatively good compliance is supported by sophisticated monitoring and planning efforts. Furthermore respective results are made available to government actors as well, thus facilitating joint planning efforts at the watershed level. What stands out as a contribution though, is the technological innovation and the related investment in infrastructure to address the most prominent water problem in the region – the occurrence of acid mine water, which is impairing ecosystem quality. At the same time, treated water is used to alleviate water stress at the municipal level. As indicated above, the contributions are for the most part provided by the larger, well-resourced firms and lesser so by smaller and emerging operators. The larger firms have also undertaken some capacity-building and outreach activities, which however only partly contribute to mutual learning but rather to shaping the (water) policy field according to firms' preferences.

F.4. Drivers

F.4.1. **Resource-based Factors**

The high ***relevance of water*** issues for the companies investigated is for example expressed by the respective overarching policies established at Anglo American. Firm-internal policies highlight water as one of the key challenges for sustainable development, particularly in the light of climate change impacts (Anglo American, 2008). In addition, the control of acid mine water is a key prerequisite for ensuring efficient production. Acidic mine water, which was originally re-used in production without prior treatment, constantly led to a corrosion of the piping infrastructure at the mine's processing facilities, causing considerable additional costs due to the need for replacing pumps and pipelines (Günther, 2008).

Similarly, water is also considered a critical input variable, for example at bhp Billiton. Inadequate supply, the lack of appropriate infrastructure and access to resources is explicitly mentioned as one of the major risks for operations and profits (bhp Billiton, 2008). For BECSA water management is one of the key challenges as the quality of water resources in proximity to the mines is critically affected by the mine's operations.

Water issues and specifically water scarcity and lack of access to water are also described as major risks to Sasol's operations. Sasol requires significant amounts of water for manufacturing processes. Sasol's main sources of water in South Africa – the Vaal and Olifants catchments – are both under considerable pressure due to multiple uses. Risk mitigation with view to the supply base is thus clearly one of the strongest drivers for Sasol's water management activities, also at the policy level.

At the same time, all companies mentioned above, devise of the skills and management resources, i.e. the ***organizational slack,*** to engage in activities to address the water challenge. Coal is usually sold on the basis of long-term contracts and thus not subject to fluctuations at commodity markets, leaving the companies with some slack to plan ahead (Coetzee, 2008).

In addition, larger firms, such as Anglo Coal and bhp, have the technical know-how and management capacity to develop, finance and operate costly and complex water treatment technology. This is less

so the case with Optimum Coal, where financial resources are more scarce. Nevertheless, technical expertise is available at Optimum as the lead engineer for the construction of the reclamation plant was involved with a similar project at bhp before.

While these factors explain the relatively high level of activity of the two larger companies investigated with regards to addressing water challenges, the leading role of Anglo Coal in terms of water management activities can be related to the ***company culture and the commitment and leadership of employees***.

The activities undertaken by Anglo Coal at the Witbank site and its other South African operations are managed largely independently from Anglo American. In fact, planning and progressive thinking started in-house at Anglo Coal without actually consulting with the Executive Committee at Anglo American in the first place (Günther, 2008). Preliminary planning steps were favorably supported by a conducive organizational environment. The company was represented by a proactive and knowledgeable employee in the fields of engineering and water reclamation. This individual was in a position to engage in discussions with stakeholders, including municipalities and communities, but also with technology providers and mining specialists. At the same time, this person was also in a position to maintain the necessary momentum of the planning process over a long period of time before the completion of the reclamation project by providing not only the expertise but also a sufficiently positive vision. In addition, lines of communication were established within the company, which provided for the integration of technical, environmental as well as social and community-related concerns (Garner, 2008). Through this set-up it was possible to eventually realize the reclamation project, which was boasting the latest treatment technology and catered to a range of environmental requirements and social components.

The disposition towards sustainable development as well as the international orientation of the firms investigated is closely correlated to normative drivers and thus discussed in the following section.

F.4.2. **Normative Drivers/Industry Pressure**

Anglo Coal, bhp and also Sasol are responsive to international codes of conduct. They have committed themselves to general and sector specific norms and reporting schemes, such as ICMM guidelines, the Global Reporting Initiative, as well as the Global Compact. These norms have been interpreted accordingly in the respective company context, often following the lead of their mother companies.

Anglo Coal for example is almost exclusively driven by Anglo American's approach to responsibility governance. London-listed Anglo American is actively engaged in the national and international discourse on mining and sustainable development. It maintains a sophisticated sustainability management system, streamlining policies for social and environmental responsibility across all their operations worldwide. The main emphasis of their program is placed on integrating all sustainability functions performed by the company (Anglo American, 2007). Water is included as an integrative aspect.

Similarly, as a multinational company with a global business scope, bhp Billiton is propagating a group-wide 'Zero Harm' and sustainability strategy[147]. At the South African operations, there is also a

[147] The strategy is overseen by the Board and lies within the direct responsibility of Management. Sustainability is an integral part of the company's Charter and is enshrined in a number of company-wide standards in the areas health, safety, community and environment, which are audited on a three-yearly basis at all operations and facilities. In terms of its South African operations, bhp committed up to 1 % of revenue to social issues, even before respective legislation was promulgated in South Africa (Clark, 2008).

strongly proactive understanding of responsibility as a learning process (Clark, 2008). Overall, BECSA is largely driven by the level of standards at the corporate level in terms of specific processes and compliance mechanisms.

Compared to the larger mining companies, environmental management at Optimum is still in its infancy (Cogho, 2008). At the same time, some procedures were taken over from the previous owner of the colliery, bhp Billiton[148]. As a company focusing on black economic empowerment Optimum's emerging corporate social and environmental management activities have a strong emphasis on community improvement programs[149]. This includes access to water supply.

Sasol's sustainability management framework defines the main challenges, which guide reporting activities and the interaction with stakeholders. At the same time, it also clearly communicates the intention to appear as 'a good corporate citizen, as the company to obtain further access to water for the expansion of future operations, which are planned in extremely water-scarce regions of South Africa.

Normative pressures that originate from international initiatives and the establishment of management structures serve as a conducive background for addressing water management issues, but do not constitute a genuinely strong driver.

This background is augmented by endorsements provided by the South African Chamber of Mines (CoM SA, 2008). In this context the activities of Coaltech[150], which is conducting research on innovative solutions for the coal mining industry, should be mentioned. Through this research Coaltech promotes the development and transfer of water-saving technologies, which eventually become established as industry-wide best practice. The latter also demonstrates that normative drivers originating in the national context supplement and specify such drivers originating from the international level.

Other industry specific drivers emerge due to the heterogeneity of the industry, comprising relatively large companies as well as emerging, smaller firms. As indicated above, the latter often display a considerably bad environmental (and water-related) performance, thus putting at risk the reputation of the entire industry. This is discussed in more detail on social drivers.

F.4.3. **Competitive Drivers**

Competitive drivers are relevant in several regards, however mostly in determining the mode of the contribution. A competitive dimension emerges for example in the context of technological innovation in the area of water reclamation. The partnership agreement between Anglo Coal and bhp Billiton helped to ***avoid potential competition*** with regards to the respective treatment technology as well as potentially arising costs. At the same time, the approach offered an opportunity for the companies to link the treatment of polluted water resources, water management on site at the mine and the possibility to generate an, albeit small, revenue from the municipalities' water fees. Thus the marketability of the treated mine water to an acceptable price for mining companies and municipalities alike constituted an important driver in determining the type of contribution. A number of other actors played an important role in this process. This not only included consultants, which have been instrumental in initiating and facilitating the communication

[148] The success attained and widely perceived in eMalahleni offers a good reference project for similar endeavors.

[149] While safety and environmental awareness remain a major priority, Optimum has also developed a vision for sustainable development and established a committee to promote sustainable practices at the corporate level. Stakeholder engagement is the core component of Optimum's sustainability policy and strategy. The strategy is supported by a sound implementation budget as a business imperative as well as a suite of performance measurements guidelines and scorecard targets.

[150] Coaltech is a coal-focused research branch of the CSIR.

between municipalities and firms (Golder Associates), but even more so technology providers, such as universities and research centers. While these actors do not necessarily constitute a classical driver per se, access to these research providers enabled companies to move ahead in terms of treatment technology. Where this access was not possible, companies were more likely to refrain from engaging in the development of technologies.

A more classical example for competitive or market drivers is provided by Sasol. With the concept of water footprinting[151] gaining in relevance, this constitutes an increasingly important tool for product marketing and ensuring access to relevant markets (Sasol, 2008a).

F.4.4. **Social Drivers**

NGOs and Activists

The NGO and activist movement has not directly targeted the impacts and activities of the coal mining industry in Mpumalanga. Compared to other mining areas, this industry is relatively uncontroversial. Nevertheless the industry increasingly moves into the focus of national and international environmental activists in the context of discussing negative aspects of coal as an energy source. This might lead to increased scrutiny in terms of the impacts on water resources as well. The connection of these issues is for example evident in the Crissiesmeer area, where a strong activist movement looks to prevent the expansion of coal mining through the establishment of smaller operations. Activists fear that mining operations will put the environment at risk, especially since the region is an emerging tourist destination in South Africa. They also point to the negative effects of mining on water resources and have brought this to the broader attention of the public (Pretorius, 2008a). The movement consists of several localized groups, made up to a large extent of white farmers (Bloom, 2007). Over the last year, the initiative has joined forces with the Federation for a Sustainable Environment and mobilized substantial legal action against government departments. While this activity mostly focuses on the mining expansion in that specific area, it creates adverse conditions for coal mining in general (50/50, 2008). The larger firms discussed in this case study are not directly affected by this criticism, nevertheless a considerable reputational risk originates from these conflicts in adjacent areas as well as from the behavior of emerging mining firms, which might not be in compliance with legal provisions. This is aggravated due to the expansive media coverage of this issue. In reaction to this mounting public pressure, companies have started to prominently advertise the benefits of the recently constructed reclamation plant, to showcase good practices on the part of the industry.

Citizens and Communities

Other social drivers of relevance in the context of mine water reclamation are communities neighboring the respective mining operations. Community needs and preferences constitute an increasingly important driver for mining companies. In the case of Anglo Coal for example the construction of the waste water reclamation plant was preceded by a consultation of key community stakeholders. One of the issues addressed included the acceptance of treated mine water as drinking water as well as the overall expectations of the communities towards the activities of the mining firms vis-à-vis water resource management (Mfolo, 2008). Clark (2008) mentioned that mine water

[151] Water footprinting refers to a methodology, which allows for the calculation of the water used in production processes. This allows for differentiating among more or less water-efficient products. The water footprint is increasingly used as a marketing tool, especially in the food and beverage sector.

reclamation also presents a welcome opportunity for bhp Billiton to show their community involvement. This bears however also a regulative component due to the requirements stipulated by the MPRDA (see section D.4.3).
At the same time, the involvement of mining companies with the generation of drinking water for communities is increasingly receiving criticism echoing the fear of an increasing commodification of water supply and the over-reliance on end-of-pipe technology in order to mitigate pollution (Benchmarks, 2008).
Thus, while in this case NGO activism has only had limited strength in terms of triggering certain contributions apart from heightened attention of some firms to potentially emerging protests; community needs have at least had an impact in term of shaping the type of contribution. Without a strong community orientation the treatment plant for acidic water would probably not have treated water to drinking water standards.

F.4.5. **Government Drivers**

Government pressure can be differentiated according to policies at different levels: the national/provincial and the local level, furthermore between policies that are directly targeted at mining companies and those policies that impact the mining companies indirectly. An example is National Water Resources Planning, which pertains to the allocation of water resources to different user groups and thus sets the overall 'tone' of government policies in terms of resource protection and sustainable development. Coal mining firms and also Sasol with their crucial dependence on water resources for their operations, are heavily influenced by the allocation decisions made by government at the national level. The government can exert influence by directly mandating, but also through the provision of a more or less favorable environment for operations.

Mandated through the Water Act and the MPRDA (Hobbs et al., 2008), the ***regional offices*** of DME and DWAF are in charge of implementing the respective national regulation in terms of compliance, monitoring and enforcement of the 'polluter pays' principle at the level of individual operations (Bopape, 2008). The regional DWAF offices are struggling to keep up with monitoring and enforcement, due to a lack of qualified staff (Bopape, 2008). Monitoring for example, can only be performed sporadically leaving mines enough leeway to discharge at times when no monitoring is taking place. The other engagement with the mines is mostly taking place through (scheduled) site visits and meetings between mine representatives and regulators. Currently, however, there is no legal mechanism to effectively enforce compliance[152].
Another aspect hampering the effectiveness of regulation is the lack of coordination with the DME and other departments. Especially when it comes to the issuance of licenses, impact assessments or permits directed at influencing corporate behavior coordination processes fail. In many cases, DWAF is consulted only after decisions about the approval of licenses have already been made (Bopape, 2008). In other instances, decisions made by DWAF are overridden by other 'political considerations', such as job creation and BEE issues.
More consultative approaches, such as the Controlled Release Forum, proved to be only partly successful. As outlined above, firms would participate in the fora, while not necessarily increasing their compliance. On the positive side, the forum would facilitate the collaboration among

[152] There were plans to establish a waste discharge charge system, where polluters would actually have to pay for their discharges. Implementation of this system would be supported by a specially created institution at the regional level.

companies, which have an interest in jointly addressing the most pressing water problems. In the other instances, the Controlled Release Forum is used to endorse good practices, such as the reclamation plant built at eMalahleni.

At the ***national level***, DWAF finds itself in a particular dilemma. On the one hand it is aiming to fulfill its mandate to provide sufficient water to allow for industrial development. On the other hand it engages in the regulation of mining activities and their negative impact on water resources. In the past, this balance was biased towards ensuring the allocation at the expense of regulatory strength. This compromised the overall regulatory credibility of DWAF at the national level, which then compounds weaknesses due to implementation at the regional level (Van Rooyen, 2008).

Thus, national government activities lead to compliance among firms to some degree. At the same time however, the hampered enforcement of regulations and a lack of coordination among the relevant departments also lead to an at times rather lax compliance performance. It remains to be seen, whether the planned waste discharge charge system will lead to an improvement of the situation.

At the ***municipal level***, the planning perspective is most relevant for this case. Within the scope of the IDP process municipalities are developing Water Service Development Plans as well as the Water Master Plan. Through this instrument, which is updated annually, the municipality compiles an overview of the available water resources, their allocation and specifically the existing and projected needs of the municipality in terms of water services. This also includes the needs of industrial water users.

eMalahleni and Steve Tshwete municipalities both continue to be under severe pressure to assure sufficient water resources to guarantee supply. At eMalahleni, several options have been considered to alleviate this problem. One of the suggestions was the construction of a pipeline from the Vaal river catchment, which however was the least cost-efficient solution (Tshwete, 2008)[153]. In comparison, the option of the mine-sponsored reclamation plant proved to be a much more preferable option due to the lower predicted price per litre of treated water. Initially the municipality had reservations regarding the quality of the water and its fitness for drinking water purposes. The security of supply, i.e. availability of water for service purposes without major interruptions was another issue. Following a decision by the municipal council in favor of the mine water, the negotiation process, which eventually resulted in the construction of the reclamation plant, was started. The reclamation plant is now making a contribution to alleviating the pressure on water supply in eMalahleni municipality. However, with population growth currently peaking at almost 5 %, additional resources to guarantee water supply will be needed in the near future (eMalahleni Local Municipality, 2008). Although this case is usually deemed a success, it needs to be considered that efforts and activities, such as infrastructure planning, negotiating with business and national government authorities are often complicated at the municipal level due to a lack of capacity.

This lack of capacity can be related to high staff turnover, inadequate funding, and insufficient training of municipal staff. Albeit this is an issue in the municipalities in this case study as well, the

[153] This pipeline would have been built by the government-owned agency TCTA. The municipality would have had to pay for the connecting infrastructure as well as for the treatment of the river water to drinking water standards. A further major drawback of the pipeline was constituted by the expected water losses over the long transportation pathway.

success of the collaboration with the mining houses is attributed to a relatively high level of leadership at the municipal level. According to interviewees, this was supported by an atmosphere of trust, which was created by the very different partners (Günther, 2008; Tshwete, 2008).
Although the companies are aware of the difficult situation at the municipalities they largely avoided to approach the municipalities as 'big companies', but rather attempted to act as partners. In addition, the fact that such a process takes its time and that results cannot be expected to emerge quickly was widely acknowledged (Günther, 2008). The Authority Steering Committee established to facilitate an integrative regulatory approach for the reclamation plant is another example for proactive firm behavior, which has since then been replicated in the context of similar projects.

When discussing municipal government as a driver, two components are of relevance. In the first place the lack of governmental capacity and activity, combined with a considerable problem pressure, prompted the companies to take the initiative. At the same time however, a certain minimum level of capacity and leadership was needed in order for the process to move ahead. An example is the relatively high technical capacity of Steve Tshwete municipality representatives, which was then matched by expertise available at Optimum, which gave considerable momentum to the second reclamation project in the region.

F.5. Case Study Summary

F.5.1. **Contributions**

In discussing contributions of the mining companies to addressing the water challenges in this area, the following emerges most prominently. Corporate actors developed and provided the technological solution to a water pollution problem, which was however mainly caused by their own operations. More specifically, in the context of a collaborative industry initiative they provided for the funding and realization of a state-of-the art treatment facility, a water reclamation plant to treat acid mine drainage. The treated mine water is then provided to eMalahleni local municipality for drinking water purposes, thus assisting the municipality with a relatively low-cost alternative to obtain additional water to augment rather scarce municipal supplies. The plant is the result of a ten year experimentation phase from a technical point of view, but also numerous negotiations with regulators, municipalities as well as other affected stakeholders (Günther et al., 2006). Only through leveraging this type of corporate expertise and finances could the project become possible.
This contribution could be achieved through a collaborative effort of two of the largest mining companies in this area. The reclamation project is flanked by monitoring and planning activities, which take place at the individual firm level, or are undertaken as a joint effort, thus also addressing planning issues at the regional or catchment level. The collaborative initiatives have received positive feedback from regulators and are recommended as best practice to other operators. It needs to be stressed however that these contributions are mostly provided by larger and well-resourced firms, while emerging companies are struggling to comply, let alone engage in this type of project.

F.5.2. **Drivers**

Regulation at the national level, even though not always enforced thoroughly, constitutes the most important driver. Regulatory pressure and the interest to forego potential legal fees is however augmented in all cases by firms' strong avoidance of reputational costs in terms of a negative social reception (Garner, 2008). Especially the latter aspect is leading to a more proactive behavior among

the major coal companies. These companies' reputation is increasingly tarnished by other impacts of the industry (e.g. climate change). Specifically, the response to community needs is thus gaining in relevance and becomes an integral element of the incentive structure. This holds especially true in cases, where the capacity of local government to provide for water-related services is hampered. The case study however shows that some capacity needs to be present in order to enable cooperative approaches between municipalities and firms to function; e.g. with regards to the successful combination of mine water reclamation and municipal water supply.
A further driver is a variation of peer pressure. As mines are literally on each other's doorsteps in the Mpumalanga Highveld, environmental impacts are often not attributed to individual firms, but rather to the entire industry. For this reason, firms also critically observe each other in terms of their respective impacts, particularly those of smaller mines. There is however also some competitive pressure among larger firms with regards to technological developments. This observation hints at the important roles that internal and resource-based factors play for the specific behavior of firms. Next to sufficient organizational slack and the ability to manage economic resources, also individual leadership and the ability to collaborate with partners are crucial in crafting successful contributions to addressing the water challenge.

F.5.3. **Long-term Dynamics**

While the contributions of the mining industry to address some of the water management challenges are viewed quite positively by several stakeholders (Coetzee, 2008), the following potential long-term trajectories need to be considered.
When focusing on the mine water reclamation, the actual longevity of the project is set by a clear time horizon as to when the mine will stop production in that area. Projections show that water will be pumped for the following 30 years. The municipality is looking at a 20 year contract for taking water from the reclamation plant necessitating new solutions to ensure municipal water supply after that period. While thus the reclamation plant has not been built for eternity and the developments after this period remain rather uncertain, the project is still seen as an important step towards sustainable water management in that particular region (Coetzee, 2008).
Next to releasing pressure on municipal water supply systems for a determined time frame, the project also improved the relationship of local municipalities and mining houses. This might open the door to a number of other initiatives as well as mutual learning. A further advantage is related to the new terms of communication, which were established between firms, municipalities and communities in the area through this project. This is for example also relevant in the context of impact monitoring. Stakeholder liaison meetings are held monthly to discuss concerns with regards to the mines' water contribution, such as treatment parameters, discharge practices as well as other monitoring parameters. Monitoring data is collected by the mines, independently verified and provided to the municipalities.

On the other hand, several disadvantages and also criticisms are emerging with regards to the long-term trajectory of the firms' contribution. In the first place, the reclamation plant strengthens the dominance of infrastructure-based and end-of pipe solutions by those companies, which are in a position to afford them. From a management perspective, there is the fear that a certain dependency is thus created between the municipality and the mining firms in terms of water supply. There are plans to form a water management company, which will take over the service delivery function

under the auspices of the municipality to ensure the long-term viability of the reclamation project. However there is only little experience with such transfer processes (Clark, 2008). The need for capacity-building in this regard is quite evident. Companies have engaged in the training of government representatives and also staff for the operation of the plant. While these efforts need to be viewed positively in terms of fostering government capacity at the current stage, they are probably not sufficient in order to ensure independence from the mining companies' support in the long term. In addition, municipalities continue to depend on companies' good will, e.g. for the construction of extra piping as well as other support.

On a broader scale, considering the integrated nature of water management, the question emerges whether the expected growth that is enabled by additional water supply can be adequately addressed by the municipalities. This includes not only the management of emerging settlements, but also the provision of additional infrastructure to collect and treat waste water. This aspect of the water management cycle is rarely considered by the mining firms, which are mainly interested in controlling their immediate water in- and output.

Furthermore, benefits could only be reaped by those municipalities, which were located in the vicinity of mines and which also devised of a sufficient level of capacities. Other municipalities in the same district, which experience a much larger backlog in terms of access to water services, so far have not managed to leverage support by private actors to alleviate this problem. In the broader context of sustainable water management, the question of distributing the benefits deriving from corporate projects and achieving a better integration with other users would have to be addressed more explicitly.

Finally, the role and behavior of the South African coal mines with regards to water management and particularly sustainable development needs to be seen in the broader context of the international discourse on climate change mitigation and the introduction of more efficient and particularly less carbon-intensive technologies for energy production.

G. Water Challenges and the Platinum Mining Industry

The platinum mining industry in South Africa offers two interesting case studies, located in the North West and Limpopo provinces. One of the most distinctive features is the development status of the platinum industry in these provinces. While the industry is well established in the North West, it is in a more fledgling state in the Limpopo province, which offers the opportunity to observe the industry's impacts at different development stages. In addition, one can observe the effects of varying levels of municipal government capacity.

Before discussing the two case studies, I present the common characteristics of both cases, which derive from specific dynamics of the platinum mining industry in general. I then proceed with the two sub-cases; starting with the North-West, followed by the Limpopo province. The main emphasis will be placed on the situation in the North West province as the development is more advanced and tangible there. The Limpopo case is thus mainly employed to highlight the above-mentioned differing stages of industrial development and municipal capacity.

G.1. Regional and Sectoral Context

The geological formation of the so-called Bushveld Igneous Complex (see Figure 1) stretches across the North West and Limpopo Provinces in the north of South Africa and contains the world's largest reserves of platinum group metals (PGM)[154]. Other economically important metals and minerals, including chrome can be found there as well. It has been described as 'a geological feature unmatched anywhere on Earth, and the repository of unparalleled mineral wealth' (Reader, 1998). Platinum occurs in a distinct reef structure with varying accessibility ore composition and abundances, referred to as Merensky-, UG2 and Platreef.

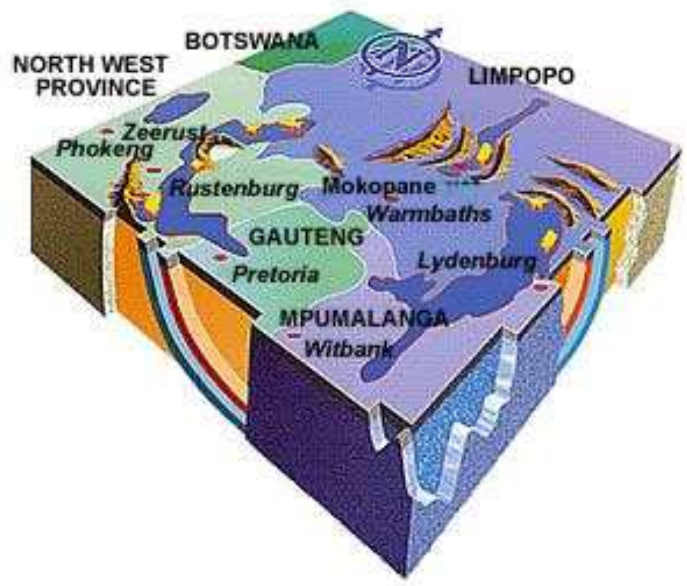

Figure 11: Location of PGM Reefs in South Africa[155]

[154] The PGM comprises platinum, palladium, gold, rhodium, osmium, rhenium, iridium and ruthenium.

[155] Source, Anglo Platinum, 2008.

Reflecting the occurrence of these reefs the Bushveld complex splits into three areas. Each area has its own distinctive mining operations. The areas are arranged in a semi-circular constellation and referred to as the Western Limb, denoting the area located in the North West Province[156], the Eastern Limb, located in the Limpopo province, roughly demarcated by the Sekhukhune District Municipality, and a smaller middle section near the town of Mokopane (formerly Potgietersrust). The three areas straddle the provincial boundaries between the two provinces. Platinum mining in these areas is conducted underground as well as open cast. Mines operate metal concentrators at each site, further processing is conducted at centralized refining plants and smelters.

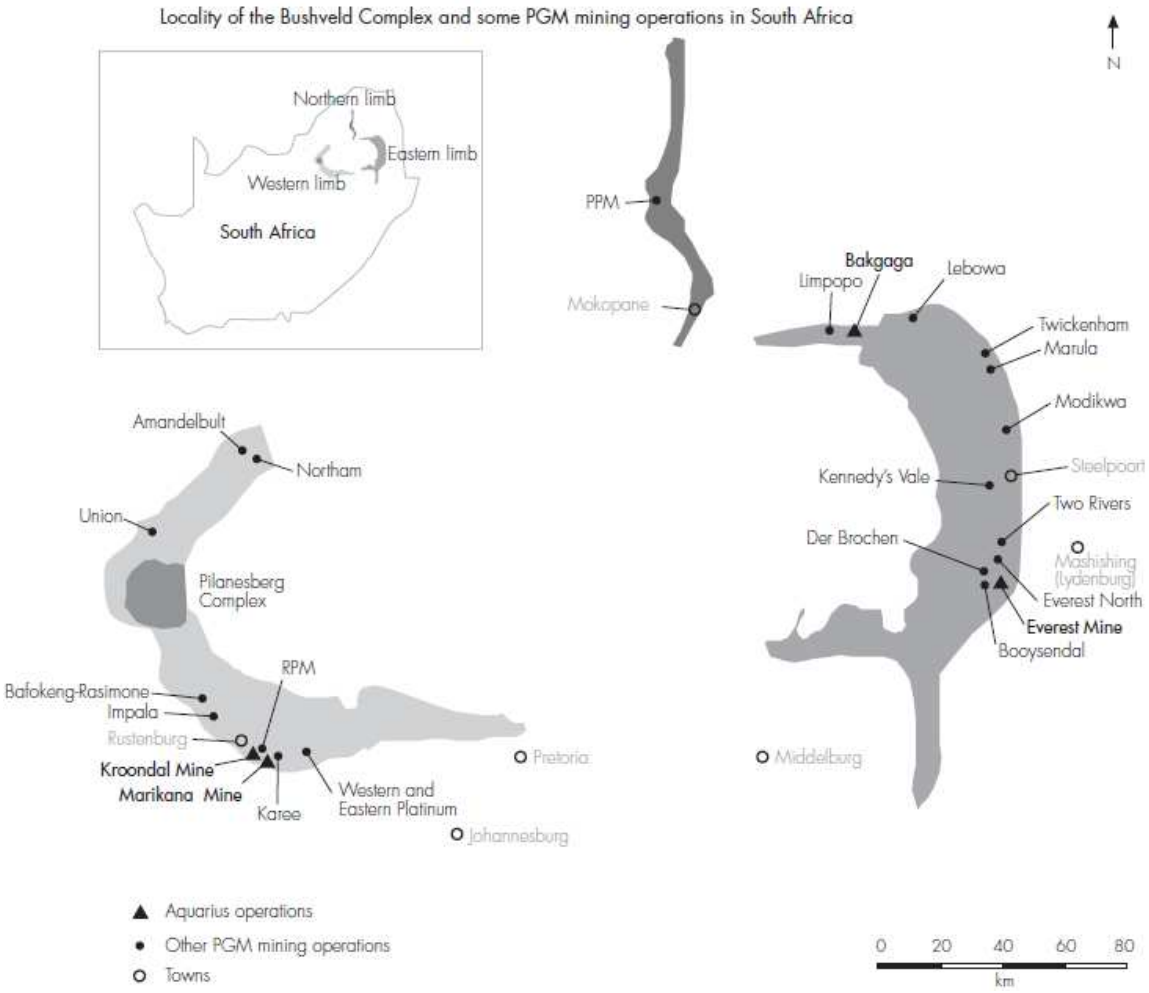

Figure 12: South African Platinum Mining Areas: Location of Mining Operations[157]

From a hydrological perspective, the Bushveld complex is located in different sub-basins of the transboundary Limpopo basin. Each basin represents specific water management scenarios and development dynamics. The location of the PGM-bearing reefs has a further important implication, as it mainly occurs in former 'homeland' areas. Thus the land mostly belongs to traditional authorities rather than private land owners (Benchmarks, 2008).

[156] This region around the town of Rustenburg is also referred to as the Platinum Province.

[157] Source: Aquarius Mining, 2008.

By the year 2000, the South African ***platinum industry*** accounted for 75 % of the world's platinum supply, almost all of which was produced by three companies, Anglo Platinum, Impala and Lonmin in order of size by revenue. Over the past years, platinum has taken the top position in its contribution to South Africa's primary minerals exports. It is considered a high-growth industry with usually above-average revenues. Platinum is primarily used in auto catalysts, the jewellery industry as well as for other industrial applications in the glass, chemicals & electronics industry. For this reason, platinum prices are extremely volatile. A change in the supply from the main platinum producers or changes in the demand of the platinum-processing industries are reflected in the prices immediately (DME, 2007a).

Platinum prices and production soared with emission controls enacted in the European Union in the early nineties. These regulations require that about 80 % of cars were to be equipped with catalytic converters. The demand was increased with international agreements, such as the Kyoto protocol, calling attention to the impact of vehicle emissions on the world climate (Benchmarks, 2008). During the South African electricity crisis in the beginning of 2008, production losses in the industry were high due to production stoppages while demand remained stable. As a result platinum prices increased further reaching over $ 1.500 per ounce in July 2008.

However platinum prices reacted immediately to the current financial crisis, with prices reaching all time lows of $ 700 per ounce by December 2008 leaving the industry in a state of temporary paralysis and putting new projects and acquisitions on hold. Current estimations however, project a recovery of the platinum prices to early 2008 levels in late 2010 due to strong long-term demand prospects (Anglo Platinum, 2008a). Especially, even stricter vehicle emissions standards following the Euro 4 standard in Europe, the US, but also China are expected to provide for a significant boost over the coming years. The markets however remain unpredictable due to a high number of variable factors. An example is Japan, the world's third significant market. During the 2008 crisis the car industry's losses due to a decrease in domestic demand could be balanced by a higher demand of fuel-efficient cars abroad. Fuel-efficient cars however, also require less platinum rich converters than heavy-duty vehicles. Thus, with car manufacturers increasingly looking to develop more efficient cars, platinum might in the long run lose its main application and market. Platinum furthermore is in direct competition to Palladium, where South Africa is only the world's second largest producer after Russia. A further important factor influencing the platinum price is the Rand/foreign currency exchange rate (Anglo Platinum, 2008a).

Unlike in the coal and gold mining industry, ***water challenges in the platinum industry*** do not primarily revolve around the pollution of the resources, but around issues of scarcity, which affects the industry as well as surrounding communities. Platinum mines require enormous amounts of water for their operations, such as ore extraction, drilling and cooling purposes, but also for dust suppression at roads and tailings dams as well as during further processing and concentrating (Matambu, 2008). Thus, an expansion of operations is heavily dependent on the availability of sufficient water at a reasonable and predictable price.

As a consequence, platinum mines usually devise of sophisticated on-site water management systems. They also have good knowledge about the hydrological situation in the surroundings of their rather expansive mining operations. As for the South African PGM mines in the Bushveld complex, they are faced with a chronic shortage of water. This water scarcity however, not only affects the mines, but first and foremost the communities in these areas. There are several aspects to the

problem: first, the natural endowment with water resources is considerably low; second, the region is experiencing a massive influx of people looking for jobs at the mines, which requires more water and additional infrastructure; third municipalities do not devise of the necessary financial as well as administrative capacity to provide for this additional infrastructure, let alone the upgrade of existing infrastructure. This leads to a situation where water supply within municipalities is under severe pressure, while mining houses are struggling to secure water resources for keeping up their production.

G.2. The 'North-West' Case

The scale of investigation in the North West case is the interaction of mining companies and other actors at the local level. At the same time this level is connected to dynamics and developments at the national and even the international scale.

G.2.1. **Sector and Region**

The analysis focuses on the Bojanala Platinum District Municipality, located at the heart of the North West mining complex. The municipalities under specific consideration for this report are the Rustenburg Local Municipality which surrounds the town of Rustenburg; Moses Kotane Local Municipality, headquartered in Mogwase as well as Madibeng Local Municipality, which is administered from Brits and located in the vicinity to Pretoria at the provincial boundary to Gauteng. In addition to elected government officials and municipal administration, the case study area comprises several traditional authorities. The most influential and dominating group is the Royal Bafokeng Nation (RBN), which resides in a 1,200 km² area near Rustenburg and maintains its own administration, catering exclusively to members of the Bafokeng tribe. The Bafokeng have also been referred to as the 'richest tribe in Africa' (Manson & Mbenga, 2003), owing their prosperity to their involvement with the platinum mining industry. Other tribes in the area are the Bagkatla-Ba-Kgafela, which own 15 % of the shares in Anglo Platinum's Union mine, Bakubung in the area of the new Wesizwe mine as well as the Bakwena-Ba-Mogopa, holding about 26 % of Implats' Leeuwkop project.

Platinum mining in this area started in the late 1920s and was ramped up to full-scale production in the 1960s. The area now features the oldest and currently largest mines in South Africa, including Anglo Platinum's Rustenburg mine, Impala Platinum's Kroondal operations and Lonmin's Marikana operations. All of these mines have been in production since the early 1980s. An exception is Anglo Platinum's smaller, relatively new mine Bafokeng-Rasimone (in production since 1999). Other large operations are located in the northern section of the Western Limb (Angloplats' Amandlebult operations). Further operators in this area are smaller compared to output and volumes of the big three and include for examples mines owned by the Australian company Aquarius Platinum near Kroondal and Marikana. It should be noted that there are a number of joint ventures between the companies in place that intend to secure access to certain mineral reserves and reduce costs for operations and processing. Bafokeng Rasimone, as revealed by its name, is owned by the Bafokeng to 50 %. The nation's involvement with the mining sector however, started with royalty payments from Implats for mining on Bafokeng land. These royalty payments were granted after a 'decade of legal battles' and later converted into shares, thus turning the RBN into the largest shareholder of the company (Russell, 2008).

In addition, there is a growing number of BEE operations, which are in most cases spin-offs of the major operators in the area. One example is Wesizwe Platinum, which is currently in the exploration phase for a major PGM operation. Of relevance in the area are also large and medium chrome mining operations by Amplats, Samancor (a subsidiary of BHP Billiton) and Xstrata (listed in London). According to an overview by DWAF, around 40 large and medium size as well as some smaller mining operations are currently undertaken in this area.

Apart from the strong influence of the mining industry, the area is characterized by rapid growth and urbanization, specifically in close proximity to mining operations. Originally the mines constituted relatively autarkic operations in a largely agricultural area. In the early 1990s there was a significant influx of people looking for work in the mining industry. This was supported by the release of access control at the end of the apartheid regime (Hamann, 2008). Especially Rustenburg local municipality, which is also the most populous with 450.000 inhabitants, has experienced continued growth over the past 15 years (between 1 and 5 % growth rates) (BPDM, 2009). The majority of the population in the Rustenburg local municipality resides in urban and peri-urban municipal areas. There is a significant share of the population residing on tribal Bafokeng land (24 %), rural areas and mining hostels house 11 % and 5 % respectively (Rustenburg LM, 2008). Other municipalities in the district are largely rural, which poses considerable problems in terms of service delivery (BPDM, 2009).

Poverty levels and unemployment rates are high and have risen (from 26 to 40 %) over the past years in the district (BPDM, 2007). Unemployment rates in some of the informal settlements scattered around the mines are estimated even higher at about 44 % (BPDM, 2007).

The socio-economic situation in the case study area is to a large extent dependent on the mining industry. Impacts are related to the mining operations itself, such as employment and economic growth as well as the intended and unintended consequences from mining activities in the social environment. Selected statistics for the largest mines in the study area are provided in the following table. It shows the role of the mines as major employers, as almost half of the total workforce in the district is employed in the mining sector[158]. At the same time however, unemployment among the local economically active workforce is considerably high, which is owed to the fact that migrant workers still constitute large parts of the mining workforce.

Table 17: Estimated Employee Numbers for Mines in the Study Area in 2008

	Anglo Platinum	Implats	Lonmin
Workers (group total) C: contract workers	53,000 (+ 29,000 C)	34,381 (+20,610 C)	N/A
Workers (Bushveld Western Limb) [159]	21,500	29,500 (including 15,400 C) (Impala Rustenburg)	25,000 (including C)

Thus, In terms of employment, mining has more or less positively impacted development in the area at least in the short term; on the other hand the industry contributed to or caused a range of

[158] In aggregate terms for each case study company, 2008 financial year. Other sectors providing employment in the area are agriculture, including cattle farming and irrigated crop cultivation as well as tourism.

[159] Source: Company annual reports, Anglo Platinum's figures for workers exclude contract workers – a significant number – while other companies' figures include them, number given. Numbers for Anglo Platinum are for mines in the Rustenburg area and the Amandlebult and Union mines, excluding Mogalakwena mine.

negative externalities, such as the emergence of informal settlements. The large number of informal settlements epitomizes probably the more problematic side effect of the economic growth enhanced by the mining industry, as they have led to some of the most pressing development challenges. Informal settlements mainly sprung up next to the former so-called single-sex hostels. These were set up by the mines during apartheid to house large numbers of migrant workers near the mining site.

The informal settlements not only represent the largest share of population growth with growth rates of around 20 %. It is estimated that about 30.000 people[160] live in shack settlements, among these many mineworkers. This development was supported by the so-called 'live-out' allowance, which no longer binds migrant workers to the hostel system. Living conditions in informal settlements are very disadvantageous, due to a persistent lack of municipal services, such as water and sanitation, electricity, but also limited access to schools and health services (Hamann, 2008). The situation is aggravated due to a high prevalence of crime as well as a high occurrence of HIV/AIDS[161].

The problematique of informal settlements shows that the interests of mining companies and local government in addressing development challenges are inextricably linked, whilst not necessarily congruent. The main issue of concern for the municipalities is to make sure that economic growth is sustainable. This might be supported through mining, but also reaches beyond the operational life of mines. Of importance are secure employment, improved housing and a stable provision of municipal services, such as water and electricity supply. The mines on the other hands are first and foremost interested in maintaining their production base, including their license to operate. They thus share a common interest with the municipalities: improving infrastructure and to some extent also living conditions around the mines.

Overall, the Bojanala platinum mining district appears as a region, which is struggling with significant demographic, institutional and economic challenges, which are epitomized by the emergence of and the conditions in the informal settlements. Linked to this is a range of other development issues, such as increasing pressure on municipal services infrastructure, which is not keeping up with the rapid development in the area.

In addition to social impacts of the mining industry, there are also a number of environmental issues, which have been recorded in the vicinity of the mines (Benchmarks, 2008). This includes the impact on underground water resources due to mining-related pumping activities, which led to changes in underground aquifers as well as development of underground fissures[162]. Air pollution, mostly emissions from platinum smelters, are suspected to lead to acid rain, negative impacts on crop production as well as considerable health hazards. Furthermore, blasting in open cast mining has lead to several incidences of damaged houses in nearby villages and settlements (Botomani, 2008). Water challenges will be addressed in more detail in the following section.

G.2.2. **Main Water Management Challenges**

Towns and mines are located in a sub-catchment of the Limpopo basin. The sub-catchment consists of the Crocodile and its two main tributaries, the Elands and the Pienaarsrivier. All these rivers are perennial and their flows are supplemented by substantial discharges of treated domestic effluent

[160] Benchmarks, 2008 however reports that almost 250.000 people lived in informal settlements by 2008.

[161] According to Benchmarks, 2008 infection levels are as high as 80 % in the informal settlements.

[162] This phenomenon has occurred frequently in the gold mining areas of the Witwatersrand, see Case Study 2.

and enhanced by water imported from the Vaal river system in order to maintain domestic and industrial use (Ashton et al., 2001). In addition, the case study is located in an extremely drought prone area of the country with low rainfalls and high temperatures. This imbalance is expected to increase with climatic change.

All settlements in the sub-catchment rely on water supplied from larger dams, river abstraction, occasionally from boreholes. Most of the water is consumed by the extensive urban areas that spread across the headwaters of the sub-catchment; irrigation along the Crocodile River also requires large volumes of water. The extensive mining operations in the Bushveld complex compete with irrigation about the scarce water resources in this area (Ashton et al., 2001). An interviewee representing a mining company in the Western Limb highlighted water as a key prerequisite for platinum mining, while at the same time pointing to potential conflicts emerging with other water uses, such as agriculture and municipal water (Sheppard, 2008).

Combined the mines in the study area require several hundred megaliters per day[163] in order to maintain their operations, thus putting major stress on the system.

Looking at the situation of ***water supply and sanitation***, there is a considerable backlog particularly in the informal settlements. But there is also a critical challenge in terms of overall provision of water supply and sanitation services to growing community needs. Particularly in drought periods the municipality (Rustenburg) often experiences a shortage of water. The problem is usually alleviated with returning rainfall, but the system is largely operating at its maximum capacity with demand and supply just at balance. There is a high uncertainty as to how the system will react in extended drought periods[164], which are expected to lead to more severe imbalances (Pretorius, 2008b). It has been reported that some residential areas have been without water supply for extended periods of time over the past years. Water shortage affects all types of residential areas, including the more affluent ones, which ironically might add to the urgency of the issue. This however also compounds the challenge in those areas which are not connected to water services at all. The following table shows that particularly in rural areas the backlog is still extremely critical, while urban areas seem to be well-serviced.

Table 18: Connection to Water Supply and Sanitation Services in Rustenburg (Rustenburg LM, 2008)

Percentage Connection	Urban	Dense	Village	Scattered	Farmland	Total
Water Supply above RDP Standard: House Connection, Yard Tap or Community Tap < 200m	87.98	51.75	65.65	48.94	57.02	71.63
Water Supply below RDP Standard: Communal Tap > 200m, Borehole, Tank, Dams and Rivers	12.02	48.25	34.35	51.06	42.98	28.37
Sanitation above RDP Standard: Water treatment work or consumer installation: VIP, Septic tank	88.71	22.29	28.09	33.51	32.36	54.24
Sanitation below RDP Standard: None, Bucket or Pit Latrines	11.29	77.71	71.91	66.49	67.64	45.76

[163] 1 megaliter is one million liters.

[164] Three weeks are considered an extended period.

The most pressing problem is the backlog in terms of infrastructure development, which is currently estimated to amount to about five to ten years, combined with extended planning and implementation periods as well as an overall lack of long-term planning. This deficit is also reflected by the fact that by the time infrastructure has been built, new systems are needed already. The significant population growth in the Rustenburg area in reaction to the haphazard growth patterns of the mining industry is usually considered to be one of the main factors rendering planning at the municipal level difficult, as the combined demand by mines and municipalities is quite unpredictable. With the economy slowing down, demand usually also declines, while a rising platinum price leads to increasing demand (Pretorius, 2008b).
Considering the situation for the entire district municipality, a similar picture is conveyed. The water services backlog is most severe in Morelete, Madibeng and Moses Kotane local municipalities. On average the sanitation backlog is three times higher than the supply backlog. Here Morelete, Moses Kotane, and Rustenburg local municipalities are faced with the largest backlog (BPDM, 2009).

G.3. Business Contributions – Firms and Activities

There is a total number of about 40 mining operations in the area, among them not only platinum mining firms. I however specifically focus on the platinum mining companies: Anglo Platinum, Impala Platinum and Lonmin as larger operators, and one smaller operator, Wesizwe. The sources for this section are companies' annual and sustainability reports as well as interviews with company representatives and other stakeholders. In some cases, especially with the smaller operators, representatives were not available for in-depth interviews.

G.3.1. **Main Characteristics of Firms Investigated**

This section provides for an overview of the main differentiating characteristics of the company cases considered. While there is a clear differentiation between the larger companies and the smaller operations, it is also worthwhile to look at variations among the larger operators. They are quite similar in terms of their involvement in the Western Limb and their adherence to corporate governance standards as well as internationally promoted environmental management systems. There are however differences in terms of public perception, stakeholder engagement and the overall management approach.

Table 19: Estimated Production Figures for Mines in the Case Study Area in 2008,[165]

	Anglo Platinum	Implats	Lonmin
Overall operating income (Rand – millions or $m if indicated)	14,663 Profit for the year	17,705 Profit for the year $m 2,400	$m 963
Overall Platinum/PGM production (Moz)	2.0/ 3.7	1.9/ 3.6	0.72 1.4
Western Limb operations production	1.8/ 3.3	1.0/ 1.8	NA

Anglo Platinum is the world largest producer of Platinum Group Metals and owned to 100 % by Anglo American plc. Anglo's platinum mining, smelting and refining operations are located in all sections of the South African Bushveld complex. Anglo Platinum has a primary listing at the Johannesburg Stock exchange, and is also listed in London. The company furthermore maintains joint ventures with other mining companies, such as Lonmin, Xstrata and Aquarius For some of its operations, Anglo collaborates with so-called HDSA[166] mining companies, as well as traditional authorities in the case of the Royal Bafokeng and the Bagkatla (Anglo Platinum, 2008a)[167].

Due to the long involvement with platinum mining in the Western Limb, Anglo Platinum also receives the highest attention from stakeholders. In order to manage these interactions, Anglo Platinum keeps a record of all possibly relevant stakeholders, amounting to over one hundred entities. Focusing particularly on the interaction with communities, a specific department CED (Community Engagement Department) is addressing this task. The CED bundles most of the interaction with the community through routine interactions with community representatives. At these meeting a broad range of issues, ranging from social aspects, CSI issues, as well as environmental concerns is being discussed (Zitha, 2008)[168].

Impala Platinum is the world's second largest producer and supplier of platinum after Anglo Platinum, contributing about 25 % of the global supply. Next to its operations in the South African Bushveld, it is also producing in the Great Dyke Complex in Zimbabwe and exploring in other parts of the world, including Canada and Mozambique. Impala's primary listing is at the JSE, the secondary listing is in London. Impala, as a South African company, maintains extraordinarily strong links and interaction with local communities. The company is more focused on its local operations and only maintains a relatively small representative unit in Johannesburg (Townsend, 2008).

Lonmin Plc is a major platinum mining firm, operating exclusively in the South African Bushveld complex, while also undertaking exploration activities in other African countries. The company has a dual listing in London and Johannesburg. As a British company, Lonmin maintains even stronger links to Europe and the respective discourses on CSR. Lonmin operates its own smelters and precious metal refineries in South Africa and mostly serves customers in the United States, Europe and the Far

[165] In aggregate terms for selected companies, source: Company annual reports, interviewees. The figures should be considered as rough estimates only as reporting methods vary considerably. Numbers for Anglo Platinum are for mines in the Rustenburg area and the Amandlebult and Union mines, excluding Mogalakwena mine. The exchange rate for 2008 was about US$ 1.00=R 10.00. Data for Wesizwe are not yet available.

[166] These are mining companies set up to specifically historically disadvantaged South Africans.

[167] The company is furthermore in preparation of additional black empowerment deals to create two new HDSA companies for the management of four Anglo Platinum mines, albeit one of these deals was put on halt due to the international credit crisis in 2008.

[168] An assessment of community needs is undertaken through the SEAT program, which represents the company's social performance.

East for industrial applications (Lonmin, 2008a). In 2007, Lonmin has initiated the formation of a separate Safety and Sustainability Executive Committee, in order to emphasize the company's commitment 'beyond the boundaries' to safety, environment and housing (infrastructure) as well as the 'long-term sustainability of the communities where they operate' (Lonmin, 2008b). The company has furthermore developed an innovative stakeholder engagement practice and is in this context mostly dealing with the challenges in the Madibeng local municipality

Wesizwe Platinum is not yet fully operational but is currently developing a major platinum operation in the Western Limb of the Bushveld Complex near Rustenburg, where it plans to mine about 350,000 ounces of PGM per annum. In 2008, Anglo Platinum acquired a 26 % share in the venture, partly also to mitigate impacts from the global economic slowdown. The project is entering the phase of construction, i.e. the build-up of the mine before the actual ore production is then started in about five years.

G.3.2. **Types and Modes of the Contribution**

This section details the specific contributions made by individual firms or in cooperation with industry peers as well as other stakeholders, in following the analytical framework suggested in chapter B.

Compliance

Especially with the larger operators, there is evidence for ***internal schedules and reporting processes***, which are designed to ensure compliance with regulatory requirements (e.g. Implats). These internal processes are usually catering to the regular site visits paid by the regional DWAF office to check on maintenance and pollution control issues of dams and structures (Malan, 2008). Lonmin assures the adherence to the EMP requirements through annual internal performance audits, which are integrated in the firm's overall Sustainability Management System. Also the 'zero discharge' and water recycling approach contribute to the compliance level (see section on efficiency improvements). Results on water quality are reported to DWAF on an annual basis.

Thus the overall level of compliance can be considered as satisfactory, especially when considering the other large operators. At the same time, a more critical look, such as taken by Benchmarks (2007) and community groups reveals, that regular breaches of legislative provisions, such as the MPRDA or the South African water legislation, occur. Lonmin for example reports on incidences of dam leakage, which led to the contamination of soil and ground water contamination at the refining plant. In this case, remediation was initiated with the approval by the authorities. Thus, while Lonmin was not in compliance in terms of the avoidance of the impact, still compliance was shown with view to the responsibility for the impact.

As it is the case in other mining areas, a major issue with regulatory compliance is the delay in the issuance of ***water licenses***. This is largely attributed to limited capacities within the regional branch of DWAF and the lack of interaction with the DME. Furthermore, the governance framework within DWAF regarding the water use licenses is considered incoherent in terms of a universally applicable framework across all provinces (Malan, 2008).

All major companies currently operate without a water use license. Anglo Platinum applied for a water license for all Rustenburg operations in 2004. The according licenses had not been issued by DWAF as of December 2008. Lonmin and Impala have also applied for an integrated water use license. Approval however is still pending (Krzyzanowska, 2008). Lonmin maintains a follow-up

system, which inquires about the status of the approval on a bi-weekly basis. Also, the company is considering taking the legal route at the national level to resolve the issues concerning the water use license (Matambu, 2008).
In complying with the respective regulations, companies contribute to the avoidance of pollution and support the planned use of resources.

Monitoring & (Internal) Planning

Compliance is often closely related to internal monitoring and planning processes; at the same time monitoring and planning assist in mitigating uncertainties at the firm level and beyond. For example, to ensure compliance, Anglo Platinum maintains a detailed internal water planning and monitoring program, targeted at tracking water use at its facilities. Water use is accounted for in the three categories groundwater, potable water and waste or lower grade water. The company sets clear internal targets for several water uses to promote water use efficiency. Meeting these internal benchmarks has been improved over the past years (Anglo Platinum, 2008a). The company is furthermore in the process of developing a flexible accounting system for improving internal water use planning. Lonmin maintains an intensive on-site surface and ground water monitoring program and undertakes groundwater modeling at the site level. Implats has also developed a comprehensive groundwater model for its Rustenburg operations, which allows for determining potential and future impacts on groundwater quality as well as for devising mitigation measures in case impacts occur. Operating since 2003, the model is continually updated through continued measurements, thus allowing for a more effective management of groundwater resources on site (Implats, 2008). Monitoring activities take place on-site while also taking into consideration 'transboundary effects', i.e. the impact of water use and/or pollution on water users off-site.
In addition to meeting regulatory demands or company-internal policies, and reduction targets, monitoring thus also serves the purpose of a more comprehensive and long term planning and research beyond the 'mine's fence'. Anglo Platinum for example has for over 20 years engaged in various aspects of water-related research. Currently, the company is in the process of combining all related knowledge in order to render a more complete picture of physical water balances and the impacts of mining operations on streams and rivers in terms of quantity and quality implications in the region. Other firms, such as Lonmin are working on Integrated Water Balances taking into consideration not only own operations, but the broader water management context (Matambu, 2008).
From an organizational point of view, comprehensive planning at Anglo Platinum is achieved through an overall concertation of all internal departments that are influencing water management issues at a regional level. This includes environmental and engineering personnel as well as production staff. Through this, a firm-level integrated approach towards water resources management that takes regional water management into consideration could be realized.
This has wider repercussions as careful water monitoring and planning might help with better controlling and avoiding water shortages and a better consideration of other water users including the environment.

Efficiency Improvement & Technological Innovation

Common ways to improve operational water efficiency include the minimization of water usage and at the same time the maximization of water reuse and recycling. This way the impacts on the freshwater resources near operations can be reduced. Lonmin[169] for example employs strategies targeted at water reduction at the operational level and 'zero discharge[170]' of effluents. Such steps are then supported by improved water use monitoring, e.g. through the installation of metering systems (see above) and the setting of ambitious goals. Lonmin chose to cap water intake at its operations at 8 million m³ per year and uses this number as a benchmark for the future operations. While the goal was initially not met in 2007, higher efficiency contributed to meeting this target in the following year. The goal of zero discharge, however, can only be realized to some degree. Recycling of water is only possible until a certain concentration of pollutants has been reached. At this point the water has to be treated or eventually released into the environment.

Another increasingly popular way to improve efficiency and ensure supply is to replace potable water by other water types, i.e. sewage water, obtained from municipal sewage treatment plants. For example, Anglo Platinum is using 15 ML a day from a water treatment plant of Rustenburg municipality. In order to obtain water at a sufficient quality, it was necessary to upgrade the treatment facilities to some degree[171]. Anglo Platinum provided part of the financing needed to realize the upgrade. This points to the following category of contributions, involving financial as well as infrastructural contributions to the improvement of water supply and sanitation services at the municipal level.

Technological innovations constitute an important prerequisite for achieving efficiency improvements. According to a company source, the selection of appropriate technologies for adequate water treatment is complicated by the lack of guidance on water quality objectives. Thus, the companies are working on developing potential technological solutions in order to address the identified problems and shortcomings in anticipation of the issuance of quality objectives. These efforts also include technological options, which allow for transferring water resources from a different basin in order to augment supply at the production site[172] (Malan, 2008). Other innovations pertain to technological options for the use and reuse of fresh and grey water at the production site. While the latter is often at a company's discretion, there is evidence for industry-level cooperation with regards to larger infrastructure projects affecting several firms (Maynard, 2008).

Infrastructure/Finance

Infrastructure and finance are discussed together as these issues are interconnected: firms' involvement with municipal water infrastructure cannot be discussed without talking about the provision of financing for this purpose. Companies get involved with these contributions either on an individual basis in cooperation with the respective municipality or as an industry collective.

Capacity-building at the municipal level needed to address tasks related to the financing, maintenance and/or operation of this infrastructure is addressed in the following section.

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169 Implats is also applying the informal industry-wide standards in terms of zero discharge, water recycling for production purposes.

170 The ‚zero discharge' approach seeks to avoid any effluents and emissions from the firm's premises. This is achieved through the reuse and also recycling of waste water. Zero discharge needs to be understood as a theoretical goal, as some effluents will always occur.

171 This for example includes a Memorandum of Understanding with Madibeng municipality regarding a feasibility study on the re-use of treated waste water from one of the municipality's sewage treatment plants.

172 This related to the option of transferring water from the Hartebeespoort Dam, which is also being discussed in the context of the Producer's Forum. This arrangement is discussed in more detail at a later stage in this case study report.

Arrangements between individual companies and municipalities

An example for a partnership with a municipality is the arrangement between Implats and Rustenburg municipality regarding the treatment of municipal sewage at the company's treatment plant. A further example in the case of Implats is the so-called Freedom Park informal settlement, which was provided with RDP housing by Rustenburg municipality in order to mitigate problems related to informal housing. However, the settlement remained under-serviced in terms of water treatment, prompting Implats to provide for water supply and sanitation facilities in the settlement in exchange for the treated waste water (Townsend, 2008).

Lonmin also acts as a water supply intermediary for surrounding communities. Lonmin receives water from a Rand Water scheme, an arrangement dating back to the early 1990. Lonmin uses this water for production purposes and domestic uses on site and then transfers a share to neighboring users, which pay a levy to Lonmin for this service (Maynard, 2008).

A similar arrangement is foreseen for Wesizwe Platinum in the context of the Ledig Water Supply Project. Wesizwe coordinates with the Bakubung Traditional Authority and the local municipality in order to prepare the construction of a 2.3 km water pipeline to the town of Ledig as well as yard connections to the community.

Arrangements between company collectives and municipalities

In addition to individual arrangements between companies and municipalities, collaborative efforts between several mines and municipalities emerge as the most dominant form of interaction for addressing water in conjunction with other development challenges. The arrangements described in this section involve collaborative structures among mining houses and the cooperation of mines' collectives with different levels of government.

The first type of arrangement is represented by the Western Limb Producers' Forum (PF) (Western Limb Producers Forum, 2008), the second form by the Bojanala Municipal Mining Forum (BMMF). In the following section the respective arrangements will be described in more detail in order to illustrate the specific role of the mining industry in this context.

The *Western Limb Producers' Forum (PF)* was established in early 2005 as a collaborative effort of almost all mining houses operating in the Western Limb of the Bushveld complex. Collaboration in the Producers' Forum is governed through a common constitution, which establishes the forum as a non-legal entity. It is further described as a 'discussion and advisory' platform that does not establish any liability towards the decisions taken by the Forum. The Forum's activities are limited to the greater Rustenburg area and include the Rustenburg, Moses Kotane and Madibeng local municipalities (Western Limb Producers Forum, 2008). Membership in the Forum is voluntary and limited to those mines operating in the Bojanala District Municipality. Reflecting the consultative nature of the Forum, it is established to address mutual needs of the mines, and not those issues only pertaining to individual operations[173].

[173] The internal governance structure consists of a chairperson (and a deputy). Both are chosen on an annual basis. The Chairpersons agree on the agenda of the meetings. They also have an important role with regards to facilitating consensus. The Chairperson presides over the meetings and facilitates the decision-making process. In some of the tasks, the Chairperson is assisted by a service provider, in this case UWP consulting, which is responsible for the overall management of the project as well as secretarial support to the forum. Funding for PF is provided by the members following an apportionment, which foresees Anglo Platinum Rustenburg, Impala and Lonmin making the largest contribution and smaller mines contributing between 8 and 2 %. Free membership is granted to some of the smaller mines as well. The Forum furthermore works through a structure of working groups and technical task teams reflecting the main issue areas of interest identified for the common work. Progress monitoring is conducted at the task team level using an evaluative scheme to point out gaps in the implementation.

The Forum understands itself as a clearing house for a range of development issues faced by the mining houses in the area. It is driven by a general vision of 'sustainable environment in which all stakeholders thrive' (Western Limb Producers Forum, 2008) and that will help with identifying and addressing the most pressing issues for its members. Issue areas that have been identified as primary areas of concern for the Producers' Forum are water supply and sanitation, spatial development (including housing), transportation, energy as well as building increased delivery capacity at local government level (Western Limb Producers Forum, 2008).

What exactly is the contribution to addressing the water challenge provided by this collective arrangement? The following two examples show the complexity and multiple facets of the contributions provided. These initially involved the establishment of the Rustenburg Water Services Trust and found their continuation with planning for the construction of a bulk water augmentation scheme.

The Rustenburg Services Trust was established by the mining companies in 2000 as a financial vehicle to provide for the off-balance sheet ***funding of municipal water infrastructure***. In this function, the Trust also managed the construction of a waste water treatment plant for the Rustenburg municipalities, which provides about 30 ML of industry-grade water at a reduced charge to the mines (Townsend, 2008).

The model of the Rustenburg Water Services Trust constitutes and important reference for the negotiations underway in 2008/2009, concerning the design and construction of the Bakwena Pipeline. The pipeline is designed to provide the Rustenburg Platinum Mines with industry grade water for production purposes in order to free up much needed water for the surrounding municipalities. The actual planning process is spearheaded by the 'Water' Working Group of the Producers' Forum and brings together the mines, the municipalities as well as the national DWAF office. DWAF gets involved in this arrangement as it is mandated with the identification a solution to the water problems[174], whilst facing budgetary constraints.

As a consequence, ***leveraging private capital*** appeared to be the only possible solution; however with the Municipal Systems Act[175] preventing any type of privatization, the direct involvement of private capital in public service provision has been limited. The model[176] used in case of the Bakwena pipeline is to establish a public service entity, e.g. the Trust[177], to basically contract out the acquisition of financial means, with the goal of financing infrastructure investments off the balance sheets of the municipalities. The entire model becomes feasible for private investors through the off-take agreements, which the mines sign for the water provided by the pipelines. It is estimated that mines will take about 100 ML water per day. For the mines this water is secure; all considerable risks are managed, the tariff structure is stable and the supply as well as the price is predictable. The mines thus indirectly provide for the funding of the augmentation scheme.

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[174] DWAF also represents the interests of water resources planning, which considers water use needs in the entire country, including the planned new Sasol operations in the Lephalale region, which require massive transfers of water´.

[175] Stipulations in the Act prevent involvement of private financiers to an extent that the World Bank, in assessing the success of their PPP model, declared South Africa a complete failure with regards to Infrastructure PPPs (Olivier, 2008)

[176] This model has to a large extent been developed and promoted by Bigen Africa Consultants.

[177] Section 67 of the Municipal Systems Act now prevents the establishment of such a vehicle; the Rustenburg Services Trust however was established before this amendment and thus continues to exist, which is subject to criticism by Madibeng local municipality.

In addition, the mines pay a tariff to the municipalities for the grey water used for production purposes. The ***design of the tariff*** determines the degree to which this contributes to the management of water challenges in the respective municipalities. It is expected that the tariff levied from the mines for the water provided by the pipeline will also pay for the upgrade of the sewage treatment plant in Rustenburg municipality as well as an upgrade of the reticulation[178] system. The tariff design however is still subject to discussion between the mines and the municipalities. The municipalities aim to charge a tariff, which redeems the loan for infrastructure development, pays for operation and maintenance and covers the above-mentioned extras[179]. The mines on the other hand, albeit subscribing to a social responsibility component, are interested in limiting this add-on payment. At the same time, the add-on surplus also constitutes a basis for discussions among the municipalities, as there are different preferences on its specific design and use, thus rendering the discussion a political issue. Irrespective of these tactical issues, the tariff is also determined by the available institutional, financial as well as technological options for building the pipeline. Four models have been discussed in the context of the negotiations.

Table 20: Options for the Bakwena Bulk Augmentation

Option	Status	Additional Remarks
Rand Water, the largest bulk water provider in South Africa	Will not continue with a bid	Rand Water faces the problem of improving the quality of their currently available infrastructure
Magalies Water , a regional bulk water provider	Continues with a bid; water will be brought in from Hartebeespoort Dam	Water provided would be comparably expensive, i.e. unattractive for mines and municipalities; bid however is used as a reference for RST proposal
Western Basin Environmental Cooperation (WBEC)	Proposed the transfer of water from the treated mine drainage water from the West Rand basin	Bid is not considered attractive, due to the length of the pipeline necessary to provide water; water is expected to be exorbitantly expensive; furthermore it is not considered best practice, to transfer water problems from one basin to another one (Olivier, 2008)
Rustenburg Services Trust (RST)	Serves as an institutional alternative to the other models	Likely to be the preferred option, as their price will be guided by the other bidders' prices

The contribution of the mining firms consists of leading the negotiations with the respective service providers and assisting with the necessary knowledge and insight in determining the most feasible option, from the mines' as well as the municipalities' perspective[180].
The contribution in this context, thus does not involve the actual construction of infrastructure or the actual investment of financial means. But rather the contribution is much more subtle, involving the leverage of finances, and the assistance with planning and technology assessments.

Capacity, Awareness & Shaping the Policy Field

Through these activities, the Forum to some extent also aimed to ***complement the IDP*** process rather than replace municipal functions with regards to the issue of informal settlements as well as the need for bulk service provision. However, with development challenges mounting – companies have taken on more responsibility than originally foreseen (Bierman, 2008). In addition to an

178 The reticulation system delivers water directly to the households.

179 Thus the tariff consist of three elements; to redeem the capital investment, which is usually amortized in 30 to 40 years, the life- cycle cost, i.e. operation and maintenance and the surplus, which constitutes less than five percent of the total tariff.

180 Feasibility in this context is in the first instance related to operational feasibility or 'what makes sense from a business point of view'. This does not mean that firms are negotiating in the municipalities interests, let alone that the mines would consider all aspects of the municipalities development needs.

improved communication of the needs and contributions of the companies to the municipalities, companies organized in the Forum have identified local government capacity as a crucial prerequisite for successful collaboration and thus decided to provide targeted support to local government to enable it to better fulfill its statutory responsibilities and facilitate regional coordination. In particular, this support includes human resources development for local councilors. There is a general understanding however that this needs to be undertaken sensitively and transparently to prevent allegations of corruption or cooptation. In essence, the Forum puts companies into a position, where they 'lead from behind' in facilitating more coordinated and effective responses to the development challenges in the area.

Capacity-building is taking place in different forms. Local government officials are invited to technical workshops organized by the mining companies. This facilitates knowledge exchange between industry and government representatives on a technical level. In addition, companies sponsor participation in technical training courses for local government representatives[181] (Bierman, 2008). A specific example for a comprehensive capacity-building effort is the Madibeng Capacity Building Initiative. Lonmin is partnering with the International Finance Corporation (IFC) as well as the World Bank in a concerted effort to boost the local municipality's capacity and effectiveness in performing its assigned tasks. The Initiative adopted a programmatic approach to address some of the most pressing shortcomings and to avoid duplications with other assistance programs. Goals pertain to the improvement of information and database management regarding sectoral development plans. It is also targeted at improving the reporting capacity of municipalities to national departments and agencies (Joint Capacity Initiative Madibeng, 2008). The project is of relevance for the issue of water as it is directed at ensuring delivery on the Water Service Development Plan, which has been produced by the Technical Task Team of the North West Producer's Forum (Joint Capacity Initiative Madibeng, 2008). In addition, assistance is provided for the management of complex integrated projects, for example with view to water; i.e. the transfer of water to communities, including billing issues and the management of debt and credits.

Capacity-building is also an aspect of firm contribution in the context of the delayed approval of water licenses, Anglo Platinum is for example engaging with DWAF at the national level to speed up the licensing process[182]. Similarly, Impala has also begun to address government departments and also engages in capacity-building measures for the regional departments. These activities are however of a different quality than those related to infrastructure development as they are aimed at shaping regulatory processes.

Similarly, companies have also engaged in activities, which are directed at 'speeding-up informed decision-making' and thus reducing regulatory uncertainty (Malan, 2008). An example for this is the currently emerging industry forum ***water resource quality determination.*** The forum is basically modeled after an already existing forum focusing on air quality issues (Malan, 2008). While it is expected that the water quality forum will meet on a bi-monthly basis, preparatory meetings are taking place to determine the governance and performance goals of this forum. The model air quality forum was initiated by DEAT North West Province and then was taken over by the group of firms. The

[181] The specific example given was sampling according to US-EPA guidelines.

[182] An item of discussion at this point of time was the linkage of the water licensing process and requirements under the Mining Charter in terms of BEE considerations proposed by government. Anglo Platinum was interested in clarification of the issue linkage against the background of measures already taken (Malan, 2008).

companies transformed the forum from an initiative originally targeted at achieving regulatory compliance to a more lobbying oriented activity targeted at the national level. The decisive strength of these industry forums is the know-how of the industry representatives, which is then available in the regulatory process (Malan, 2008). This type of activity is congruent with other activities at the national level, where the close involvement of business with government officials is directed at shaping international standards according to the South African situation. In this regard, these latter activities obviously also significantly contribute to capacity transfer as well as the shaping of the policy field.

This is also happening to some extent by way of interaction between mines and municipalities in the context of the Producers' Forum. In addition, this interaction was also officially institutionalized through the *Bojanala Municipal Mining Forum,* which was established in late 2008 as an industry-government partnership. The BMMF is based on a Memorandum of Understanding between the North West Province, the Bojanala District Municipality, the five local municipalities within this District[183] and the Producers' Forum, thus bringing together and leveraging the buy-in of all political as well as economic actors in the region.
The key focus areas of the BMMF basically reflect those of the Producers' Forum. They are specified in the MOU regarding socio-economic cooperation (BMMF, 2008). The MOU is closely linked to the Provincial Growth and Development Goals of the North West Province, which set out targets to be reached in 2014 in terms of skills development, fighting unemployment as well as poverty at the provincial level. It explicitly refers to the municipalities' IDPs and the necessity to integrate with the respective coordinative meetings already in existence.
The MOU prioritizes concrete projects, which are to be tackled over the next years in the focus areas water (e.g. support to water services authorities, augmentation of bulk water infrastructure), housing (e.g. improvement of land use management, support to local municipalities, support on managing informal settlements), transport (e.g. identification of needs for road improvements), and energy (e.g. development of an energy master plan for the region).
While these activities will also lead to tangible infrastructure-related contributions, both collaborative water platforms set up by corporate actors also provide an additional contribution from a governance point of view. They create a space for municipalities to interact more directly with corporate decision-makers and to learn about corporate motivations. This enables them to raise their own concerns and in the best case to engage in a mutually beneficial dialogue among all actors involved. It remains to be seen how these platforms for exchange will actually evolve given the heterogeneous power structures.

In summarizing the main contribution of business to the respective water challenge in this case study region, a focus is placed on efforts relating to water resources planning as well as the development of innovative technologies to increase water use efficiencies, mostly owing to and addressing the scarcity of the resource in the case study region. Most notably however, companies have contributed to the improvement of municipal water supply by facilitating alternative water supply for the platinum mines. These contributions have been augmented by the facilitation of dialogue with stakeholders and capacity-building for municipal government. It is expected that these measures will

[183] Rustenburg, Madibeng, Morelete, Moses Kotane and Kgetlengrivier.

alleviate water stress in the region in terms of supply, while allowing the platinum industry to continue its growth path. At the same time, an overall improvement of water management skills at the municipal level is expected as one of the outcomes.

G.4. Drivers

G.4.1. **Resource-based Factors**

In terms of resource-based factors, the ***security of water supply*** and the risk inherent to uncertain supply is of paramount importance, as platinum mining is crucially dependent on the availability of water for production purposes. Furthermore, the mines in this area are looking to expand operations over the next years and thus need even additional water in order to grow. This interest clashes with already scarce water resources in the region and struggling municipalities to meet their communities water demands.

In addition, the dependence on just one supplier, e.g. the bulk water provider Rand Water, is considered as highly uncertain. Diversifying and controlling supply are considered as proactive ways to mitigate this risk.

This is to some extent reflected by ***individual leadership*** at the company level. For example an executive at Lonmin was instrumental in setting up the industry partnership on water, while he was still with Anglo Platinum. He took up his new position at Lonmin and ensured his new employer's participation in these activities. In addition, Lonmin has hired the former water policy officer at the DME to manage internal water policy, which has resulted in a significant improvement and formalization of on-site water management and monitoring (Matambu, 2008). Similarly, the negotiations in the context of the Producers' Forum from the mines' side are driven by the representative of Anglo Platinum, who enjoys considerable authority among his colleagues as well as the municipalities' representatives. While this factor is not a direct driver, it thus determines the type of interaction.

This case also demonstrates the aspect of ***technical management capacity and organizational slack*** of the larger platinum mining companies. This is of relevance with regards to managing the construction and maintenance of water supply and sanitation infrastructure, which constitutes an important contribution in addressing municipal infrastructure backlogs. Also the platinum firms dispose of sufficient financial resources to pay for the construction of water infrastructure and become involved in expansive planning activities.

The importance of an ***international orientation*** is demonstrated by Lonmin and also Anglo Platinum. In the latter case the development of a company-wide water strategy is clearly motivated by the mother company Anglo American. The company looks to promote universally applied standards across the group in congruence with international best practice (Coombes & Ireton, 2008). This also points to the following driver of international norms as well as industry pressures, which also applies to a number of other companies.

G.4.2. **Normative Drivers/Industry Pressure**

Normative drivers derive from international initiatives as well as mimicry pressures within the industry. It is possible to differentiate between broader international initiatives, which set the general scene for corporate responsibility with the platinum mining industry and more specific mechanisms that provide for more precise motivations for addressing water challenges.

As for the general set-up of environmental management and monitoring, ISO 14001 as well as the Global Reporting Initiative emerge prominently. Anglo Platinum for example maintains a reporting system for its environmental and social impact dimensions. Environmental performance is monitored through ***ISO 14001 certified systems***, which has been obtained for all operations in 2004. Lonmin's and similarly Implats' SHEC Management Standards provide a risk management framework in line with ISO 14001 environmental management standards as well as with Occupational Health and Safety Standards according to OSHAS 18001 and are audited on an annual basis. In addition, Lonmin prepares internal audits against a set of sustainability indicators according to the GRI. Sustainability and responsibility reporting with Implats is conducted in accordance with the GRI G3 guidelines. These management systems thus serve as means for guiding and structuring monitoring and planning.

Also the ICMM's Mining Metals and Sustainable Development initiative and the respective guidance developed in this regard serve as a reference for strategic orientation at Anglo Platinum and Lonmin (Groom, 2008). In terms of South African initiatives, Anglo Platinum makes reference to the King II Code. All these codes and initiatives are endorsed by the South African Chamber of Mines and are thus established as an unofficial industry standard. A similar impulse is provided by the Sustainability Index of the Johannesburg Stock Exchange. This is for example demonstrated by the example of emerging mining companies, such as Wesizwe, which makes clear reference to the impact of mining on sustainable development and its adherence to standards and requirements established by international organizations[184]. These international drivers play a role with regards to the overall set-up of sustainability management systems and serve as basis and reference for water-related activities, but do not qualify as a distinct driver. The major players however, very eloquently mention the needs and interests of all stakeholders and have established strict ethics standards[185] and codes[186] as well as supporting high-level board structures[187]. Such motivations derive for example from the global discourse with regards to the Millennium Development Goals. Lonmin, refers specifically to the MDGs on water as guidance (Lonmin, 2008a). This is unique in comparison to the other case studies, where the MDGs were not explicitly mentioned. The water pipeline project received further impetus through an endorsement by the Water Program of the World Economic Forum. This international forum mainly represents business interests and launched a number of initiatives to test the potential of public private partnerships in the water sector. The Rustenburg Producers' Forum and the planned pipeline were identified as examples for successful partnership approaches. Through this initiative, the buy-in of the NEPAD Foundation and the EU, the project received praise at the international level (World Economic Forum, 2008), which aided in keeping the momentum at the local level.

184 Specifically mentioned are the IFC, the World Bank as well as the Equator Principles.

185 Anglo Platinum's board members are held directly responsible for the company's sustainability performance and strategy, such as communication to shareholders, setting strategic objectives, implementation, monitoring and reporting.

186 Lonmin's approach to corporate responsibility and sustainability is guided by the Lonmin Charter, the SHEC Policy and the Lonmin Code of Ethics. Sustainability functions are anchored directly with the executive board through the Chief Executive's Committee. Personal responsibility of executives is enforced through incentive-based remuneration.

187 At Implats, implementation structures with regards to corporate sustainability and responsibility are located with the central holding company. The group manager for sustainable development thus is responsible for liaising with all relevant stakeholders in the light of the three aspects of sustainable development (Lourens, 2008b). This central unit coordinates a number of sectoral champions addressing a variety of key development issues, ranging from housing and services supply, over local procurement, skill development, health services as well as community development.

In discussing normative incentives that led to the contributions, it also needs to be considered that previous attempts of business to address development issues in the area were haphazard and mostly led to insular approaches by individual companies. Corporates struggled with accepting their share of responsibility for development challenges occurring in the region. Philanthropic and public relations aspects seemed to be the main reason for their involvement. Initial attempts to foster collaboration among mining houses and the municipalities were not successful due to a lack of buy-in from both sides. Due to the continuing deterioration of the situation, the mounting problem pressure as well as the frustration with the failed collaborative attempts, an industry-wide awareness emerged. The relevant parties started to realize that sectoral and even multi-sectoral collaboration would be needed in order to address the challenges. An initiation was provided by Anglo Platinum's commitment to establishing a tri-sector forum, which was then taken up by other mining companies in the region, thus leading towards the establishment of the present day collaboration. These were supported by important changes in corporate perceptions and policies on sustainability issues, especially with regard to the growing understanding of development challenges as a business item. This is also reflected by companies' public reports, more so in Lonmin's (2008b) and Anglo Platinum's (2008b) than in Impala's (2008). This demonstrates the linkage between normative and industry pressure in shaping the firms' internal disposition for addressing the water challenge.

G.4.3. **Social Drivers**

When looking at social drivers it is necessary to differentiate between incentives provided by NGOs and by community stakeholders. The first group is not very pronounced, but the second group is of crucial relevance to all mining firms. This is demonstrated by the considerable number of stakeholder fora established by the mines. There furthermore appears to be a continuum between these two groups – community efforts become increasingly institutionalized and experience support by nationally organized NGOs.

NGOs

In terms of the NGO movement, organizations active in this region are the North West Environmental Forum, a movement driven mainly by conservationists, and the recently formed Rustenburg Environmental Community Forum (RECO). RECO is a predominantly black movement originating from community protests, which is also collaborating with the nationally operating Benchmarks Foundation. These organizations criticize companies on the basis of their environmental and or social performance, while often issues are used interchangeably. They focus on a range of issues, amongst them water. In addition to direct protest, the second way of interaction with the mines is through the established municipal fora and processes. At the same time, the impression emerges that there is not much integration between campaigns initiated by the regional NGOs and local community groups, such as the Luka Environmental Forum.

Citizens and Communities

The Luka Forum is an example for community activism, which is relevant at the local level. In the case of the village of Luka for example, which is heavily affected by Impala's operations, persistent community protest eventually led to a change in drilling techniques by the company as well as more attention to the needs of that specific community with regards to service delivery.

In order to channel community feedback companies have set-up stakeholder platforms as well as other consultative fora to elicit community opinions about certain water-related impacts and other developmental issues.

At Anglo Platinum stakeholder or community interaction is management though the CED; the environmental department also maintains a direct-line to key environmental stakeholders, such as the North-West Eco Forum. In addition, the company also organizes so-called 'open-days' in order to inform about impacts and mitigation measures (Zitha, 2008). Implats' stakeholder engagement focuses on six 'host' communities, which are impacted by daily operations and is guided to a large extent by the needs formulated in the IDP, for example with regards to water needs (Tau & Malau, 2008). At this stage however, there is no immediate linkage between the bulk infrastructure issues covered at the Producer's Forum level and the community-liaison department. Efforts are furthermore concerted through the Impala Sustainable Development Forum, which serves as an entry point for the participation of various stakeholder groups including councilors, environmental groups and traditional authorities to mention only a few (Tau et al., 2008). Overall, Implats' stakeholder engagement policy is considered as very advanced by community representatives and other stakeholders (Botomani, 2008). Lonmin has also adopted a very comprehensive and integrative stakeholder engagement approach, which aims to build partnerships with the surrounding municipalities and communities (Mokwena, 2008). This approach also provides for the linkage to the communities under the auspices of the Greater Lonmin Community (GLC), where community members engage to discuss strategy and more long-term visions for the company. This forum also includes the local traditional Bapo Ba Mogale authority (Mokwena, 2008).

While regulation plays an important role with regards to the set-up of these community interactions, as will be discussed in the following section, the case also demonstrates that particularly industry leaders also feel a moral obligation to address community issues as part of their corporate social responsibility agenda. Infrastructure projects offer a hands-on possibility to directly address shortcomings, while at the same time leading to a win-win situation. There is also an increasing awareness regarding the security of water resources for neighboring communities or 'the' community' at large. Companies realize that they hardly can continue to demand more water for the expansion of their production, while communities in their vicinity continue to struggle to address their water challenges. Reusing industry-grade water to free up potable water for communities, leads to the aforementioned win-win situation. At the same time, the situation allows for addressing broader development challenges abundant in South Africa (Bierman, 2008). Wesizwe for example is already committing to building 'sustainable communities' around its mine, specifically emphasizing the relationship to the local traditional group, the Bakubung. In addition the company is planning to initiate a number of social projects, including skills development and health related programs in the local community of Ledig (Moses Kotane LM).

This again emphasizes the role of traditional authorities, as community representatives. Traditional authorities are important actors to be considered by the firms. This is certainly the case with regards to the Royal Bafokeng, as the most powerful traditional authority in the region.

Finally, the intermediary role of the consultants, especially in managing collaborative efforts, like in the case of the Producers' Forum as well as the Municipal Mining Forum, should be mentioned. While clearly following a business interest, companies such as Bigen African and UWP are instrumental in facilitating the gap between mining houses and municipalities, between community

needs and technical expertise, that mining companies have to offer (Malan, 2008). They thus form an important element for keeping up the momentum of the process.

G.4.4. **Government Drivers**

It is again useful to differentiate between government pressures originating from the national and provincial level and those originating mainly from the local level. As demonstrated by the contributions discussed above, especially the governance structures and performance at the local level plays a significant role in driving business behavior with regards to some key water management challenges in the region. It needs to be considered however that these are embedded in the overall policy context set by the national level.

National & Provincial Level

National government is of relevance with regards to the following roles. It sets the overall goals and directions for water resources management and also steers the behavior of mining houses through legislation with regards to mining responsibility.

While standard-setting occurs at the national level, the mandates in terms of regulation monitoring and the issuance of mining and water licenses are fulfilled by different government departments, in the first place the regional offices of DWAF and DME. Partly overlapping responsibilities lead to several challenges in terms of the cooperation between different departments on related issues. Other government portfolios need to be considered for this case; the Department of Provincial and Local Government assists local municipalities in fulfilling their constitutional tasks.

Regulatory incentives pertaining to water quality goals, reserve determinations as well as those stipulated by the MPRDA, constitute a considerable driver for businesses. Lonmin representatives for example referred to regulation as a key motivation, but also to the impact of indirect pressure from government departments, including DWAF, but also DEAT and the Department of Agriculture. The latter has established a policy preventing the conversion of irrigation water rights to mining related water uses, which prompted Lonmin to pursue alternative water provision schemes. Similarly, Impala highlighted national legislation, whether existent or pending, in the context of the mining charter as a main driver for their activities. Already the stage of ramping up production, Wesizwe Platinum has completed and submitted the Environmental Management Plan and the Social and Labor Plan for approval. The company has also completed an environmental impact assessment for the exploration phase, detailing how environmental impacts will be addressed and mitigated.

Acknowledging this considerable impact of regulation, shortcomings become evident as indicated above, mainly due to a lack of coordination and a lack of capacity. As an example, Lonmin is the first mining company discussing a direct link between activities in the area of water-related projects and requirements pertaining to the Social and Labor Plans. While a link might be established, particularly in the context of infrastructure-related project, there is no complete certainty as to the extent to which these water-related activities (regulated by DWAF) would find consideration under SLP requirements (regulated by DME) (Maynard, 2008).

Limited or lacking capacity with regulators, particularly at the regional level, also constitute a key driver for Anglo Platinum's activities related to anticipating new regulation and particularly for engaging with government at different levels in order to design and influence the regulatory process. A perceived consequence, of this limited capacity and the lack of coordination between different government portfolios is an overall absence of direction, as it is the case in the context of water quality management, where a coherent framework regarding resource quality objectives is still

missing. Only first steps have been taken with regards to drinking water standards or water quality targets for recreational use or industrial use respectively, which are however rather general. What is lacking from an industry-perspective are detailed regional or even local targets (Malan, 2008). This is the reason why companies such as Anglo Platinum have engaged in the capacity-building measures, described above.

In the context of the partnership platforms, national government and here specifically Water Affairs has taken on the role as a facilitator between the mining houses and the municipalities. In this task DWAF on the one hand is clearly employing a strategy of encouraging partnership approaches. These partnerships are considered necessary to address the infrastructure backlog from a municipal as well as an industry perspective through the pooling of available resources. Also, in the context of the partnership platform, government has provided for political support for the mines' plans. This process however represents an exception so far. Other more innovative approaches, such as incentive setting are still under-utilized to address water management issues (Malan, 2008).

Important legislation at the national level furthermore includes the SLP requirements as stipulated by the MPRDA. These requirements provide for a direct linkage of the national and the local level as they 'force' mining companies to look at the needs of the municipalities in the areas where they operate.
While the SLP/IDP is designed to provide for an effective coordination between the needs of mining communities and the companies, the implementation has been lagging behind due to a number of reasons. It has proven difficult for mining firms and local government to effectively communicate on these issues. Limitations from the side of local government will be discussed in the following section.

Local Level/Municipalities and Traditional Authorities

Local government acts as a driver through its actual activities, as well as through its lack of capacity to perform these activities. In fulfilling their constitutional mandate as water service provider, municipalities need to perform a multitude of tasks, including the budgetary and technological planning, the actual implementation, operation and maintenance of infrastructure, but also engaging with business when it comes to matching Social and Labor Plans with community needs. At the same time they also need to accommodate guidance from the provincial level through the North West Growth and Development Plan[188].

While these tasks constitute a veritable challenge under normal consitions, the situation for municipalities in the case study area is aggravated due to the increased scarcity of water resources, a lack of water infrastructure, including bulk and reticulation, and a serious deterioration of existing infrastructure. Municipalities dispose of only limited knowledge concerning appropriate solutions or the collaboration with public or private actors in this regard.
Municipal administrations in this region have also been suffering from a loss in engineering capacity over the past years; in addition there is a lack of experience of junior staff entering municipal positions as well as the problem of a high turn-over of staff. Elected government officials are

[188] Provincial authorities, e.g. the Office of the Provincial Premier, play a role in terms of overseeing the provincial development plans, detailing development and growth trajectories for the province and its regions. The provincial level has also played a role in facilitating the Bojanala Municipal Mining Forum by fostering the buy-in of the municipalities.

furthermore constrained by the five-year election cycle, which essentially gives them two years to 'do their job', since a lot of time is taken up by political work (Olivier, 2008). Next to the technical capacity, municipalities also lack the fiscal capacity to finance the installment of the necessary infrastructure. This problem is then compounded by a lack of skills in financial management, i.e. regarding the acquisition and spending of government funds made available for water services provision.
While the same problem structures can be found across the region, there are still distinguishable differences between Rustenburg, Madibeng and Moses Kotane Local Municipalities.

Rustenburg for example is described as a 'very structured, formal city, which is just under-resourced, while they have adequate people and also expertise' (Townsend, 2008). In terms of financial resources, according to Magketla (2007) Rustenburg Local Municipality ranks in the upper range of the third quintile of South African municipalities[189], indicating an average expenditure of 1,400 Rand per person and year.
Madibeng ranks in the same quintile, however more to the lower end of the range. Contrary to Rustenburg, Madibeng Local Municipality was often referred to as 'totally run-down and defeated' (Townsend, 2008) or as one of the worst managed municipalities in the entire country (Slabbert, 2008b). While these observations must be evaluated against the overall contexts and individual perceptions, shortcomings are evident. Among the main issues are limited financial resources, although Madibeng does not fall significantly behind Rustenburg in this regard, and also limited human resources. Both limitations impact the municipality's capability to perform the required engineering tasks, for example the maintenance of existing infrastructure, but also with regards to performing overall management tasks. There are deficits regarding the clear allocation and assignment of responsibilities at the municipal level, but also in terms of grasping the overall policy contexts and problem-setting. (Slabbert, 2008a). An assessment conducted in the context of the IFC/Lonmin Joint Capacity Initiative demonstrated that other shortcomings occur with regards to the integration of various planning tasks and the avoidance of duplication of monitoring and reporting obligations (Joint Capacity Initiative Madibeng, 2008).
Moses Kotane Local Municipality on the other hand is equally struggling in terms of financial resources. This is also indicated by the figures on financial expenses per citizen and year; Moses Kotane only ranks in the fourth quintile of those municipalities, which spend less than 500 Rand and are to a large extent dependent on municipal subsidies and grants (Magketla, 2007). However, this municipality appears to be better positioned in terms of their engineering and management capabilities, while deficits are noticeable in some instances. Moses Kotane's advantage is that they have a strong capacity in the financial department, which combines financial skills with the necessary engineering knowledge. Also, there are better linkages between the different functions within the municipality and an understanding that issues need to be addressed through a team effort (Makhoana, 2008; Slabbert, 2008a).

Overall, the lack of infrastructure planning at the municipal level is most obvious. In some cases plans exists, catering to the numerous reporting requirements by national government, while they do not lead to any actual results (Slabbert, 2008a).

[189] Statistics South Africa ranks municipalities according to their expenditure per capita in four quintiles with quintile 4 denoting the wealthiest municipalities. Quintile 3 ranges from 1488 to 504 Rand expenditure per person and year.

Due to this situation all three municipalities are struggling with serious challenges in their collaboration with corporate actors. Integrated Development Plans are developed, however without establishing a direct link to what the corporates could actually contribute to these plans. For example, the linkages between meeting the SLP/IDP requirements and the bulk water infrastructure project undertaken by companies have not been fully established yet. Due to the prevailing capacity deficits municipalities also find themselves in a dilemma, where they have to interact with firms, while not being capable of negotiating at par with corporate representatives about the best possible options, leaving them in a situation where they are confined to agreeing to corporate propositions.

From the perspective of corporate actors, the lack of capacity to provide and maintain water infrastructure is a considerable incentive. That is for example the reason why Lonmin took over water supply functions and was working with the local municipality to improve their management performance. Similar motivational patterns can be found with Anglo Platinum (Bierman, 2008) as well as Impala (Lourens, 2008b), but also smaller operators where the SLP requirements coincide with a perception of responsibility towards local communities. Furthermore, companies increasingly view their engagement with municipalities on such issues as bulk water provision as an entry point for companies to better work with the IDPs issued by the communities and thus also to fulfill their own SLP requirements.

Further important elements of local government are the traditional or tribal authorities in the area. There are about ten tribal authorities in the region, vested with different financial means and thus also political power. Again, the Royal Bafokeng Nation owing to their financial strength constitutes the strongest political power among the tribal authorities. They maintain their own tribal administration and are in a position to hire skilled staff, for example in the infrastructure department. At this level, they have developed a sophisticated Master Plan detailing the development for the tribal area until 2050 including massive investment in infrastructure development and local economic development, intended to create a sound economic basis, which is eventually independent from mining activities around them (Royal Bafokeng Nation, 2006). Representatives of the RBN regularly interact with municipal government on a number of issues; at the same time, their independence and strength often poses problems in terms of overall coordination and agreement concerning certain development issues (King, 2008). In some instances they compete with local municipal government when it comes to service delivery. Collaboration between these two administrations is considered rather difficult, which is in many cases hampering efforts on the part of the municipalities, adding an additional problem dimension. This is less the case with other traditional authorities, which are clearly less sophisticated and lack the level of organization shown by the Bafokeng.

Companies operating in the area are faced with the need of liaising with these traditional authorities and adjust to the different terms of interaction. Especially in the case of the Bafokeng Nation, they exert considerable leverage on the mining industry due to the multiple linkages with the key players. In case of the other traditional authorities, they increasingly serve as contact point for corporate actors, for example in the case of Wesizwe Platinum's water project. This is due to the fact that corporate leaders are often 'closer' to the needs of the community, while the ward system (see section D.4.5) often offers only insufficient access. In the interaction with municipalities and traditional authorities alike, companies however run the risk of compounding the conflicts between these two governance entities.

G.4.5. **Competitive Drivers**

As in the other case studies, conventional market drivers do not play a significant role in driving firm behavior. Direct customers are not end-consumers, and industrial consumers are not yet focusing on the environmental and social impacts occurring during production.

From a broader perspective is it however helpful to view the industry's long-term market prospects. While the platinum market has been stable and growing over the past years, thus also contributing to a relatively stable resource-base at the mining firms, future prospects are less promising. Already the economic downturn in 2008/2009 showed that firms were less willing to engage in larger investment, which were not directly related to production (Bierman, 2008). This not necessarily disconfirms the relevance of market drivers. It again points to the relevance of the resource-base, which is of course market dependent and highlights the fact that the market environment might also be a spoiler with regards to sustainability activities of firms.

Another market-related factor to consider, particularly with regards to infrastructure-intensive industries, is access to and competition for financing. Financiers, i.e. commercial banks have considerable leverage in determining the specificities of infrastructure investments. However, so far there is only limited evidence that banks have applied screening criteria their financing strategies (World Economic Forum, 2008).

G.5. Case Study Summary

G.5.1. **Contribution**

The contribution to addressing the water challenges in this case is multi-faceted. In terms of compliance, companies have put in place comprehensive management systems on site. Compliance checks are performed by the respective regional authority and pose a considerable, although not insurmountable challenge for the companies. In addition, firms have engaged in developing technological innovations, in order to increase water use efficiency on site. Furthermore, companies have contributed to a better understanding of the water situation in this region by engaging in the monitoring of water flows. In the first instance, this only covered production sites while the scope was increasingly broadened to include surrounding areas as well.

The contribution with the biggest intensity though, is clearly the stabilization of water supply for platinum mines in order to free up water for an improved access to water by communities across the region. This is expected to alleviate water stress for other users as well as from an environmental perspective. To this purpose, firms have engaged in a number of related activities. In the first place, corporate actors have initiated the establishment of a platform to facilitate exchange and collaboration among corporate actors and at a later stage also with local communities aimed at finding joint solutions benefitting both sides. In the context of this initiative, business is driving and contributing to the joint planning of infrastructure development and financing projects. Particularly the financing aspect is relevant. Mines are not funding the construction of the infrastructure per se. Rather, capital is being leveraged from private lenders (i.e. banks) on the basis that mines will off-take (industry-grade) water provided by the newly constructed pipeline. In addition, mines will pay for the water, thus also covering the upfront construction cost. Without the mines' "buy-in" the municipalities would not get access to the funds necessary in order to build this infrastructure. While these projects have not yet been realized, a workable consensus has been found with the relevant

local municipalities. Parallel with their activities in the infrastructure forum, companies have engaged in capacity-building measures for local municipality staff. These efforts are still on-going and include issues such as administrative and technical capacity.
While some of these contributions are provided by the firms individually, the emerging and prevailing modes of interaction are collaborative arrangements among corporate actors after a period of non-cooperation. Similarly, multi-stakeholder platforms as well as partnership approaches have found some application as well.

G.5.2. **Drivers**

A decisive driving force in this case study is the dependence of companies on water as a key production factor. As a consequence they need to understand and secure how they manage and access water, which results in the above-mentioned activities. Through water firms are also linked to the needs and challenges of the surrounding municipalities. Firms are dependent on municipalities providing basic municipal services in order to maintain a reliable production environment. Municipalities on the other hand are faced with the challenge of enabling and supporting economic activities in the area, while at the same time fulfilling their constitutional mandate of ensuring sustainable livelihoods for their communities. They however struggle to perform all these tasks due to lacking and even diminishing capacity (albeit at varying degrees across the district).
This situation combined with the need for secure water supply, which at the same time must not compromise the municipal water situation, constitutes quite a strong driver for business and has resulted in the formation of the Western Limb Producers' Forum, which is designed to result in a win-win situation for companies as well as municipalities and ultimately communities. As they overcome the insular approach and establish continuous forms of interaction with municipalities targeted at capacity-building at the municipal level, corporate strategies thus bear a higher potential for unilaterally agreed solutions. At the same time, the collaborative structures also allow for the companies to share the risk in addressing the complex water situation in this region.

Regulation also constitutes a relevant driver in this regard. While the involvement of national government mostly has a mandatory character and has lead to relatively good performance levels in terms of water-use efficiency, compliance, monitoring and planning, provisions related to integrated development planning and Social and Labor Plans (which pertain to the issue of water supply) need to be implemented at the considerably weaker local government level. While this poses a substantial challenge, it is even less clear whether corporate initiatives addressing the water challenge will be successfully integrated in the local municipality's Integrated Development Plan (IDP). As a company manager noted: 'Companies must input into the IDP; but this didn't happen as well as it should have, it wasn't well managed'. Under the current situation, companies in the Producer's Forum are well aware of the necessity to integrate with the IDPs of the municipalities, where they operate. At the same time there is a noticeable difference between these expectations and reality. Thus, in this case, the regulatory framework is well in place, while the implementation in all its details is not quite clear and needs to be adapted to the respective case context. This also prompts firms to take on a rather proactive role with regards to water management in the region.
These drivers resonate with a favorable internal disposition of firms towards addressing water challenges in terms of organizational slack and also in some cases internal leadership and well-developed sustainability management systems within the internationally-oriented firms. This is

augmented by a conducive normative environment consisting of these internationally established norms, but also historic legacies as well as community expectations. The latter feature quite prominently, especially in combination with the leverage of traditional authorities, which are present in this area.

G.5.3. **Long-term Dynamics**

In terms of the long-term development trajectories, the establishment of a joint forum for addressing water as well as other development issues is often considered a success in itself. However, it remains to be seen, whether this forum is actually effective and leads to long term and mutually accepted solutions. Certainly, the recently achieved consensus on the augmentation of the water supply to the Rustenburg regions can be considered as a first success. However, the implementation, including financing of the complex project, is still pending and thus bears considerable uncertainties. At the same time the case study on water issues has already demonstrated that there is a long way to go from an initial agreement to the negotiation of the nitty-gritty details on the ground. While there has been a general understanding on the necessity to assist with the provision of bulk water resources in the region, issues such as infrastructure planning and tariff structure are subject to detailed negotiations between the partners.

In terms of the long-term prospects of these activities, there appears to be a relatively unison agreement that if it turns out to be successful, this process will be decisive in determining the outcome of related projects concerning other development issues in the Rustenburg area as well as the entire country. The project is thus expected to redefine how infrastructure can be created through entirely private financing with only top-off funding provided by government and government ensuring affordable tariffs. While most actors are optimistic that this will redefine the way that mines and municipalities cooperate, there are also critical voices to be heard. They consider the entire process as something like a green-washing exercise of the mines, hiding their need for water resources behind a socially-themed agenda (Koitsioe & Khutsoane, 2008).

Further concerns evolve with regards to the integration with other water uses, such as for example agriculture. In many instances, agricultural activities are considered less valuable compared to platinum mining (Koitsioe et al., 2008). Criticism also arises in relation to the potential source of the industry grade water to be used for mining operations. Most probably these will be transported from a different catchment in South Africa, thus affecting the overall water balance across basins and increasing the dependence on remote water sources (Van Rooyen, 2008). While the activities undertaken in the context of this cases study address the water challenge locally, they might prove problematic for sustainable water management in the broader context.

In terms of the ‘governance feedback’, the developments in this case study are largely viewed positive. In addition to capacity development programs initiated for example by Anglo Platinum and Lonmin, further capacity transfer is expected to take place in the context of the partnerships and initiatives (Slabbert, 2008a). However, the different municipalities investigated in this case study also provide for some insight into different uptake mechanisms in capacity development. While in Rustenburg capacity-building activities contribute to filling gaps in terms of human resources and technical know-how, the contribution in the Madibeng and Moses Kotane municipalities are more profound and involve certain planning and budgeting processes (Makhoana, 2008; Pretorius, 2008b;

Slabbert, 2008a). Thus, it can be expected that the influence of the firms' activities is probably slightly more profound in the two latter cases. In all cases however, capacity development is not viewed as problematic in terms of agency capture.

In terms of enabling and fostering interaction and learning several fora established by the mines could potentially provide for a good starting point. Nevertheless limitations apply, as there is for example a lack of direct feedback from communities in the context of the fora. Also traditional authorities' interests are not integrated properly. While the Producer's Forum and the Bojanala Municipal Mining Forum led to an improvement of the relationship between the mining houses and municipalities, other actors need to be better integrated in this collaborative scheme. With consultative structures becoming more accepted by municipal management as well as stakeholder relationships of the mining houses, the fora are likely to benefit from wider stakeholder consultations, when it comes to determining the needs of communities, managing expectations and avoiding conflicts.

G.6. Platinum II: Limpopo Province[190]

The situation in the Limpopo Province allows for considering the platinum industry's contributions to addressing water management challenges at a different development stage of the industry. While often the same companies are active in both regions, albeit in a more emerging stage in Limpopo, it also needs to be considered that the overall context in Limpopo is different; especially in terms of the considerable backlog in access to infrastructure as well as the level of municipal capacity.
Furthermore, water use in the catchment of the Limpopo river has been a matter of debate and conflict between different users for quite some time, thus providing for a rather conflict-prone setting for interaction (De Lange et al., 2005; Lévite, Faysse, & Ardorino, 2003).

G.6.1. **Sector and Region**

The analysis focuses on the mostly rural Greater Sekhukhune District, covering an area of 13,000 square kilometers. Only an estimated 5 % of the population of one million lives in the urban centers, such as Groblersdal – the seat of the district municipality administration - , Burgersfort and Marble Hall. In addition, there are over 500 villages, sparsely populated and distributed throughout the district. The District consists of five local municipalities – Elias Motsoaledi, Fetagkomo, Greater Marble Hall, Greater Tubatse and Makhuduthamaga.
Six traditional authorities live in the case study area. The Ga-Mawela have received most attention thus far in the wake of their struggle against an Anglo Platinum dam project. The Marula community holds about 22 % in the Marula mine.

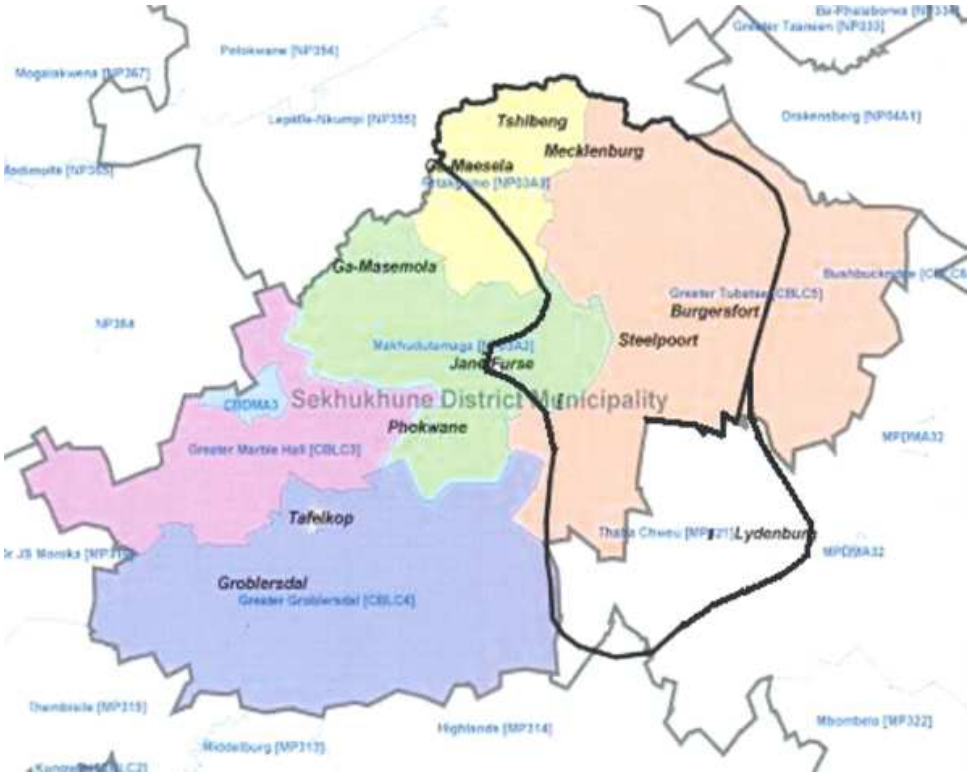

Figure 13: Location of Municipalities and Eastern Limb Mining Footprint (Lourens, 2008a)

[190] In contrast to the other cases, this case study is less based on interviews with those involved than on desk research and literature review.

The District is furthermore characterized by the highest unemployment rate in all of Limpopo at 69.4 %, resulting in extraordinarily high poverty levels and a high dependence on public social support. There has been no significant growth in population over the past five years (GSDM, 2008), due to high rates of worker migration, leaving the province to seek employment elsewhere. According to the deprivation index, a commonly accepted measure for social and economic deprivation in South Africa, Sekhukhune district is among the most deprived in the entire country (Barron et al., 2006).

The contribution of the mining industry to the District's economy is estimated at about 20 % focusing on the local municipalities of Tubatse, Fetagkomo and Makhuduthamaga (Goode, 2006). Firms operating in the Western Limb of the Bushveld Complex are also in process of ramping up or setting-up production in the Eastern Limb. Of the 17 mines operating in the District, there are about six platinum mines currently in production, half of them owned by Anglo Platinum (Lebowa, Modikwa and Mototolo), Aquarius, Implats (Marula) and African Rainbow Minerals. About 20 mining operation are in several stages of the pre-production process ranging from exploration to completed bankable feasibility studies (Goode & Granville, 2006). Consequently, the district places considerable hope and aspiration towards the industry in terms of its potential to foster development (Pelser, 2008).
At the same time, the past record of the mines in terms of meeting key development challenges and addressing sustainable development has been debatable (see section on compliance below). The specific impacts and contributions of the mining industry however need to be considered against the background of the general water management context.

G.6.2. **Main Water Management Challenges**

Mining operations in the District are roughly located in two sub-catchments of the Olifants River, the Middle Olifants as well as one of its tributary, the Steelpoort sub-catchment. Both rivers are impounded by numerous dams, which are used to provide water to communities, agriculture as well as the mines.

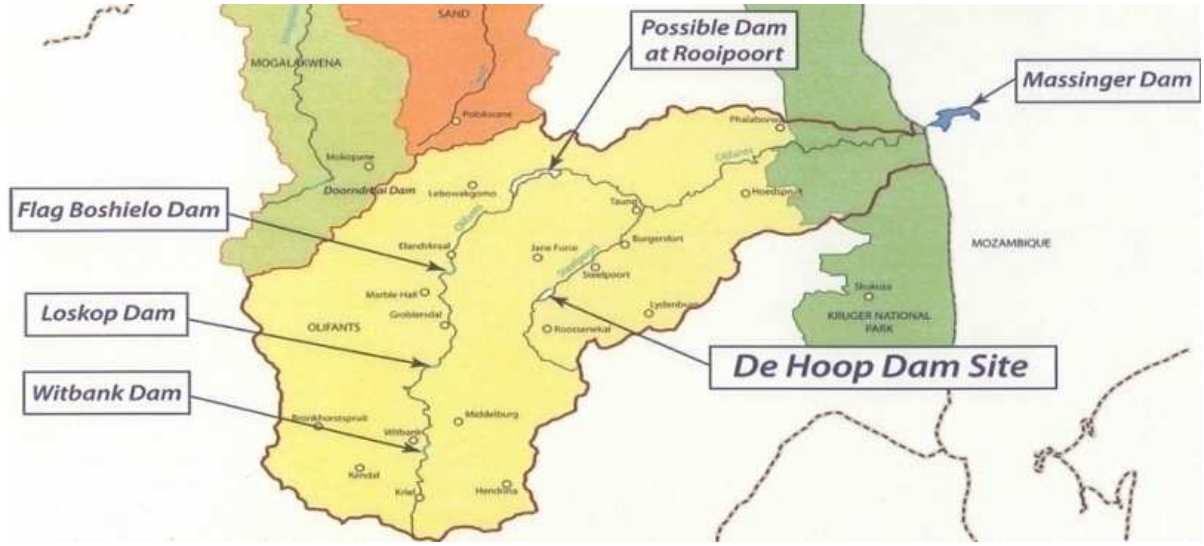

Figure 14: Olifants WMA and Location of the Case Study Region[191]

Water scarcity is an issue of concern across the Province and specifically also in the Sekhukhune District. Aggravated during extended periods of almost no rainfall, in 2004 the area has suffered periods of extreme drought, which increased the hardship of the poorest segment of Sekhukhune's population (GSDM, 2008).

The Olifants is part of the transboundary Limpopo basin; significant proportions of the basin are shared with Mpumalanga province. The coal mining operations described in case study F are located upstream of the platinum mining in the same catchment. Kruger National Park, located downstream on the river, decisively influences water management decisions further upstream. Next to the urban growth centers in Mpumalanga, Witbank and Middleburg, also the Burgersfort and Phalaborwa areas in Limpopo are considered economic growth areas with a projected increase in water use over the coming years (Nditwani, 2008). In terms of water usage by sector, irrigation followed by urban and rural demands is the dominating use (57 % and 13 % respectively for the entire Olifants basin, 83 % and 10 % for the Middle Olifants and the Steelpoort). Power generation (18 % and 0 %) and mining (10 % and 6 %) also require considerable amounts, which leads to the current situation where sectoral water requirements currently surpass the resources available.

Table 21: Water Requirements for the Year 2000 (million m³/year)[192]

Sub Area	Irrigation	Urban	Rural	Mining Industrial	Power	Total	Transfers out
Upper Olifants (Case Study 1)	44	62	6	20	181	314	96
Middle Olifants	336	15	28	13	0	392	3
Steelpoort	69	3	5	17	0	95	0
Lower Olifants	108	7	5	43	0	164	0
Total	557	87	44	93	181	965	8

[191] Maps taken from Nditwani (2008).

[192] National Water Resource Strategy.

Decisive in terms of topographic characteristics influencing water resources management is the fact that a large portion of the population in Sekhukhune resides on a plateau, which is extremely prone to droughts and difficult for water service provision. In addition, most of the large rivers in the Province are located relatively far away from the major development centers, again complicating the provision of services (Nditwani, 2008).
Water delivery to RDP standards remains a considerable challenge in the region. The District has improved access to services below-RDP standards (GSDM, 2008). The situation with regards access to above-RDP standard sanitation is even more critical.

Table 22: Domestic Water Services in Sekhukhune District Municipality

Percentage Connection	Total District	Schools	Clinics
Water Supply above RDP Standard: House Connection, Yard Tap or Community Tap < 200m	23	33	37
Water Supply below RDP Standard: Communal Tap > 200m, Borehole, Tank, Dams and Rivers	77	67	63
Sanitation above RDP Standard: Water treatment work or consumer installation: VIP, Septic tank	2	47	37
Sanitation below RDP Standard: None, Bucket or Pit Latrines	98	53	63

There has been a slight upward trend with regards to the access to water supply and sanitation, particularly in terms of providing access to standpipes in rural areas. This low rate of servicing combined with the high poverty levels in the District results in a situation where almost half of the population does not pay for the service, but receives free basic water. Only seven percent are actually paying a fixed monthly amount for the provision of water services on-site (GSDM, 2008).
The pressure on water supply and sanitation is furthermore likely to increase with the influx of people seeking employment with the mines over the years to come. The necessary expansion of municipal infrastructure will place an additional challenge to already under-capacitated and struggling municipalities.

Furthermore the current water development trajectories (Molle, 2003) must be considered against the historical perspective. Van Koppen (2008) maps out three distinct phases in the development of the Olifants basin during the apartheid period. The systematic dispossession of black water users, which deprived them not only of the access to water, but also to land resources, was mainly targeted at strengthening white farming, while mining operations benefitted as well from additional water allocation. In contrast to massive state support for irrigation however, water provision for the mining sector was mainly self-financed. This situation let to the emergence of a 'White water economy' (Van Koppen, 2008), including massive infrastructure developments (including dams and water transfers) to support farming, mining as well as municipal water needs, however the latter only to a some extent. The water management approach during these years (1970-90) saw the introduction of economic principles, such as the user pays approach and 'realistic price policies' for economically viable users; an approach which further promoted segregation. This situation set the stage for the developments after 1994. With the government seeking to redress inequalities, new approaches were developed that aim for a better cross-sectoral integration of water needs as well as better participation of all actors. Still infrastructure development served as the main approach to securing

water resources in the Olifants basin, while addressing the unequal access to water service described above constitutes one of the key challenges for government. How does the mining business act in this context? The implications of this behavior are discussed in the following sections.

G.7. Business Contributions

The decisive feature of the Limpopo case study is the lesser focus on the operational dimension of platinum mining, but rather on the developmental stage and the potential growth the industry might experience and also bring to the economically deprived province. It is evident for industry as well as government at the local level, that the much desired growth through mining will only occur once sufficient (water) resources can be secured for the mines to operate. Committing to this growth trajectory however brings about the question of the potential positive and negative impacts of the mining industry on communities, specifically with regards to their water situation. The issue of integrating and managing trade-offs between different economic sectors is emerging prominently, most notably between mining, agriculture and tourism. The mining industry has been actively pursuing its interests. The following section frames these activities as a contribution to addressing the water challenges in the region. After a discussion of the respective industry drivers, with a specific focus on government actors, an assessment with regards to the long-term development trajectory of these activities will be undertaken.

G.7.1. **Type and Mode of the Contribution**

In contrast to the other platinum case study, the focus here is less on the activities of individual companies, but rather on different collaborative activities in the context of water management.
Mining activities and their interaction with government and other stakeholders can be narrated in the context of several infrastructure-related initiatives, which are comparable to the Producers' Forum in the Western Limb of the Bushveld Complex.

Compliance, Monitoring & Planning

Although compliance levels could be expected to be similar to those in the North West, investigations by the NGO Benchmarks point to several digressions of mining operations in Limpopo province (Benchmarks, 2008). In addition to several human rights violations (removal of communities by the mining firms in order to vacate land for establishing operations) there is a long record of environmental pollution incidences, affecting air and also water quality, which can be related back to the mining industry. The report also re-emphasizes the enormous amounts of water used by mining operation as well as pollution impacts originating from mine tailings dams. The report differentiates between impacts occurring during the different phases of mining operations and highlights that impacts during explorations are hardly ever taken into account, while significant nevertheless. In this context, smaller start-up ventures are mentioned, which are considerably less inclined to follow environmental and social standards than larger companies (Benchmarks, 2008).
Owing to the many problems encountered in the ramp-up phase of a mining project, the compliance level thus can be considered to be somewhat lower than in the North-West case. This might also be related to monitoring systems just being set-up.
On the other hand internal planning as well as at the watershed level is quite sophisticated in this case study as well. This can be explained by the mere necessity for the mine to secure access to sufficient water resources as well as the need to use it efficiently on-site (Bierman, 2008). Planning is also of relevance for the infrastructure-related contributions addressed in the following section.

Infrastructure Development/Finance & Capacity

Given the overall problem context outlined above, the focus of corporate contributions is placed on the areas of infrastructure development, financing as well as capacity-building. These issues are often addressed conjointly under the framework of industry collectives or partnerships, which are described in more detail below.

A notable initiative is the *Steelpoort Valley Producers Forum* (SPF), which was established in 2002 and currently has about 15 mines as members, including various operations of Anglo Platinum (Lebowa mine), Implats (Marula mine), Xstrata and Eastplats. The SPF is a platform to discuss the interests of the mining operations in the area in terms of putting those infrastructure features in place necessary to enable mining in the Greater Tubatse area.

In addressing these challenges mines liaise with a number of governmental stakeholders in order to align their own interests with the development needs in the area, such as spelled out by provincial growth and development plans, IDPs of the affected municipalities (e.g. Greater Tubatse Local Municipality) as well as water-related planning at Greater Sekhukhune District Municipality (GSDM, 2008). The following figure displays the interaction currently managed by the SPF. The relationships with communities and traditional authorities are not addressed by the SPF, but remain at the discretion of the individual companies (Nkadimeng & Mabunda, 2008).

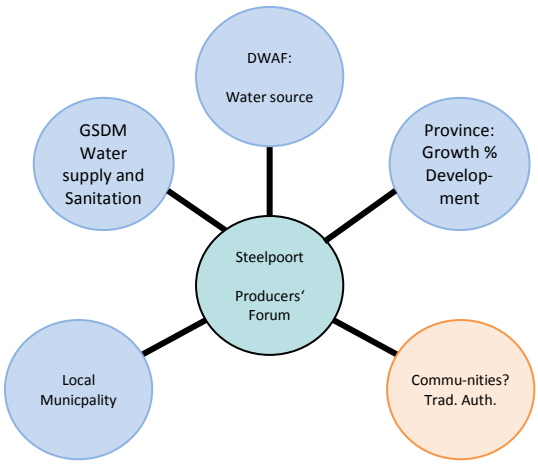

Figure 15: Steelpoort Producers' Forum and Stakeholder Relations

In terms of concrete activities, the SPF promotes infrastructure development in the areas of water, roads and electricity in order to enable mining development from a production perspective as well as with regards to the creation of supporting municipal structures in the Sekhukhune District (Lourens, 2008a). In acknowledging this the 'common ground' in terms of development needs, the SPF has also identified the need for capacity-building and assistance, specifically for local municipalities in order to improve their ability to 'deliver'. Capacity-building measures focus on project and contract management and have addressed budgeting issues, risk management and project evaluation. To date more than 200 training lessons in these subjects have been provided by the SPF for municipal project

managers. In addition to capacity-building the SPF also provides direct municipal assistance in the form of external experts focusing on municipal infrastructure finance and engineering aspects, specifically with view to water supply operations (Lourens, 2008a).

In addition to these activities, which are directed at fostering the overall developmental potential in the region, the SPF also pursued the formation of the *Olifants River Joint Water Forum*, which is a partnership between mining houses, the Department for Water Affairs and Forestry and its implementing engineering unit the TCTA[193]. At the core of the activities of the Joint Water Forum is the development of bulk water infrastructure, in order to secure long-term access to water resources for mining activities in the area. This type of access also constitutes a prerequisite for obtaining mining licenses for new and existing operations.
Efforts by the mines and subsequent negotiations with DWAF have resulted in the signing of a Memorandum of Agreement with the national government in early 2008. The Memorandum administers the modalities concerning the construction of a 4.7 Rand billion dam on the Steelpoort River (De Hoop dam[194]), which is expected to provide water to the mining operations as well as around 800,000 people on the Nebo plateau in Sekhukhune District (Van Vuuren, 2008). Similar to the pipeline project in the North West Province, the specific contribution by the mining industry is rather subtle and considerably complex.

It is useful to trace the process leading up to the Memorandum in order to obtain a better understanding of the contribution.
In the first instance, the financial model developed by DWAF concerning the feasibility of dam construction and maintenance was considered inacceptable by the mining houses. DWAF approached mines individually for off-take agreements, and expected the mines to contribute about 60 % of construction costs. The mining houses, most of which were still in the exploration or pre-feasibility phase, were not willing to commit to off-take agreements at that point in time, due to the uncertainties inherent to their operations. In this impasse situation the *Joint Water Forum* was formed with the goal of taking negations to a different context (Lourens, 2008a). The Memorandum of Agreement resulting from JWF activities establishes commitments for both, national government as well as the mines. On the one hand it confirms the government's (i.e. DWAF's) intent to supply water to the mines; on the other hand it binds the mines to off-take agreements on a take-or pay basis. This obligates the mines to pay for the allocated amount of water irrespective of whether they will actually take the water eventually provided by the dam or not. Due to these off-take agreements, the project becomes bankable so that funding can be secured from private sources in addition to the share provided by government. While the project foresees the installment of new bulk infrastructure servicing the mines as well as municipal areas, the local water services authorities are responsible for putting in the necessary reticulation infrastructure (Van Vuuren, 2008).
With the signing of the first off-take agreements, the construction of the dam has been commenced in early 2008 and is projected to be completed by 2010/2011, while pipelines and ancillary infrastructure is due for completion over a ten-year period. There is however, substantial uncertainty

[193] Trans-Caledon Tunnel Authority is the implementing agency for water infrastructure projects in South Africa, named after its initial project, the management of the Lesotho Highlands Project.

[194] The decision to build the dam goes back to a decision by the South African government about the continuation of the Olifants River Water Resources Development Project (ORWRDP) in mid-2004 through the implementation of Phase 2, i.e. the construction of the dam and the associated bulk distribution components.

attached to the contribution of the mines, which might falter if exploration proves that the ore deposits are unfeasible or an overall economic downturn as experienced in 2008 recurs (Pegram et al., 2009b).

To summarize, the contribution of business actors to addressing the water challenges in the Limpopo province revolves around infrastructure development designed to improve water availability for corporate actors. The industry's contributions also intend to and are likely to also positively impact the situation of municipalities and communities, which are currently lacking access to water services. As in the case of platinum mining in the North West province, the contribution of business actors consists of **leveraging financial** resources for the construction of the infrastructure. Take-off agreements by the mining firms are considered a main financial incentive for securing private capital necessary to finance construction of water infrastructure. This is taking place in the context of cross-sectoral partnerships, where mining firms collaborate with national, provincial and local government on developing mutually acceptable solutions.
In the context of these platform activities, firms also become involved in extensive planning activities with regards to water infrastructure development. When discussing the contribution of corporate actors to solve the water challenge, one needs to take into consideration however, that the bulk infrastructure is only one, yet decisive, component. Additional infrastructure for reticulation remains in the responsibility of the government. Strengthening government at the local level by making technological and managerial expertise available should thus also be considered as a further contribution.
At the same time it needs to be considered that the construction of dams and the specific role of mining firms, but also the South African government are subject to considerable criticism. This aspect will be addressed in the assessment of long-term dynamics.

G.8. Drivers

The following driver categories are of particular relevance in this case: resource-based factors, normative, government-related drivers and the potential impact of social drivers.

G.8.1. **Resource-based Factors**

Business activities in terms of bulk water infrastructure are clearly determined by resource constraints and the interest to secure water access for projected production in the area. This is the foremost motivation for businesses to become involved in the initiatives and partnerships (Bierman, 2008; Olivier, 2008; Townsend, 2008). An important component in this regard is also the mere absence of appropriate infrastructure, which would support the efficient exploitation of the platinum resources available (Smith, Da Lomba, & Andersen, 2008).
The mines furthermore dispose of the necessary technical capacity to become involved in large-scale infrastructure projects due to their previous involvement with similar undertakings in other regions as well as the overall capital-intensity of the mining industry.

G.8.2. **Normative Drivers/Industry Pressure**

Apart from mere business-related considerations, there also seems to be the implicit perception among business, that there is an obligation to complement the developmental role government seeks to play in this province. Given the harsh backlogs in this region, again the historically close

relationships between (mining) business and government seem to play out in this context and business is taking on the responsibility to integrate industrial infrastructure development needs and those requirements formulated by the municipalities (Smith et al., 2008). These processes and considerations constitute a very strong normative driver beyond what is required by regulation.
This approach is also reflecting initiatives and recommendations issues by the ICMM, which however constitute a background component of firms' motivations.
In addition, similarly to the North West case, the brokering initiative by the World Economic Forum also sought to increase the momentum of the Joint Water Forum through actively bringing together relevant actors on the corporate as well as the municipal side. Supported by South African consultants, the WEF was able to showcase and highlight some of the efforts and best practices in the area. The overall success of this international initiative however was quite limited. While corporate actors became interested in the process, it could not assist with bridging the gap in communication with local government (Paxinos, 2008).

G.8.3. **Government Drivers**

The following factors could be identified as drivers at the various levels of government.

At the ***national level***, mandating is an important factor. As in the North West Case, new mining legislation, such as the MPRDA, requires heightened responsibility on the side of mining firms to community needs, in order to achieve a conversion of old mining rights into new mining rights. Stipulations with regards to Social and Labor Plans have also led to an increased awareness among corporate actors to the needs of neighboring municipalities. What is noticeable in this case is that in terms of mandating, mining regulation play a more important role than water-related-legislation.
Other roles of national government become evident, when considering the involvement of different government portfolios in the set-up of development partnerships and specifically in the process leading up to the Memorandum of the Agreement for the De Hoop dam.
In terms of the cross-sectoral partnerships the facilitative role of DWAF is considered as largely conducive to the collaborative effort and even instrumental to the successes achieved thus far (Kleyngeld, 2008). The role is similar to the DME and its supportive behavior vis-à-vis the industry. DWAF however rather seeks to fulfill its mandate through actively pursuing a partnership approach to leverage the buy-in of the mining industry to costly infrastructure projects (Van Zyl, 2008).
The process preceding the construction of the De Hoop dam however, demonstrates conflicting views and leverages of different government departments, which individually, but also in combination sent different signals to corporate actors. Conflicts unfolded specifically between DWAF and DEAT (Couzens & Dent, 2006). DWAF acted as the entity charged with improving water services for communities and responsible for providing sufficient water to key industries. In fulfilling the latter task(s) DWAF took on planning activities for improving water infrastructure, including the construction of a dam and liaised with the mining industry regarding their needs.
DEAT on the other hand was taking on the role of a regulator, responsible for the NEMA-authorization necessary of DWAF's initial plan to build the dam[195]. The authorization was provided; the approval documents however revealed that the decision was based on environmental impact reports, management plans and assessments undertaken by a range of institutions, while excluding

[195] The authorization was granted through a Record of Decision issued in November 2005.

the position of main critics, such as SANParks[196] pertaining to ecosystem destruction[197]. The DEAT statement also did not make any reference to the mining industry as one of the key recipients of water provided by the dam, but exclusively spoke about the water needs of previously disadvantaged communities. This was in stark contrast with DWAF announcements referring to supplying water for social and economic development in the Olifants catchment. The approval was appealed on the grounds of these conflicting positions[198], which led to a revised decision. This new decision in essence foresaw stronger oversight from the side of DEAT of DWAF's plans through environmental management plans, a "coordinating authorities" committee and better inclusion of stakeholder concerns in future planning and implementation steps. At the same time, the revised decision was also synonymous with the final approval of dam construction. While for critics the stale taste of a *fait accompli* remains, it has been argued that environmental concerns have been given additional attention through this process (Couzens et al., 2006). This inability to coordinate positions and adequately consult stakeholder must be considered a considerable weakness of national government. Firms react to these regulatory uncertainties in multiple ways, for example by seeking alliances with those government departments apparently most supportive of their cause. In addition, they react by forming collaborative industry platforms in order shape a common position in negotiating with the different government portfolios.

Provincial government plays a driving role as the key planning authority with regards to economic development and infrastructure planning in Limpopo Province. Growth and development strategies are spelled out in the respective Provincial Strategies (Limpopo Province, 2005). Reflecting national development frameworks, such as for example the Accelerated and Shared Growth Initiative for South Africa (AsgiSA), the Strategy establishes focus areas for economic growth in the region and defines the respective developmental agenda. These provisions set the broader context for corporate engagement with developmental issues including water (Smith et al., 2008). They are more specific than national provisions, but at the same time also aim to guide activities at the local level.

At the ***local level***, municipalities on the other hand constitute a very weak component of government as they lack the financial, human resources as well as distributive capacity to tackle their constitutional mandate. While respective challenges have been outlined before, the situation is particularly problematic in the case study area due to the following reasons.
Sekhukhune District Municipality as an overarching administrative entity has only been established in 2000. The District looks back at a moved history and is currently undergoing a transition from formerly separate 'white' urban areas and black homelands to new administrative structures (Nkadimeng et al., 2008). The lack of integration between the two formerly different administrative units, their varying tasks, human as well as financial resources are still visible as the District Municipality attempts to grapple with the daunting development tasks in this region. Also, formerly contradictive practices in terms of integrating traditional leaders constitute main challenges for municipal administrative structures. Problems are aggravated by the fact that formerly a cross-

[196] South African National Park Service.

[197] As Couzens et al. (2006) show, the Decision issued by DEAT thus was not based on sound assessments of different interests, but consisted of a collection of rather imprecise statements.

[198] The main proponent of this appeal was SANParks, whose appeal however was rendered unconstitutional on the grounds of procedural issues.

border municipality (Limpopo and Mpumalanga) the district's boundaries were redrawn in 2006, leading to some tensions regarding the incorporation with Limpopo province.

According to the data provided by the National Treasury (2005), all local municipalities in the Sekhukhune District spent less than 500 SA Rand per resident and year[199]. Makhuduthamaga even ranked as the poorest municipality in all of South Africa, with an average expenditure of around 150 Rand per resident. While these figures mainly reflect the limited financial viability of the municipalities, they also allow for deriving further conclusions regarding other performance areas (Magketla, 2007).

The stark capacity limits at the municipal level are also reflected by the fact that not the individual local municipalities were designated water services authorities, but rather this mandate was combined at the district level. In fulfilling this function, the District has prepared a Water Services Development Plan and undertaken necessary steps under 'Section 78' of the Municipal Systems Act (DPLG, 2000) to fully serve as a Water Services Unit (GSDM, 2008). While this reflects the intention of the District, it becomes evident from interviews and review of additional documents, that the District administration is still very much dependent on funding, intervention and guidance from national government departments.

Deficits also become evident with regards to the interaction with the mining houses. Communication between the District and the mines is described as difficult by representatives of both sides. On the other hand, the impression emerged that there actually is very little consultation with the municipalities regarding issues related to mining activity in the area.

Nevertheless, the deficits with local government constitute one of the main drivers for business to become involved in addressing developmental challenges, including access to water. This pertains to the delivery of services, respectively a contribution to the necessary infrastructure, and also capacity-building measures at the municipal level. While the engagement of firms for these issues can be viewed as beneficial for the most part, it may also bear the danger of instrumentalization and capture, i.e. cases where government agencies are co-opted to support the interest of corporate actors. In cases, where the linkage to communities is not effectively established, this is a veritable threat (see discussion of long-term dynamics).

G.8.4. **Social Drivers**

Other actors that might play a role as business drivers include communities as well as national and international NGOs. Both groups have demonstrated their disapproval of corporate, but also government activities in the past. They thus contributed to an overall sensitization of these actors, which in the long-run might lead to more responsible behavior in the Limpopo case as well. Since the actual outcome of the water infrastructure development project in this case has not yet been decided, it is only possible to infer from previous stakeholder activities in similar cases.

With regards to community interaction, particularly traditional authorities are expected to be of crucial importance. On the other hand, the integration of traditional leaders will crucially depend on the ability of government to cooperate with them.

Community criticism is often based on the negative track record of the mines in terms of considering the water needs of communities. A much quoted example is the case of the so-called Lebalelo Trust pipeline, which is taking water from the Olifants system and was built to supply mining operations in

[199] This compares to an expenditure of more than 3500 SA Rand per resident in the wealthiest municipalities in the Western Cape.

the area without taking into consideration the needs of nearby villages. Water was distributed to the mines, while pipelines were running untapped past neighboring communities (Nkadimeng et al., 2008; Townsend, 2008). Negotiations are currently underway as to how water could be provided to communities. The issue of payment for these water services effectively provided by the mines frequently comes up in this context. It gives rise to the debate on the commodification of water resources through the schemes put up by the mines, which finds attention among the national and international NGO community (Bond, 2009).

A further case, gaining high visibility among the NGO community is the case of Anglo Platinum's PPRust operations near Mokopane in the central part of the Bushveld Complex. In 2008, ActionAid claimed that the firm was responsible for nitrate pollution of surface water, suspected to have negative impacts on the rural community and their farming activities. Further criticism related to the relocation practices near the mining operation, which were conducted in an unfair manner and led to the cut-off of water supply for those residents who resisted relocation (Benchmarks, 2008). The report led to a major dispute between Anglo Platinum dismissing the criticism and local communities insisting on the massive environmental impacts and human rights violations in the area (ActionAid, 2008). Farrell, Mackres, & Hamann (2009) analyze this interaction, which eventually resulted in the involvement of the South African Human Rights Commission, and emphasize the weakness on the part of Anglo Platinum in terms of successfully integrating the full range of community stakeholders. The massive reputational losses originating from this case are likely to determine Anglo Platinum's behavior with regards to other interactions with local communities.

The De Hoop Dam development is only one of about 20 planned infrastructure projects in the Limpopo province, which often involve problematic community interaction (Van Rooyen, 2008). One of these projects involves the construction of the Richmond Dam, which is supposed to provide water to Anglo Platinum's Der Brochen operations[200]. The project is already meeting massive protests, originating from the local Ga Mawela community. The community fears negative impacts on the land for which it won a land claim in 2006 after a lengthy legal process. Anglo Platinum plans to own and operate the dam and has completed an Environmental Impact Assessment. The community has lodged a statement against the construction on the grounds of unwanted consequences for local agriculture and the development of tourism activities. Anglo Platinum has offered compensation for the flooded land and also to pay for adjustment measures around the newly created dam. The community however, refuses to accept this unsolicited offer, also referring to the perceived reckless behavior of the mine (Venter, 2008). While the community does not completely condemn mining in the area, it criticizes the approach taken by Anglo Platinum in this matter and requires to be treated as equal partner. Anglo Platinum on the other hand claims to have followed the regulations and attempted to respond to the community's needs. With the parties locked in a struggle, which is expected to end in court, this case raises questions about the role of traditional communities in determining mining behavior. The ways companies address criticism and the question whether they are actually capable of learning from previous experiences are also under close scrutiny.

[200] This dam is partly constructed as a mitigation measure for the delayed construction of De Hoop dam and partly to anticipate over-allocation expected for De Hoop by 2020.

G.9. Case Study Summary and Comparison with the North West Case

G.9.1. **Contributions**

The example of platinum mining in the Limpopo showcases some of the aspects inherent to the challenges of sustainable development as seen through the lens of water management and the specific role of corporate actors. There are several related and at times contesting interests and priorities. In the first place, there is a strong interest to increase and stabilize economic development to redress historical inequalities and to provide a basis for accelerated growth and thus much needed employment. An important aspect of this development is improved access to services, including water.

Industry, and specifically platinum mining, is expected to play a pivotal role as driver of economic development. At the same time this development is crucially dependent on the availability of water resources, which puts industrial uses in competition to other water uses. Opportunities for a corporate contribution to addressing the water challenge in the region emerge at this interface. At the same time, the situation also bears the danger that companies will use their competitive and economic strength to pursue their own cause at the expense of other interests.

Looking at the concrete contribution of the mining industry in the Limpopo case relating to the analytical framework suggested in this thesis, this entails the development and financing of bulk water infrastructure (i.e. dam construction), which is expected to serve the mining industry as well as other water users (i.e. municipalities) in the long-run. A further contribution pertains to capacity-building activities at the municipal government level, which is expected to increase the municipalities' ability to address key development challenges. Drivers will be discussed in direct comparison with the situation in the North-West Province (see section G.9.3).

G.9.2. **Long-term Dynamics**

In the first place, the contributions are vested with a considerable amount of uncertainty. As the construction of the dam is currently underway, it is not clear whether the benefits will be reaped by the communities as planned. While the mines are likely to secure their share of the water, the provision of services to municipalities is subject to further infrastructure development, which is only slowly unfolding.

Further uncertainties derive from a lack of integration with other water uses. This is for example demonstrated by protests arising in the context of the De Hoop dam construction among NGOs (e.g. the South African Water Caucus), but also more conservation-oriented stakeholders and government agencies, such as the South African National Parks Service. The latter as the custodian of the downstream Kruger National Park points to the massive potential negative environmental impacts of the dam. One of the main concerns relates to the impacts of the dam on the river ecosystem of the Olifants River, which had been impacted by limited water availability for quite some time. In addition, further environment-, social-, health- and safety-related impacts are expected in the wake of massive economic development; such as the influx of employment seekers and related problems, as experienced in other mining areas before. De Hoop also gives reason to international tensions, with Mozambican NGOs criticizing to the lack of international consultations regarding the potential damage to ecosystems across the border. In addition, criticism was launched in the context of the findings of the World Commission on Dams, which hint to some of the shortcomings and problems to be expected in the context of large scale water infrastructure projects, such as the drying up of

financial means during construction, adverse impacts on neighboring communities and re-settlement (Roelf, 2006). Conservational concerns are also voiced by the tourism industry, opposing the destruction of the ecological heritage and thus the considerable potential for tourism in the region. Farmers, including large scale and subsistence farms, also expect to be negatively impacted by the mining development and specifically the large dam project (De Lange et al., 2005).

Governance-related concerns strongly emerge with regards to the interaction of corporate actors and municipalities. Corporate actors often find themselves faced with the necessity of taking over municipal functions; at the same time they provide local government with experts in order to improve collaboration as well as municipal management processes. For some critics, these activities are straddling the line between capacity-building and agency capture either through direct or indirect influence as firms are easily put in a position to influence decision-making processes at the local level.

A broader concern revolves around the potential commodification of water resources in the context of infrastructure projects, which are driven by corporate interests. There is the fear among local communities that potentially unaffordable charges will be levied to recover the costs for infrastructure development (Benchmarks, 2008).

In this context also the repercussions with regards to national government need to be discussed. National government has been playing an instrumental role in planning and developing the project and liaising with the mining firms to facilitate their involvement. The criticism launched in the context of the dam construction is as much directed at national government as at the mining firms. The close collaboration between government and industry in developing water resources might also be construed as a once again too close entrenchment of these actors, especially against the background of historic legacies. This might impair government's ability to regulate business with view to negative impacts.

In assessing the corporate contribution, a valid question that emerges is whether industry is truly considering existing water challenges and thus developing strategies to address them or whether industry resorts to common, 'traditional' behavior and takes advantage of its often close relationship to government, thus utilizing those government departments, which would purport its interests.

In this context, the relevance of appropriate drivers for encouraging sustainable corporate behavior becomes evident. In addressing the question 'What does it take?' the gaps in the Limpopo case point to the following answer. There is the need for a strong regulator, which is in concordance with its own regulations (Couzens et al., 2006) and disposes of capacitated counterparts at the local level. In addition, liaison with communities and other affected stakeholders on the part of government as well as business also appears to be of crucial relevance. A further element, which can only be taken up by government drivers to some extent is the issue of learning from previous experiences and interactions. Given a true interest in promoting sustainable development, companies would learn from previous cases, such as the North West or De Hoop, in order to adapt behavior for future cases, such as the Richmond Dam. Against this background, a one on one comparison with the North-West case study is warranted.

G.9.3. **Comparison**

A comparison between the two platinum cases is useful for the following reasons. Next to similarities with view to the commodity mined as well as some overlaps with regards to industry structure and

active companies, both regions are faced with somewhat water problems and comparable infrastructure-based solutions to address these. In addition, similar modes of interaction have been chosen by the industry actors. These higher similarities allow for a more in-depth analysis of the decisive drivers, which also have their implications for long-term trajectories.

In the North West case providing water to industries is definitely a key driver. At the same time freeing up more potable water for communities is an equally important aspect, thus pronouncing the mutual dependence and the importance of the community contribution. In the Limpopo province on the contrary, the dominant driver is to build infrastructure to provide water to the mines in order to allow for a ramping up of platinum production. Getting water to the mines is the key incentive for all activities. The water and development needs of the communities in the area are acknowledged by the companies as well. This need cannot be neglected entirely due to national regulation in place, but also due to the evident development deficits in the region, which constitute additional, however somewhat weaker drivers, as they are second place to the interest of industry development (Bierman, 2008).

This can be related to the relative weakness of government at the local level in the Limpopo case and the magnitude of developmental challenges in the region. In contrast to the situation in the North West case, there is also less feedback from the local government level. This leaves leeway for mines to use their economic leverage for driving development according to their interests (Smith et al., 2008).

While there is not much variation in terms of the contributions to addressing the water challenge under current conditions, when considering long-term trajectories differences could be identified between the two cases.

In terms of the consideration and integration of different water uses, the situation in the North West is currently more favorable in this regard. This is mostly due to a better interaction and cooperation with local government and a relatively good adherence to provisions stipulated in the IDPs. It must be considered however that this interaction it is far from optimal. The question remains, whether all potential water users have been taken into consideration and a link has been established to other potential stressors on water, i.e. pollution impacts. While this degree of integration across different water uses still needs to be achieved, company structures are often not supportive of this integration, as water quantity and quality issues are usually handled by different and often poorly coordinated corporate departments. This situation is however often reflecting the lack of coordination within and among national and local government.

In the Limpopo case, the situation is even more problematic, as massive power imbalances between mines and local government lead to a predominance of corporate interests. It is highly unlikely that an equitable distribution to all possible uses, such as communities, tourism and agriculture will be achieved. This tendency is for example epitomized by the almost exclusive concentration on the issue of water supply versus other water-related challenges such as access to sanitation. Thus, overall the outcome in terms of improving equitable access and the ‘right to water’ remain unclear and highly uncertain.

Overall, there is a considerable uncertainty with regards to the potential benefits of the infrastructure developments underway. These are probably higher in the Limpopo case, as the North West province has been subject to industrial transformation processes for a longer time. Irrespective of the expected or unexpected outcomes, industrial development in the mining sector significantly

influences and determines future growth and development trajectories in both regions. Massive path dependencies and lock-in situations are created in terms of water management options for the sake of securing or promoting economic development in the short term (Ashton et al., 2008a). These measures might create a sense of false security other more flexible and thus recommendable development strategies are largely ignored.

On the other hand, it should be noted however that in light of the considerable needs for infrastructure improvements in Limpopo province, the involvement of mines in developing and financing this infrastructure is an opportunity that, if used intelligently, can be leveraged towards water for growth and development and the alleviation of persisting backlogs and inequalities in terms of services delivery.

Again it boils down to the role of government and how it interacts with business at different levels. National government has established checks and balances in order to provide for water resources development along a sustainable trajectory. A collaborative approach has then been chosen as the preferred mode of interaction with the mining industry in both regions to leverage a contribution. Due to the differences in capacity to engage with corporate actors at the local level, the benefit of this interaction remains somewhat debatable in the Limpopo province. While the interaction points to mutual learning processes in the North West case, the situation in the Limpopo case is rather characterized by a dominating role of corporate interests, which leaves only little room for the joint development of mutually beneficial water management options.

H. Analysis and Synthesis

This chapter views the four different cases in synopsis, derives commonalities as well as differences with view to the research questions posed in the introductory sections of this thesis. In addition, it will be discussed to what extent lessons can be drawn from the current research design to cases beyond the South African and mining context.

Specifically, the analysis will be conducted in the following manner. Building on the 'within-case analyses' performed in the previous case study section, this chapter attempts a cross-case analysis as suggested by George and Bennet (2005). This analysis is guided by the categories introduced by the analytical framework, the preliminary model and the respective research questions derived. In addition to a comprehensive cross-case analysis, pair analyses of interesting case pairs are used in order to identify emerging relationships, interactions, drivers and distinct patterns. These are cross-checked with the data as well as with insights from literature.

This process serves the purpose of revisiting and revalidating the model created on the basis of the literature reviewed and to modify it where necessary in order to represent the specific situation encountered in the context of the case studies, but also to derive more general lessons with regards to the mechanisms observed in terms of the interaction of business and government in addressing the water challenge (Eisenhardt, 1989).

H.1. Summarizing Overview of Empirical Findings

In order to illustrate the relatively complex model developed based on the literature reviewed, the universe of cases chosen aimed to allow for the investigation of several distinct factors, while keeping some of the key determinants constant. This section provides a broad overview of the findings of each case study and thus serves as the basis for a more detailed analysis in the following sections.

Background Setting

The individual case studies have to be viewed against the background of the context variables, i.e. the selection of South Africa as the country case study and the emphasis on the mining sector as the industry setting.

To reiterate, South Africa as a case study country is faced with several distinct challenges with view to sustainable development. These derive from the specifics of South African history, such as the need to effect economic growth in order to redress inequalities incurred during apartheid. A further aspect is the mandate to grant equal access to services, which has been formulated as one of the main tasks of government. As for the environmental dimension, South Africa displays a relatively high degree of industrialization, which has lead to the emergence of pollution hot spots (cf. Chapter D).

Specifically focusing on water, the country is confronted with a water challenge of relative severity, which is expected to worsen over the years to come due to the impacts of climate change (Ashton et al., 2008a). The water challenge is directly connected to the broader sustainability challenges outlined above in that water constitutes an important input variable for economic growth, a central element of the service delivery 'promise' made by the South African government and last but not least a crucial natural resource.

At the same time, South Africa is a state, which devises of advanced legislation, particularly with regards to water and water services management, and also in terms of the regulation of industrial

impacts on natural resources as well as social matters, particularly with regards to the mining industry. When it comes to implementation however, the state is still struggling, particularly from a local government perspective. Managerial capacity, leadership skills as well as political will are often the most critical gaps at the local level, while there are regional variations in this regard. At the national level coordination among government portfolios and conflicting political agendas are the most problematic aspects.

The mining industry has been chosen as the focus industry sector for investigation. In the first place, this sector has a very negative track record in terms of water management. Typical impacts are massive water pollution during production, but also post closure, alterations of surface and subsurface water flows as well as general impacts on the natural environment, which also have repercussions for water management (cf. Ashton et al., 2001). Furthermore, the mining industry has been accused for being responsible for unequal water allocation patterns and general over-abstraction of the resource. Largely unregulated and heavily promoted before and during apartheid, the mining industry thus has left a considerable footprint on the South African water environment (cf. Section D). As mentioned above however, the legislative framework has changed considerably in this regard. Particularly with the introduction of the MPRDA, the mining industry is faced with a complex piece of legislation, seeking to regulate not only operational aspects of the industry, but also its relationship with the surrounding communities as well as more broadly the industry's relation to sustainable development in the South African context.

At the international level, the current discourse on business' responsibility for environment and development is to some extent following the same rationale. Especially with regards to improving services, business and particularly the mining industry is viewed as a possible contributor to sustainable development trajectories (Graulau, 2008), as it has the potential to aid in building municipal infrastructure due to the technical expertise available within many large firms. At the same time, the legitimacy of the industry increasingly depends on the contribution it can make to development above and beyond the actual time of operation. A 'no- harm' approach with regards to the environment is often considered the basis for these efforts.

Individual Cases

Within this industry, cases in four mining regions in South Africa have been selected to illustrate different types of interactions in order to revalidate the proposed model. Following the logic of a "Most different systems" design, cases were selected to represent considerably different variations of the overall South Africa mining set-up in terms of the respective characteristics of the commodity mined as well as the capacity level of government in the four selected provinces.

While thus most of the context and independent variables display some variation, it is the goal to identify those factors that a decisive in determining the outcome, i.e. the contribution of business actors to sustainable water management. In a backward looking research design, the respective drivers leading to these manifestations are then identified.

The following paragraphs provide for a summary description of the main characteristics and results of the four case studies investigated. In addition to key sector characteristics and main water challenges, firms' contributions to sustainable water management, including the mode of interaction and long-term perspective, and the respective drivers are presented.

Case 1: Gold mining in the Witwatersrand in the Gauteng Province

Gold mining represents an industry, which is faced with issues related to the closure and less with the operation of mines (Coetzee, 2008). At the same time, gold mining has been the building block of the South African economy and continues to be a significant commodity in the South African mining industry.

Gold mining, whether still in operation or post-closure, continues to have major repercussions in terms of social and environmental impacts. Of major concern is water pollution due to acid mine drainage and in other cases radio-nuclides, which is considered to pose major risks to those living in close proximity to the mines but also to the status of water resources in South Africa as a whole.

As many companies have stopped operations, mines have been transferred to other owners and companies have merged, the identification of responsible parties is one aspect of the problem. Those companies still in operation in some cases do not have the financial stability to adequately address occurring problems.

Within this region, the analysis focuses on five companies, of varying sizes, ranging from large international players, large South African to smaller companies. All of the companies considered have some exposure to water issues to a greater or lesser extent and engage in some form of activity. In terms of government representatives, national departments play a more decisive role rather than the municipal level. Overall government capacity in this province is considered relatively high in comparison to the other cases.

The **contribution** in this case consists of compliance with government regulations (issued in the form of directives) as well as technology-oriented solutions for the treatment of (historically) contaminated water, which will exempt companies from future liabilities.

In terms of the prevailing **mode** of interaction, recently firms have begun to collaborate in industry collectives, but also in the in multi-stakeholder platforms. However, compared to the other case studies, activities - if at all - on the individual basis are still more common in this case study.

Following **drivers** have turned out to be decisive; next to the threat of compliance enforcement by government, the saliency of the issue due to the near catastrophic conditions and pressure from local, but internationally-linked activists were most relevant. At the same time however, government's mandatory approach was augmented by a more collaboration-oriented strategy, aiming to nurture emerging corporate initiatives. These were initiated by larger companies, which are automatically under more public scrutiny, but also smaller, more innovation-oriented firms looking to craft a business opportunity from the water challenges. This case demonstrates that in dealing with large scale regional water pollution problems, strong guidance by national government and thus a strong shadow of hierarchy is crucial in order to achieve some buy-in by those companies still operating in the area. The companies, although for the most part subscribing to international sustainability standards, have been following a rather reactive approach, which has recently been turned into a more opportunity-led strategy, directed at the treatment of polluted water at a large scale.

Case 2: Coal mining in the Mpumalanga Highveld

Coal mining is a relatively stable and currently well-established mining sector, albeit faced with numerous challenges due to discourses in other policy fields (e.g. climate and energy) (Coetzee, 2008),.

In terms of issues addressed, this case study combines the mitigation of water pollution with a water supply component. Analyzed are three companies, two of them subsidiaries of mining multinationals, one of them an emerging BEE[201] company, which play different roles with regards to water management challenges. Several government levels, municipal and national are of relevance in this case study. The capacity level can be considered 'medium' in comparison with the situation in the other cases.

The **contribution** in this case consisted of the development and financing of a significant technological innovation in the area of acid mine water management. Furthermore, firms aimed to improve water efficiency and internal planning. Additionally, water reclamation was combined with a partnership approach, which was targeted at supporting municipal water supply.

In terms of the **mode** of interaction, firms collaborated in the context of some major initiatives, but also engaged in activities on an individual basis. Multi-stakeholder platforms are only slowly emerging as infrastructure projects are becoming more common.

In addition to the shadow of hierarchy which existed in terms of mitigating pollution impacts, the ability of municipalities to cooperate proved to be a crucial **driver** (or motivating factor) in this case. The municipalities in this case dispose of sufficient know-how and leadership capacity to successfully liaise with business actors. Thus a combination of regulatory pressure from the national level and a collaborative approach at the local level in this case led to a positive outcome. At the same time, the case also demonstrates that government needs to continue in these roles in order to provide for a long-term perspective of the business initiative.

The case study demonstrates the innovative potential - in terms of the development of water reclamation technologies – vested in large international corporations. Companies, faced with potentially more strict regulation and possibly the enforcement thereof – embarked on a relatively costly, collaborative project to determine pollution sources, regional water allocation patterns and impact routes and cooperated with local and international science and technology providers to develop top-of-the-line water reclamation technology. At the same time, they successfully liaised with the local municipality to augment locally strained water-supply schemes with treated water.

Case 3: Platinum mining in the Western Limb of the Bushveld complex in the North West Province

Platinum mining represents a growing mining sector, with high impact and high expectations in terms of future growth (Coetzee, 2008). The water challenge is mostly related to water scarcity, access to water and infrastructure development. The companies considered in this case study are three large mining firms and one emerging firm. In terms of government actors, municipalities feature prominently, while national and provincial levels play 'supportive' roles. Local government capacity is somewhat comparable to the level found in Mpumalanga province.

Business' **contribution** (and **mode**s of interaction) in his case involves the creation of collaborative efforts (and later cross-sector partnerships), pertaining to planning and financial support for water infrastructure development as well as capacity-building for local municipalities in this regard.

Next to resource **drivers,** the salience of the water issue, but also the regulative, cooperative and facilitative roles of government were the most decisive factors.

Driven by the risk of resource constraints, but increasingly also in view of developmental challenges in the region, corporate actors, in addition to maintaining a relatively high performance level in terms

[201] BEE: Black Economic Empowerment: Government-led program in South Africa in order to enhance access of black South Africans to the first economy.

of environmental impacts, have convened a collaborative forum with the goal of jointly addressing the most fundamental development challenges in the area. Facilitated by national government authorities, they have sought to extend this collaboration to the local municipalities in the area as well. Cooperation with municipalities has been pursued with differing success, reflecting varying capacity with regards to of service delivery and also the interaction with the mining industry. At the same time, the situation is rendered more complex due to the relative strength of traditional authorities. At this stage, collaborative efforts have nevertheless led to the drafting of a comprehensive package of measures, pertaining to water infrastructure development, financing as well as capacity-building with the goal of improving service delivery at the local level. Municipalities, backed by newly introduced legislation, have been in a position integrate their own needs with those of the business actors.

Case 4: Platinum mining in the Eastern Limb of the Bushveld complex in the Limpopo Province

Platinum mining in this province represents a more emergent state of the platinum mining industry if compared with the situation in the North-West province. Water challenges are similar in terms of the limited availability. Water supply for communities is lagging far behind national standards. Municipal government capacity is considered to be very low. The mining firms considered in the Limpopo case are almost identical with those in the Western Limb.

The **contribution** of the mining industry in this case can be described as development and financing of bulk water infrastructure, which is projected to not only serve the mining industry, but also to improve access to water supply in a largely under-served region. A component of this contribution is constituted by capacity-building measures for local municipalities.

A platform approach similar to that followed in the Platinum North-West Case was initiated with the goal of aligning corporate as well as government expectations in terms of water resources development.

Ensuring access to water resources for production purposes is probably the main **driver** for firms to get involved. At the same time developmental challenges in the region are imminent and the expectations towards mining companies to play a role in addressing these are considerable.

A further driver is related to municipal capacity constraints in terms of service delivery, which prompted business to step in and develop own solutions.

The contribution of business is however somewhat debatable in this regard. While the development path undertaken is somewhat similar to the situation in the North West platinum case, government appears to be lacking the mandatory and cooperative power to render a sustainable solution. Rather the lack of a shadow of hierarchy and the economic strength of business actors, might lead to unsustainable solutions in this case, where industry demand for massive water infrastructure development will be realized, while benefits for development purposes (i.e. water for communities) remain uncertain. Capacity-building initiatives undertaken by business, albeit directed at improving management capacity at the municipal level, are perceived as attempts of agency capture

Synoptic Overview of the Cases

The following synopsis summarizes the key aspects of each of the four cases in terms of the main characteristics of the companies considered as well as the dimensions of the water challenge encountered against the background of the overall situation in the South African context.

Table 23: Firm Characteristics and Dimensions of the Water Challenge

Case	Sector/Firm Characteristics	Dimensions of the Water Challenge
Gold Mining Gauteng	• **Mature mining industry** • **Legacy of more than 150 years** • **Major driver of the South African economy in the past** • **Massive environmental and social footprint**	• **Environmental threat due to acid mine drainage** • **Pollution with heavy metals and radio-nuclides in the WFS catchment** • **Impacts originating from current and past mining operations** • **Pollution of regional scale affecting most urbanized areas, agricultural land and cultural heritage sites** • **Limited capacity of regulator to enforce of companies to address**
Anglo Gold Ashanti	• *Multinational-mining firm*	• *Operates in the basin of the Wonderfonteinspruit* • *Need to control spills as well as other incidences*
DRD Gold	• *South African company*	• *Faced with the need to continue pumping at their shafts in order to prevent further incidences of acid mine drainage*
Mintails	• *Smaller Australian funded company, focus on re-mining and innovation*	• *Partial liability for acid mine drainage in the Western basin* • *Business interest in development innovative treatment solution*
Harmony	• *South African firm with significant production volume* • *Scrutiny by NGO community*	• *Acid mine drainage occurred for the first time on Harmony's property* • *Assigned partial liability for addressing AMD*
Gold Fields	• *South African firm with operations across the world* • *Sophisticated CSR approach*	• *Operation in the Wonderfonteinspruit and thus exposure to issues here*
Pamodzi Gold	• *South African BEE start-up* • *Financial problems*	• *Needs to continue pumping in order to prevent further incidence of decant*
Coal Mining Mpumalanga	• **Relatively mature industry** • **Positive profit margins** • **Major vehicle to realize BEE** • **Heterogeneous structure, a few large players and start-up firms**	• **Strong impact through pollution: acid mine drainage as major risk to catchments** • **Catchment are over-used, competition of different users** • **Coal mines: water pollution, but also major water users** • **Area is increasingly urbanized: growing need to provide water services** • **Municipalities lack financial resources in order to tackle these challenges**
Anglo Coal	• *Subsidiary of Anglo American* • *National & international markets*	• *Need to treat acid mine effluents* • *Water constraint s in the Olifants basins*
bhp Billiton	• *Branch of world's largest mining firm*	• *Need to treat acid mine effluents* • *Limitation to available water resources in the Olifants basin*
Optimum	• *Emerging BEE firm* • *Took over mine from bhp*	• *Faced with necessity of building a water reclamation plant modeled after the EMalahleni model at their site*
Platinum North-West (Western Limb Producers Forum)	• **Growing commodity** • **Major provider of jobs** • **Dependence on water for production**	• **Water scarce region** • **Competition among water uses** • **Municipalities face problem of guaranteeing water supply**
Anglo Platinum	• *Subsidiary of multi-commodity Anglo American* • *High visibility among NGOs*	• *Company in need of water in order to expand current operations* • *Current arrangements with Rustenburg municipality not sufficient in order to guarantee future demand*
Lonmin	• *UK-listed operator* • *Expansive CSR, sustainability program in place*	• *Company in need of water in order to expand current operations* • *Doorstep communities depend on Lonmin for water services* • *Madibeng local municipality is under-capacitated*
Impala	• *South African operator* • *High visibility in terms of CSR*	• *Company in need of water in order to expand current operations* • *Impala is faced with services deficits in neighboring workers' settlements*
Wesizwe	• *Emerging operator* • *CSR practices CSR not yet operational*	• *Company in need of water in order to start-up operations* • *License to operate depends on how water supply for communities will be realized*
Platinum Limpopo (Eastern Limb)	• **Emerging industry** • **Major economic impulses to alleviate major problems** • **Dependence on water resources**	• **Companies need water in order to start-up and expand operations** • **Competition about water resources in the catchment** • **Communities in need of water supply; massive infrastructure investment necessary in order to address water infrastructure backlog**
No differentiation in terms of individual case study firms, aggregate analysis only. Firms largely identical or similar to those in the Western Limb.		

The synopsis on the one hand displays the heterogeneity of the case studies with view to the pertinent challenges, which have a resource or an infrastructure focus respectively, the structure and size of companies as well as the exposure to public scrutiny. This warrants the application of a most different systems research design as the guiding research approach.
At the same time however, similar factors across all cases emerge, as water management issues usually have a strong development component, either hampering development (e.g. due to pollution impacts) or facilitating development (e.g. in the case of infrastructure finance and development).
It becomes furthermore evident that issue salience with view to the water challenge is generally high across all case studies. At the same time varying levels of uncertainty are inherent to each case, deriving from the nature of the water problem in the respective region as well as the regional water management context, but also from the respective sector structure, its market situation and future prospects.

H.2. Detailed Analysis

Based on the analytical framework, a number of research questions have been identified earlier in this thesis. In the detailed cross-case analysis these will be reconsidered in the light of the case study findings outlined above.

H.2.1. **Dependent Variable**

Business actors are central to the model developed. The contribution of business actors to addressing the water challenges is considered as the dependent variable. Thus in the first place, a mapping of the different manifestations and the variations of the dependent variable is undertaken. This mapping exercise is guided by the classification of business contributions to sustainable water management as suggested in section B.4.1. This reference framework is based on factors identified as conducive for sustainable water governance and management (Dietz et al., 2003; Rogers et al., 2003).
Accordingly, the dependent variable has the following three aspects. In the first place I ask about the actual type of the contribution by business actors: What are the companies actually doing?
Secondly, I address the type of interaction, how or in what way are companies actually contributing, what is the mode of interaction?
Thirdly, I ask about the long-term dynamics of the contributions. These aspects will be addressed separately in the following analyses.
In order to reflect the intensity and importance of the contribution, the empirically observed contributions are classified on a scale denoting differing impact categories. In assigning the categories, several factors need to be taken into consideration.
In a first step, only the occurrence of the contribution is recorded. Are companies engaging in this type of contribution or not? How important is the contribution in comparison to others? What importance is assigned to the respective contribution by company representatives as compared to outside stakeholders?
Results of the individual company assessments are then aggregated for each mining region investigated. The following scores are assigned to represent the respective regional performance.
A high score (dark grey shading, •••) is assigned:

The majority of companies investigated in each case study area provide the respective contribution; the contribution thus is assigned a high relevance in addressing the regional water management challenges.

A medium score (medium grey shading, ••) is assigned:

There are some incidences of contributions, albeit not existing throughout the region. There might also be some digressions at the individual company level.

A low score (light grey shading, •) is assigned:

There is hardly any evidence of the contribution in the region, the contribution has thus no or very little relevance in the regional water management context.

No score is assigned in case there was no evidence for the respective contribution with any of the companies investigated. The following table provides an overview of the respective scores.

Table 24 Mapping of the Dependent Variable: Contribution Types

Case	Gold Mining Gauteng	Coal Mining Mpumalanga	Platinum Mining North-West	Platinum Mining Limpopo
Compliance	•	••	••	•
Operational Efficiency	••	•••	•••	••
Technological Innovations	••	•••	••	••
Monitoring and Planning	••	•••	•••	••
Watershed planning	•	•••	••	••
Infrastructure	••	•••	•••	•••
Financing	•	••	••	••
Capacity	•	••	•••	••
Awareness	••	•	••	•

The table allows for a comparison across cases and thus for following conclusions to be drawn. In the first instance, it can be noted that the contributions in the cases differ to some degree. According to the assessment in the context of this study, it appears that the coal mining companies display the strongest performance in terms of present-day contributions to sustainable water management. Operational efficiency and technological innovations as well as also infrastructure contributions are common, particularly among the larger players in this region.

The overall performance of the gold mining companies is considerable less conducive to sustainable water management in this regard. It is striking that the investment related activities, such as investments and planning, are less pronounced with this commodity than with coal mining. The platinum mining industry in the two provinces investigated displays a similar though still slightly differential picture. There is also a strong focus on infrastructure related-activities and also capacity-building measures. The industry performs slightly better in this regard in the North West. Activities in the Limpopo province appear to be less developed or lagging behind the development in the North West Province.

The described variance, is however considerably smaller than possibly expected. Contributions of some sort can be found in all case studies. Companies across regions engage in a similar set of activities, albeit to varying degrees of intensity. Given the limitations of the research design, the outcome could thus be considered as fairly similar, with some slight modulations.

In the following step, the question as to the mode of the interaction in delivering the respective contribution will be addressed. The following table shows those forms of interactions. The • denotes the occurrence of the interaction as well as the abundance and importance of the respective form in each of the case study regions, as expressed through firm-internal as well as external positions.

Table 25: Mapping of the Dependent Variable: Contribution Modes

Case	Gold Mining Gauteng	Coal Mining Mpumalanga	Platinum Mining North-West	Platinum Mining Limpopo
Industry Collectives	●●	●●	●●●	●●●
Supply-side regulation	o	o	o	o
Multi-Stakeholder Platforms	●●	●	●●	●●
Cross-Sector partnerships	o	●	●●●	●●
Capacity-building	●	●●	●●●	●●
Individual	●●	●●	●●	●

While there is some variance with regards to the mode of interaction chosen, also with regard to this aspect of the contribution no clearly distinctive pattern emerges between the different cases investigated.

While firms address some issues at the individual level – compliance and internal monitoring and planning are the respective examples here - there is an overall relatively strong tendency for firms to enter into collaborative arrangements, including those with peers, i.e. corporate actors within the same sector, as well as with other stakeholders, although to a lesser extent.

Supply chain relations are not relevant for the context of the mining industry. As the primary producer of raw materials, the only suppliers to deal with are bulk water providers, such as Rand Water. However, there was no evidence of the mining firms exerting direct pressure on these water companies, in terms of improving their environmental performance.

Especially, collective arrangements with other industry players emerge as prominent pattern. This approach is particularly pronounced in the platinum mining industry, somewhat less so in the coal and gold mining sectors. One can however observe a correlation between infrastructure-intensive contributions (for example in the platinum mining cases) and the occurrence and importance of collaborative and also cross-sectoral partnership approaches. This is also supported by a more pronounced focus on capacity-building activities in this industry.

While cross-sectoral partnerships involve corporate and governmental actors, multi-stakeholder platforms comprise a broader range of actors, including NGOs and also community groups. This type of interaction is still in an emerging stage at this point of time. The most far-reaching platforms – involving several companies, government departments and community groups – currently exist in the gold mining areas. In the other areas, there are stakeholder outreach programs run by individual companies. These are however not yet coordinated across all actors involved.

As indicated before, capacity-building is emerging as a key pattern of involvement in those regions, where lacking government capacity hampers development efforts driven by the mining industry. The question as to the potential effects of these activities will be addressed in following section, which discusses potential long-term dynamics of the individual or collective contributions made by corporate actors to addressing water management challenges.

H.2.2. **Long-term Dynamics of the Dependent Variable**

In addition to determining the type and mode of the contribution, the respective potential long term dynamics need to be considered in order to allow for projections with regards to the overall sustainability impact. For the purpose of this assessment, I differentiate between ***immediate*** and ***long term*** effects.

In terms of ***immediate*** effects, this includes an assessment of the degree to which the water challenge is addressed and alleviated in the regional context. Do corporate contributions help in solving the water-related problems eminent in the respective cases when considering the short and medium-term perspective? While a quantification of this aspect is challenging and probably not possible with accuracy, an approximation is undertaken by taking into account the relevance of the engagement as viewed by the external interviewees.

In terms of the **long-term** impacts, the following factors have been considered. In the first place the potential long-term impacts on water resources will be considered: What are the respective development strategies of the technological pathways chosen? How will management option devolve in future? What are related uncertainties?

In addition the integrative qualities of the contribution are assessed: What are impacts beyond the immediate locality of operation? What are impacts with regards to other interlinked areas, such as economic growth, impacts on other environmental media (agriculture, biodiversity) as well as repercussions with regards to social factors? Furthermore the governance feedback is assessed: How does corporate involvement impact on existing governance structures? This question pertains to the effects of business behavior on government actors, i.e. the feedback loop between private actors and government as well as potential repercussions with regards to learning processes among stakeholders.

The indicative assessment is largely based on information provided by the non-firm, external interviewees and thus allows for a rough approximation of the development dynamics. As discussed in the methodology section, a fully fledged sustainability assessment would require considerable additional resources. However, some development vectors allow for deriving the rough indication of development dynamics depicted in the overview below (+/- denotes the potentially positive or negative development trajectory and its intensity)[202].

[202] I would strictly like to avoid the impression of a measurability of the overall sustainability impact.

Table 26: Immediate and Long-term Dynamics

	Gold Mining Gauteng		Coal Mining Mpumalanga		Platinum Mining North-West		Platinum Mining Limpopo	
Immediate effects								
Addressing the water challenge	Potentially positive (containment of AMD)	++	Positive (containment of AMD, access to water)	+++	Positive (access to water)	+++	Potentially positive (access to water)	+
Long-term effects								
Uncertainties	Likely, stable solution for clean up, some uncertainties, implementation to take a long time	+	Existing technology development	+++	Planning completed, agreement on next steps, technological know-how developed	++	Infrastructure development for municipalities still uncertain	-
Potential future challenges and trajectories	Further use of treated water, business model for reuse independent from mining industry	+	Long-term perspective uncertain, legitimization of end-of-pipe solutions, dependency on corporate involvement	--	Dependence on companies, commodification dependence on infrastructure	--	Massive infrastructure development: lock-in situation	--
Integrative aspects	Largely positive. preservation of livelihoods Negative (water transfers)	++ -	Securing of environmental quality, Consideration of social aspects, only little consideration of other sectors	+ -	Only little integration with other water uses	o	Positive economic effects, Negative impacts on other sectors (agriculture, tourism)	+ -
Governance Feedback	Strengthening of national government capacities in managing complex processes	+	capacity-building at the local government level	+	capacity- building on-going dialogue and platform for learning and exchange	++ +	capacity-building Negative: agency capture and over-dependence	++ -

The sustainability impact assessment reveals that some contributions, albeit deemed supportive to sustainable water management in the short term, might lead to less favorable developments in the long-term. Furthermore, there are indications that initially positive effects might be balanced by potentially quite negative effects, and that some solutions are 'bought' at the expense of additional problems in the long run.

While for example technological innovations might quickly contribute to addressing current water management challenges, in the long run these could result in path dependencies, over-reliance on end-of-pipe solutions, negative effects for other water uses. Similarly infrastructure investments, such as dams and pipelines are usually viewed critically, since these often involve considerable environmental and social costs and implications at the broader water management scale (e.g. the basin-level). At the same time, long-term benefits are difficult to gauge in the initial phases of the process. A further important aspect is the alignment and integration with other sustainability issues, such as social and economic considerations. Contributions to addressing the water management

challenge can assist with securing livelihoods (such as in the case of the gold mining case and also partly in the coal mining case). Economic development might be supported by improvements in water infrastructure and supply (expected in the Limpopo and North-West cases). Negative consequences occur if there is an insufficient integration with other potential water uses, such as domestic purposes, agriculture or tourism. Particularly in the platinum mining areas, the dominance of the industry bears a considerable risk that other uses are neglected.

A further angle of the contribution is the governance feedback. Positive impacts are to be expected in the coal and platinum North-West cases. Local government representatives benefits from capacity-building programs initiated by the mines. In the gold mining case, positive effects can be observed at the national government level in terms of negotiating and engagement capacities with view to the mining industry. This is particularly relevant against the background of historic legacies in business – state relationships.

Negative impacts are expected in the Limpopo case. While capacity-building measures undertaken by the mines are viewed positively by some stakeholders others fear that these could lead to state capture in some instances and thus long-term negative repercussions in the region, due to an over-dominance of the industry.

The latter example very clearly demonstrates the potentially (very) different perceptions of firms' contributions of the varying stakeholders involved. In the broader context of this thesis, it also points to the considerable uncertainties embedded in some of the contributions offered by the firms and thus gives reason for methodological concerns. These are addressed in more depth in the concluding chapter.

H.2.3. **Independent Variables**

The independent variables of the model derived above comprise the range of possible business drivers adapted to the water context as proposed by the analytical framework. The list of potential drivers consists of drivers identified in literature, such as for example institutional drivers, namely government, international norms and industry pressures, competition-related factors, and social aspects, including NGOs, communities and labor. A second group of drivers is referred to as resource-related or firm internal explanations.

An assessment of the relevance and intensity of the respective drivers is conducted based on the qualitative interviews and evaluations provided by internal and external interviewees. The following categories were assigned in response to the relevance assigned to the individual factors by company representatives as well as other stakeholders included in the survey.

The following classification of drivers is suggested:

- Strong drivers or explanations (•••, dark shading): the factor was mentioned by almost all interviewees as relevant in determining firm behavior.
- Driver of medium strength (••, middle shading): the factor was mentioned by some interviewees and also in relation to some of the firm considered in each region.
- Weak driver (•, light shading): the factor was mentioned by some interviewees as potentially important
- Non-existent (o, no shading): factors not mentioned at all or mentioned as not relevant.

A specific emphasis is placed on the role of government as a driver for business' contribution to sustainable water management. The role of government at the national and the local level is thus represented through the categories suggested by Fox et al. (2002). These roles comprise mandating, facilitating, endorsing as well as partnering. In the following overview, these roles are assigned to the respective government actors at different governance levels. The assessment takes into consideration the degree to which government takes on these respective roles vis-à-vis business.

In addition to the actual activities of government in terms of directly driving business behavior, the degree to which government fulfils its functions in the area of water resources management also constitutes an important explanation of business behavior. While the following overview includes the perceived lack of service provision as an explanation, this factor is investigated in more detail in the following section.

Table 27: Business Drivers

Case	Gold Mining Gauteng	Coal Mining Mpumalanga	Platinum Mining North-West	Platinum Mining Limpopo
Institutional drivers				
Government/Regulation				
National level				
Mandating	●●●	●●	●	●
Cooperative approach	●●	●	●●	●●
Facilitative behavior: platforms and fora	●●	●	●●	●●
Endorsement: best practice guidelines	●●	●	o	o
Local level				**o**
Mandating	-	-	-	-
Cooperative approach, step-by step negotiations	●	●●	●●	●
Facilitative behavior: platforms and fora	●	-	●	●
Endorsement: best practice guidelines	-	-	-	-
Perceived lack of government capacity (to fulfill the assigned tasks in water resources management)	●	●	●●	●●●
Normative drivers				
International norms and standards	●	●●	●	●
Industry pressures	●	●●	●●	●●
Competitive drivers				
Competition	o	o	●	●
Consumers	o	o	o	o
Investors	●●	●	●	●●
Social Drivers				
NGO	●●●	●	●●	●
Community	●	o	●●	●●
Labour	●●	o	●	o
Media	●●	●	o	o
Science	●●	●●	●	o
Resource-base/Internal factors				
Water as a Resource (Security of supply)	●	●●	●●●	●●●
Awareness and commitment of corporate leadership	o	●●●	●●	●
Capacity and disposition for learning	●	●●●	●●	●●
Capital management capability and organizational slack	●	●●●	●●	●●
International orientation	●	●●●	●●	●●

The table provides for an indication of the most influential drivers for firm behavior in the respective case study area.

Various forms of government interventions emerge prominently as important drivers. There are instances of mandating in the gold mining cases, where regional branches of national government regulate the mining industry with regards to its negative environmental impacts. While the same type of national legislation exists in all case study areas, still the aspect of mandating is not equally pronounced.

In addition to mandating, government at the national level engages in other modes of governance. Cooperative approaches have been implemented, such as in the case of the infrastructure partnerships in the platinum mining regions. At a lower level of engagement, facilitative measure, such as fora and platforms, and endorsement are less commonly used.

Turning to the local level, cooperative approaches are followed by some of the municipalities. Other, softer forms of steering are not used at the local level nor have any relevance in the context of the case studies. The perceived capacity deficit at the local government level however constitutes an important incentive, in the platinum mining cases and to some extent in the coal mining case. This capacity deficit includes the ability to provide municipal functions, but also to engage with business actors.

The other category of drivers that appears to be significant comprises internal or resource-based factors of the firms investigated. Water as a resource is particularly significant in the platinum but also in the coal mining industries. In these industries, there is a strong perception of security of supply as a major risk factor to production. Other important elements have been awareness and commitment of individual employees as well as the capacity and disposition for learning, which have been documented through the process analyses conducted in the individual case study chapters.

In addition, capital management capability and organizational slack played a significant role in determining the individual company's disposition to contribute to addressing water management challenges. This is particularly pronounced in the coal mining industry, where well-resourced companies have become involved with costly technological investments. The international orientation of the respective company also played a role, however to a comparably minor degree than other internal factors.

Overall, these factors appear to be relevant in determining the degree to which a company becomes involved with addressing water management challenges.

The overview also demonstrates however the relatively limited influence of the other drivers, such as social drivers, competitive drivers or other normative drivers. While some exceptions exist, these drives mainly become relevant through interactions with other drivers, i.e. mostly government-related factors. These interactions will be discussed in more detail in the following section.

The 'within-case' analysis also provides for some indication with regards to the sequence of drivers. Regulation or 'mandating' in many cases provide the background motivation for corporate action. This motivation is then enhanced through other drivers, such as industry sector norms, as well as social drivers.

In addition, security of supply is the other key motivation for companies to become involved with water management issues. However, in the case of South Africa and the relatively strong legislative basis, the mere disposition of corporate actors, has not led to appropriate action or has rather led to more company-focused activities.

In addition to the drivers proposed by the analytical framework, a further group of actors has emerged quite prominently as a driver, if not as an important factor in the set-up of at least two of the three case studies. Science institutions (e.g. universities and research institutes) assist with the generation and dissemination of knowledge as well as with the development and diffusion of innovative technologies. In this role they do not necessarily classify as a social driver which would be comparable to NGOs or community groups. They rather serve in a mediating role between societal drivers and corporate actors, but also between firms and governments by limiting inherent uncertainties and thus providing a basis for decision-making. This role is specifically pronounced in the gold mining case, but can also be found to some extent in the other case studies.

H.2.4. **Interaction of Government Drivers and other Drivers**

As introduced before the interaction between government drivers and other factors in driving business behavior is of particular interest. The following table indicates where this interaction was strongest in the case studies investigated and presumably led to the recorded results (• denote the strength of the interaction between the respective drivers).

Table 28: Interaction of Government and other Drivers

	International norms	Industry pressures	Competitive drivers	Social drivers	Internal factors, incl. Security of supply
Gold Mining in Gauteng					
National		•	••	•• (NGOs)	•
Local					
Coal Mining in Mpumalanga					
National		••			•
Local					••
Platinum North-West					
National	•				•••
Local				••	••
Platinum Limpopo					
National					•••
Local				•	•

The overview shows that government drivers resonate quite strongly with some of the other factors, while others remain largely unconsidered. International norms are in some cases referred to explicitly in order to enhance the impact of government drivers. National industry norms play a similar, albeit predominantly implicit role. International and national norm systems thus mostly provide for a conducive background for other drivers rather than constituting a distinct driver themselves.

In some cases, for example the gold mining industry, government makes use of market mechanism, i.e. the price for water in order to set incentives for firms to engage in the development of remediation technologies. The interaction with social drivers is also most visible in the gold mining context, where NGOs and government combined form a relatively strong driver for business

behavior. In fact government officials have teamed up with some actors of the NGO community in order to enhance their own influence. This approach however has not been broadly adopted in other case study regions.

In some of the case studies government drivers resonate quite strongly with internal factors. This could entail an interaction between the regulator and a receptive employee of the respective company. On the other hand, government actors have started leveraging the water supply issue for some of the industries (e.g. for the platinum industry).

H.2.5. **Focus on the Characteristics of Government**

As discussed before, capacity constitutes an important element of government activity vis-á-vis business actors. In order to represent different aspects of government capacity, the analysis is first focusing on the aspect of available resources (in terms of financial, capital, human and knowledge/information). In the second instance the investigation addresses the management of these resources in terms of planning activities and the actual implementation with regards to the key management functions in the water sector, such as proposed by Pegram et al. (2009a). These include tasks in relation to water resource protection and water quality management, the fair allocation of water to different uses, water use regulation in terms of control and enforcement, the development of water infrastructure and appropriate water pricing mechanisms.

Specific attention is also paid to the engagement capacity of government at different levels. To what extent does government interact with companies? Of what quality is this interaction? Observations from the case studies are summarized in the overview table below.

Table 29: Characteristics of Government Capacity

	National government		Local
Gold Mining Gauteng	Resources	●●●	●●
	Formulation and planning	●●●	
	Implementation	●	●●
	Engagement Capacity	●●●	●
Coal Mining Mpumalanga	Resources	●●●	●●
	Formulation and planning	●●●	
	Implementation	●●	● - ●●
	Engagement Capacity	●	●●
Platinum Mining North-West	Resources	●●	● - ●●
	Formulation and planning	●●	● - ●●
	Implementation	● - ●●	●
	Engagement Capacity	●●	●●
Platinum Mining Limpopo	Resources	●●	o
	Formulation and planning	●●	o
	Implementation	●	o
	Engagement Capacity	●●	o

The overview and comparison reveals that many facets determine government capacity with regards to managing water resources and also with view to engaging with business actors. Capacity-relevant resources are available to differing degrees. While national government in most cases devises of sufficient human and financial resources, several components are lacking at the local level. While in some cases financial resources are relatively stable, the human resource base is rather weak. In other cases, several weaknesses are compounded (this is for example the case in the municipality investigated in the Limpopo province).

Considering the ability to manage those resources, as expected there are considerable differences between the planning and the implementation level. Especially national government levels display a good performance in terms of planning or the formulation of guidance documents. Implementation in terms of the water management functions introduced above however constitutes a major deficit.

Of specific interest in the context of this study is the capacity of government to engage with business actors. The case studies display an interesting variation in this regard. National government actors actually have a good track record in terms of their interaction with business; the ability among local government varies from good engagement capacities to almost non-existent capacities.

H.3. Results Overview and Discussion

Following the approach proposed by Eisenhardt (1989) the initial model is revisited against the background of the empirical data collected.

The contributions of the firms to addressing the water challenge can be represented through the categories suggested by the analytical framework. In addition to firm-internal measures, and tangible contributions, such as data and infrastructure, corporate actors also engage in more public policy related activities, reaching beyond the scope of their own operations. In many cases these are realized in the form of inter-industry and also cross-sector partnerships. These are formed to provide certain measures, e.g. infrastructure development, but they also serve as platforms for passing on data and knowledge as well as for dialogue and thus potentially learning among companies as well as other stakeholders. While the latter observation points to the overlap of the actual contribution and the mode of interaction, it should be noted that instances of learning could be observed only to a limited extent and thus provides only little indication of the sustainability aspect of the interaction.

Nevertheless, the case-case comparison reveals interesting details, especially when taking into consideration the long-term impacts. Two pair wise comparisons are conducted, between water quality focused case as well as infrastructure focused cases. Comparing the gold and coal mining industries for example, both cases with water quality implications, displays different levels of engagement. The coal mining firms investigated invest considerable resources to develop and implement a relatively costly high-tech solution to environmental quality problems (Hobbs et al., 2008). A similar solution is also under development in the gold mining region, albeit vested with less financial support from individual firms. Rather a joint industry initiative was created by some of the companies involved to develop and finance the development of a treatment solution for the pollution problem.

The motivational patterns and drivers also somewhat differ in the two cases. In the coal mining case the legislative background and particularly the imminent introduction of the waste discharge charge system in combination with the impact of acid mine drainage on the actual viability of production

constituted the main incentives. In the gold mining case, the mandatory threat was much more pronounced; government directives were issued, the severity of the pollution threat triggered additional attention. At the same time however, firms are –for the most part – less viable and face a comparably less stable production environment than the coal mining firms. Government plays a much stronger role in shaping and guiding solutions. If one looks to the long-term effects and developments, there is an indication that the development in the gold mining case might be more sustainable, more integrative. This could also be a result from the numerous stakeholder fora set up, by government as well as some companies, which jointly seek to address the situation.

The coal scenario resulted in the development and application of high standard treatment technology. This technology however indirectly promotes the reliance end-of-pipe solutions and aggravates the reliance of local municipalities on the corporate contribution. It remains largely unclear, how water problems will be handled when coal mining comes to an end in 20 to 40 years. In the gold mining case, structures are created, which operate independently from the mining firms. Guided by the closure strategy, a more integrated long-term strategy is currently under development. This comparison indicates that the state plays a crucial role in guiding long-term sustainability trajectories. Firms' capabilities (in the case of closure) and interests (in terms of markets) in this regard are limited.

The second interesting pair for comparison is constituted by the two platinum cases, both with a stronger infrastructure and development component. In terms of the immediate contributions, the two cases are quite similar, although the North West case is more advanced than the Limpopo case. However, there is an interesting expected variation with regards to long-term impacts. These are expected to be somewhat more favorable and possibly sustainable in the North West case than in the Limpopo case. In the former, a broader cooperation is achieved with local communities with view to water resource management integration. This is clearly lacking in the Limpopo case. In addition, firm activities at the local level in this province are also perceived as being on the verge of agency capture. The potential for mutual learning and adaptation is much higher in the North West case, which points to more sustainable development trajectories.

This can also be related to different driver structures in the two cases studies. While in both cases, there is an element of a perceived governance gap, in terms of deficits in service provision and other developmental issues at the municipal level, yet there are differences in terms of the capacity to engage at the municipal level. While this is higher in the North West case, leading to the more integrative outcomes, it is considerably lower in the Limpopo case. This is to some extent also found in the coal case, where good cooperative structures in contributed to a favorable outcome for the local municipality in terms of securing additional water resources.

Moving from the case/case analyses to the individual firm level, the question emerges as to which driver leads to which contribution. While these causal relationships have not explicitly been addressed by the research design and require further and more detailed investigation, the following general patterns can be derived.

As expected regulation and mandatory approaches in the first instance lead to compliance in the area of pollution prevention and supporting activities, such as monitoring and planning. Infrastructure finance and development, capacity-building and awareness-raising activities follow different incentives, such as a perceived weakness, combined with a minimum of engaging and facilitating approaches. At the same time it needs to be considered that theoretically drivers can also act as spoilers or disincentives. In the case studies, this was investigated in terms of lacking capacity

at the local level. The capacity analysis supplements the assessment of government drivers. Engaging capacity at all government levels is key, but also capacity of other actors to respond and act accordingly.

This argument is also somewhat supported by the observed prevailing mode of interaction. Collective forms prevail when substantial financial or infrastructure investment are planned. On the other hand, such approaches are also emerging in compliance negotiations with government. While the earlier observation points to a capacity issue, the second one is probably more motivated by normative drivers, such as industry norms and regulation.

This brief assessment indicates that the role of governmental drivers is particularly pronounced and resonates in their effect with the resources available at the firm level. While these two categories emerge as the dominating drivers, other factors, such as social, competitive and other normative drivers function in a modulating way. While 'classic' corporate drivers thus play a definite role, issue salience – i.e. the increasing water crisis - emerges prominently as a key driver, enhancing the impact of other factors.

As for the role of government, results point to the elementary relevance of strong legislation and a strong shadow of hierarchy as the basis for other policy tools, such as partnerships or endorsements. The implementation of legislative provisions as well as the application of innovative policy approaches are currently at a nascent stage in the South African context and particularly hampered at the local level. In some cases, corporate actors compensated for constraints or chose to interact with those municipal partners, who were capacitated to do so. In other cases, corporate actors were strongly pursuing their interests, taking advantage of weak government structures.

This latter observation also points to the specificity of conditions in the South African water policy context. This relates to the varied local conditions, but also the importance of historic legacies.

I. Conclusion

Business has discovered the 'world of water' (WBCSD, 2006), as a risk factor, mostly in conjunction with the problem pressure generated by climate change, but also as a (business) opportunity. While business in the water sector per se (in the form of private sector involvement in water services provision) has not gone without criticism (Beisheim, 2007; Bond, 2009) and the business' role vis-à-vis environmental and social impact remains ambiguous, there are several reasons for taking a closer look at the dynamics of business in water governance. This investigation is particularly warranted, where water challenges, scarcity and lack of access, loom large threatening to compromise much needed development. At the same time, African states' governments are often considered as weak and under-capacitated a.) in terms of performing governance functions with view to sustainable development (sustainable water management) (McLennan et al., 2004) and b.) with view to its interaction with business (Murphy, 2004; Ward, 2004).

Over the past years, considerable attention has been paid in the academic literature to the question as to what influences business behavior vis-à-vis environmental and social concerns and also with regards to the broader paradigm of sustainable development. Based on institutional theory (Scott, 2001) scholars have developed several approaches explaining, why firms behave in a certain way (Bansal et al., 2000; Hoffman, 1997), what makes them consider environmental concerns and why at times they even choose to go beyond compliance with regulatory requirements (Gunningham, Kagan, & Thornton, 2003).

This thesis builds on this discussion, while placing it into a specific context. Firms' behavior is considered under conditions of limited or weak statehood, such as encountered in African states, albeit to varying degrees. Furthermore, the thesis approaches the complex paradigm of sustainable development, by focusing on a sub-set, sustainable water management.

Business behavior with regards to sustainability issues in areas of limited statehood has been discussed controversially over the past years (Wheeler, 2001), ranging from notions of exploitation to ideas of corporate responsibility and other concepts.

This thesis aimed to shed a light on the actual dynamics and mechanisms in this regard. What is it that corporate actors can contribute to addressing water sustainability issues? What roles do specifically the state and other actors play in driving business behavior and how are different drivers interacting?

In this study, I aimed to combine these research strands and also advance the empirical understanding by studying mining firms in four different regions in South Africa with regards to their specific behavior in water resource management. I therefore made use of a qualitative research design, focusing on an in-depth analysis of the underlying dynamics.

I chose South Africa as an emerging economy with a significantly developed industry sector, which however also allowed for the investigation of variations in government capacity, represented by the situation in four of the nine South African provinces. Furthermore, South Africa is an increasingly water-stressed country (Ashton et al., 2008a), which is faced with water quality deterioration, water scarcity and the challenge of providing water services to an increasingly urbanized population. It thus combines typical water problems of the industrialized world with those of developing countries offering a broad spectrum of case features.

Among the South African industry sectors, I chose the mining sector. Mining per se has a significant impact on water resources due to pollution incidents, freshwater abstraction as well as infrastructure

developments to assure supply (Ashton et al., 2001). The South African mining industry furthermore has undergone significant changes after the end of apartheid. In the wake of re-entering world markets, the sector was restructured fundamentally and its relationship to government underwent a major reorientation. Whilst the industry was deeply entrenched with the apartheid government, new forms of interaction are currently emerging, which present an interesting subject for study.

This investigation is placed in the overall context of governance for sustainable development with specific focus on the dynamics in the non-OECD world. McLennan (2004) establishes the link between sustainable development and institutional capacity. The latter is considered the main prerequisite for engaging stakeholders in the challenging and complex modes of governance necessary for sustainable development. It is furthermore argued that developing countries and particularly African states lack the necessary conditions for establishing responsible and effective administrations for sustainable development (McLennan et al., 2004).

Consequently, the model, which is developed on the basis of the literature reviewed above, proposes that next to resource-based or firm-internal factors, several institutional factors might play a decisive role in driving business behavior in terms of contributing to sustainable water management. The model places a particular focus on the role of government and the implications of varying capacity levels.

This conclusion is intended to compare these initial propositions with the results found in the course of the study. My analysis shows that albeit there are complex relationships between all these factors, still some factors emerge as dominant.

In this chapter I summarize the main results of my work, catering to the research questions raised as well as to some of the key lessons to be derived from this research endeavor. In the second part of this concluding chapter, I then discuss what implications for future research might arise from this. Finally, catering to the topical nature of this research and the ongoing policy processes (and the author's occupation as a policy advisor), I develop some broader guidance for policy-makers and regulatory design, in the specific context of the case study as well as from a more global perspective.

I.1. Contribution

The initial goal of this study was to identify, categorize and assess firms' activities in the realm of water management and determine whether these activities actually constitute a contribution to addressing the water management challenges identified for the context of an emerging economy in Southern Africa.

The potential contributions of business were assessed against reference conditions drawn from water governance literature (Dietz et al., 2003; Rogers et al., 2003). Factors largely considered as conducive to sustainable water management and thus meeting the water challenge include the following: compliance with regulations including monitoring, planning at the firm as well at the watershed level, technological innovation, infrastructure finance and development, capacity-building as well as awareness-raising activities, which might lead to further learning and adaptation processes.

For the purpose of this study, these can also be interpreted as governance functions which either have to be provided by the state or other actors, e.g. business (Draude, 2007). This needs to be considered in the context of the specific characteristics of the resource water. Its uniqueness, excludability and substractability (see section B.3) as well as its relevance for development point to a

prominent role for government actors. What can other actors and specifically business provide and under which conditions?

Understanding the Type of Contribution

The contributions provided by the case study firms, display some however no significant variance. Some of the most remarkable contributions and the varieties across the case study are described in this section. In all cases, compliance forms the basis of any further contribution, followed by monitoring and internal planning activities. While internal planning is undertaken at different levels of sophistication, planning activities beyond the 'company fence' are only undertaken by a few firms. Planning at the watershed level not only requires coordination with other actors, including government, but also is often used to achieve a better integration with other water users in the respective watershed context.

Technological innovations, for example in the field of water treatment processes, are a prominent feature of the mining firms' contributions. Firms get involved with the development of these innovations, provide finances to enable research on solutions and liaise with universities and researchers in this regard. By formulating a demand for technological innovations, firms thus also unleash the creative and innovative potential of the research community, which leads to an overall better level of knowledge about the state of water resources and the available options to address emerging challenges (Frickel & Davidson, 2004; Shrum & Shenhav, 1995).

Infrastructure developments are of key relevance in water resources management. If well-designed they allow for the efficient exploitation and allocation of water resources to water users, without compromising the natural reserve. Furthermore, infrastructure is needed to collect, transport and process wastewater. Infrastructure developments in the case studies are in the first place catering to the immediate interests of the firms. In those situations, where these interests of firms are inextricably linked to those of surrounding communities, infrastructure investments also constitute a contribution to the specific water management challenges. This requirement is only partly realized in the case studies discussed. Rather there is considerable doubt whether infrastructure solutions will actually benefit the broader community, which points to uncertain long-term dynamics.

A key aspect in infrastructure development is financing. In addition to the actual construction of infrastructure, firms are increasingly becoming involved with the identification and implementation of innovative financing models. Especially in the case of large scale infrastructure, municipal authorities lack the credit-worthiness to back investments. By coupling municipal interests with those of firms operating in the area through off-take agreements, enough security could be offered to private financiers as a loan basis (World Economic Forum, 2008). Financial support in the case studies was very much focused on municipal infrastructure development, rather than catering to needs of individual communities, helping to improve access to water supply and sanitation at the household level (WBCSD, 2009a).

While infrastructure-relevant contributions often have a considerable spatial and impact dimension, they are in many cases combined with a capacity-building program for local administrations. In addition to technical skills, managerial qualifications are built up, for example among municipal

employees. Capacity-building measures vary in terms of their set-up and intensity. In some cases, firms pay for external experts to work with government employees on developing certain skills; in other cases training courses are offered. More comprehensive programs involve long-term and coordinated assistance addressing several managerial shortcomings (such as the joint Lonmin/IFC program (Joint Capacity Initiative Madibeng, 2008)).

A further component of the corporate contribution is related to firms' activities with regards to the making and shaping of the policy dialogue about water management challenges. There is evidence that particularly larger and more internationally oriented firms engage in such activities. These include the setting-up of stakeholder platforms to discuss water management options as well as raising awareness for current or emergent water problems, both at the national as well as the local level. On the one hand, firms are thus provided with the opportunity to drive the public water discourse according to their preferences, on the other hand they might also bring issues to public attention, which might not be raised otherwise and thus provide for a space for mutual exchange and potential learning processes. Whether the behavior by firms analyzed in the case studies can be considered as forward-looking and sustainability oriented, such as proposed by Auld et al. (2008) as well as Loorbach et al. (2009) remains inconclusive from the case study evidence.

Understanding the Mode of Interaction

In addition to the actual contribution, the prevailing modes of interaction/delivery are of relevance. The empirical analysis indicates that cooperative and partnership approaches are the preferred type of interaction for more demanding and complex contributions, such as financial contributions or infrastructure development. This can be explained by the firms' interest in sharing costs and mitigating potential risks.

There is however no distinctive pattern across the three case studies, which indicates that the mode of interaction chosen depends on the contribution to be delivered as well as – in the case of cooperation and partnerships – the availability and characteristics of potential collaborators and partners.

The modes of interaction, i.e. the degree to which other actors are involved and consulted constitute an important indication with regards to the sustainability trajectory of the contribution. In cases where companies engage in dialogue and exchange with government as well as other actors, the contribution is more likely to be integrative and adaptive in the long-term.

Understanding Long-term Dynamics

While the concept of sustainable water management already points to the sustainability of the firms' contributions, the case studies require a more differentiated view of potential long-term dynamics. These are assessed by applying the criteria of time/uncertainty, integration and governance feedback. The investigation reveals that development trajectories of the contributions, which can be considered positive under current circumstances, might actually change for the negative in the long-term.

For example, technological fixes (e.g. water treatment plants, dams), which might appear beneficial under present-day conditions, will need to be transferred to more sustainable management arrangements in order to retain their problem-solving potential (i.e. transfer of operation and maintenance to well-trained local authorities). On the other hand, large-scale water infrastructure

developments might lead to path dependencies and lock-in situations, which forego other potential solutions. A classic example here is dam construction, which enables certain developments, while rendering other uses impossible in perpetuity.

The issue of integration gives rise to the question of who benefits from the contribution. The group of addressees varies considerably across the case studies investigated. While the group of beneficiaries is more encompassing in cases where environmental pollution is prevented or mitigated; the group of recipients is smaller in the case of infrastructure developments. Those settlements in closest proximity to the mines are often the only to benefit. This can partly be justified, as these communities are often also the most affected by negative impacts of mining. Nevertheless, the mines' contributions remain rather patchy and thus a club good, comparable to other services provided by companies (e.g. medical programs).

Often mines' water needs are in conflict with other uses, such as agriculture and tourism, which are only addressed and integrated inadequately in the case study examples. This can be explained by the fact, that water issues are predominantly addressed at the local or national level. The watershed (or basin) perspective however, which should be the main frame of reference for aligning and balancing different water uses, has only been included and considered to a limited extent.

A further aspect is the governance feedback. Companies, for example through capacity-building activities, have a considerable leverage in influencing government actors. While capacity-building is generally viewed positively, it is only a small step to agency capture. Especially in cases, where government capacity is very weak and not in a position to absorb firms' capacity-building initiatives, the relationship is often skewed in favor of firms' interests (see Limpopo case study).

Positive aspects in the context of capacity-building initiatives as well as awareness-raising activities could involve the creation of spaces and opportunities for exchange on key water management challenges as well as the initiation of learning processes among all actors involved, which then again might assist with improving the adaptability of water management system in the face of new challenges. Firm activities in this regard however often straddle the line between a true contribution and the promotion of company interests through lobbying.

The above observations hint at the challenge of assessing sustainability impacts of business contributions to addressing the water challenge. In concluding, it can however be said, that businesses (in the mining industry) do engage with a broad range of activities, which are often complementary to each other and often resonate with industry-specific interests and capabilities. While the intensity of involvement might vary across the case studies, still one finds similar sets of engagement. The drivers and determinants for these types of engagement will be addressed in the following section.

I.2. Drivers

In terms of the most decisive drivers for firm behavior with regards to the above mentioned contributions to sustainable water management, the analysis revealed internal (resource-based) and

government-related drivers as key determinants, while also uncovering some variations with view to other drivers.

Internal (resource-based) drivers proved to be significant in determining the type and intensity of a firms' involvement with the water challenge. Firms with a stable revenue base (and thus the necessary organizational slack) are more likely to contribute than those exposed to more uncertain conditions. The dependence on water as a crucial resource for production processes is a further important aspect. However, one needs to differentiate between water as a key ingredient for processing steps (e.g. in the platinum mining cases) and water-related risks due to pollution impacts (e.g. in the gold mining case). In both cases, water is a driver for corporate behavior; however both drivers lead to different types of response. While in the former situation firms are more proactive in their response, in the latter case they are usually more reactive. The supportive role of other internal drivers, such as employee motivation and individual leadership, could also be confirmed by the case study research.

Apart from these internal factors, the second decisive driver is government at different levels. The following key messages can be derived with regards to the potential roles of government actors.
At the national level, government mainly seeks to mandate certain behavior through setting emission standards or water abstraction limits and enforcing those. A certain shadow of hierarchy is created through monitoring activities, which however lack in capacity and consistency in order to pose a credible threat. In other cases, national government acts as a mediator between lower government levels (i.e. municipalities) and corporations, for example in the context of service delivery partnerships. In cases, where the facilitation is most effective, government combines its shadow of hierarchy with a willingness and ability to cooperate on the part of the companies. On the other hand, the strength of national government as a driver is diminished to some extent due to the lacking coordination of different government departments, which can be partly related to contradicting mandates, attempting to regulate and support business activities at the same time. Furthermore, the formerly very close relationship between the mining industry and the South African (apartheid) government still has a bearing on government – business relations to the present day, compromising government authority.

Looking at the lower levels of government, a different picture emerges. At the municipal level, the lack of adequate service delivery as well lacking managing capacity constitutes a relatively strong driver for business activity. Thus, one can probably rather speak of a shadow of anarchy in these cases. The situation encountered in the municipalities is however more complex. Lacking capacity to perform municipal services functions can for example be compensated by capacity to engage with corporate actors to some extent (such as in the case of the North-West case). In other instances, this capacity is not existent and firms are faced with the choice of either working with the municipalities and building-up administrative capacities or creating their own structures. In the past, they have often resorted to the latter approach, which resulted in infrastructure systems exclusively catering to the mining operations (Van Koppen, 2008).

These findings indicate the dependence of the relative strength and direction of government as a driver on the **capacity of the respective government actors**. Government actors vested with better

financial and human resources but also matching skills and expertise in terms of allocating these resources and engaging with business proved to be more successful in driving business behavior towards sustainable water management. In cases where capacity is present, for example with some national government departments, pressure could be built up, which is a strong motivator on side of companies and leads to some activity. Other cases display the limitations deriving from a weak governance context. As described by McLennan (2004) and Börzel (2010), the incentive system fails under conditions of weak government capacity, when resources and engagement skills are lacking. In this case, firms tend to follow a profit-maximizing rationale. The Platinum/Limpopo case shows some typical indications in this respect.

Of key importance in this regard is however also the interaction of different drivers. In this study, specifically the interaction of government drivers with other potentially existing drivers was investigated in order to identify dominating drivers and derive indications about the most favorable, i.e. effective combination of drivers. The emerging patterns indicate that there is a strong resonance between mandating and facilitating on the part of government and strong internal drivers on the side of business. Effective combinations also involved non-governmental and community activists, international norms as well as the stimulation of competitive or market drivers, such as financial incentives and last but not least mimetic pressures among industry peers. However, the latter combinations are not applied to the extent expected and predicted by literature based on observations in industrialized countries (Delmas & Toffel, 2004). Findings about the relationship of governmental and resource-based drivers on the other hand confirm quantitative observations by Madsen (2009), who shows that firms' responsiveness to the regulatory environment in a specific country context correlates with the company's environmental capabilities (i.e. organizational slack and technological capability).

A further aspect that can be highlighted on the basis of the case studies investigated is a characteristic succession of drivers over time, similar to patterns discussed by Bansal (2005). While this does not necessarily imply that there a consecutive order of drivers without any overlap, still the impression emerges that some drivers form the basis for other mechanisms. Mandating often provides for the underlying motivation to become active, resource-based drivers constitute a similarly strong incentive. Once the respective activity has been commenced, other drivers determine the longevity of the engagement and partly also the mode of interaction in the following stages. Mandating is replaced by facilitative approaches or the endorsement of certain practices in combination with normative pressures from industry peers.

In concluding, it is advisable to re-visit the main question for this thesis – what does it take to engage business in addressing the water challenge? It seems that the optimal approach for involving business would actually build on a shared risk perception by government and business and base on a relatively strong shadow of hierarchy, which should be augmented and balanced by other drivers, specifically those involving other actors through innovative modes of interaction. This confirms previous research discussing the importance of striking a careful balance between mandatory and facilitative approaches (Khanna & Anton, 2002) and the relevance of driving forces originating from government and civil society actors alike (Midttun, 2005). While such approaches and combinations are deemed most conducive for 'sustainable solutions', research conducted in this thesis also confirm

their validity for the field of water governance. At the same time results add a further dimension to water-related research conducted by Pegram et al. (2009) by contributing to a better understanding of the relevance of government capacity in constituting government as a driver.

I.3. Open Questions and Further Research

The qualitative research conducted in this thesis provides for an indication of why businesses might choose to address the water challenge in a certain way. Nevertheless, some questions are left unanswered and new questions are raised, when we consider the overall context of business and sustainable development in areas of weak or limited statehood.

A detailed picture is offered by the case studies regarding key drivers vis-à-vis supplementary driving forces. The analysis of government capacity, as a core element of the strength of government drivers is adding to a more profound understanding of the determinants behind these drivers.

To reiterate, the goal of the present study was mainly to establish a model for business' involvement with the water challenge, based on existing theories, and to refine this model using case study examples.

At the same time, additional qualitative small-N studies will be necessary to further elucidate the dynamic interplay of driving forces over time. To this purpose it will be helpful to conduct a detailed process analysis regarding the unfolding relationships and respective outcomes. In order to increase the explanatory power of the individual driving factors discussed, it would also be advisable to aim for a stronger congruence with a most-similar or a most-different systems design. This would add to a better delineation of context factors and actual drivers. A possible variation, which could be introduced to the present research design, is the in-depth investigation of industry sectors different from mining. Albeit the mining sector offers quite some variety in terms of characteristics, activities and impacts, it is nevertheless determined by very specific sector logics. It would be recommendable to build on the findings and the specifications with view to the identified drivers in the mining industry and make projections as to other sectors and the validity or variation of drivers there.

A further important variation would of course involve additional country case studies, which would allow for considering different dimensions and degrees of the water management challenge. Furthermore, additional country cases might offer further insight into the effect of varying state capacities at the national level and accordingly different set-ups of national water governance systems. However, introducing additional country cases must be carefully controlled by diligently adhering to the case selection logics as discussed above.

Large-N studies on the other hand could build on the model and the factors derived in the present study and apply them to a much larger universe of cases. This quantitative approach would add to the robustness of the model by allowing for the elimination of non-relevant factors and a more nuanced assessment of the relevant strength of different drivers. In accordance with the methodological strengths of a quantitative research design, results would then also have a broader applicability, than the present study, which is only focusing on a limited number of cases.

These two research strategies combined are recommendable to render an even more complete and robust understanding of the role that business plays in addressing water management challenges and their motivations to take on this role.

In discussing the contributions, while this study confirms that there are possibilities for firms to contribute to sustainable water management, the question remains as to the long-term sustainability impact. A brief assessment of potential long-term dynamics, based on the perceptions of selected

interviewees can only provide for a rough indication. A more in-depth analysis in this regard is warranted, drawing on several disciplines, such as suggested by Bossel (1999) and others (Weaver & Rotmans, 2006). Especially when considering the mining industry these questions become relevant. Mining contributes to economic growth, while at the same time compromising the (environmental) basis for growth. The mining industry can thus at best make an incremental contribution; a fundamental change is however not likely. It is thus warranted to investigate the activities and contributions of the mining industry in the context of the activities of other actors as well as in terms of the interplay of different contributions at different governance levels

In discussing drivers, there has been indicative evidence on the potential interaction of drivers and the respective effects. In this regard, the identification of dominating drivers and how these could be activated is most relevant. This also relates to the question of how drivers can be balanced most effectively in order to render the desired results with regards to sustainable development. Mintzberg (1996) describes this balancing act as government engaging business and other societal actors. While the present study thoroughly investigates the relationship between government and business actors as well as the interaction between business and other societal actors, the role of government in activating other societal actors, such as communities, remains comparatively unaddressed.

A further interesting lead to follow is the certain dynamics displayed by driving forces in this interaction. Which drivers serve as a prerequisite for other drivers; at what stage in the process can government drivers be combined with other motivational forces?

These insights can surly be translated into practical guidance for government, providing assistance in regulating and engaging with business. On the other hand, these insights need to be linked even more closely to the aspect of capacity-building. What type of capacity is necessary to mandate or engage in partnerships; which are the most decisive elements of this capacity and how can it be created?

Finally, effects of the driving forces require additional attention. The present study discusses a group of contributions and a group of drivers. This allows for a rough insight into causal relationships between drivers and contributions. However, a more detailed account of exactly what driver might lead to which contribution would be of interest from an academic as well as public policy perspective. This would also allow for a better understanding of processes leading to agency capture.

Similarly, conceptualizing historic legacies as a driver for responsible behavior will increase the explanatory power of the model introduced in the present study. Especially, in the South African context, historic legacies seemed to be engrained in all significant driving forces, however no systematic data was collected on this factor. Historic legacies could be understood as a component of culturally embedded drivers, which according to Visser (2008) are particularly prevalent in the context of developing country and emerging economies.

I.4. Policy Implications

Based on the case study analysis, several policy implications can be derived, for the South African and African context, but also for a more global scale.

From a **South African perspective**, it is obvious that business' potential to make a contribution to sustainable water management is currently underutilized. Particularly in an environment, where business also crucially depends on the availability of water resources, government could add more leverage to its position and better involve business in attaining water-related goals. These goals have

been stipulated in the newly introduced national legislation, but implementation is lagging behind expectations.

Next to a lack of monitoring and enforcement capacity, investment in urban infrastructure constitutes one of the major water management challenges. Concerned municipalities are often too poor to generate the funds needed through tax revenues, leaving this task with national government authorities. Business could step in as a potential partner in this regard (Muller, 2006). This type of involvement is however premised on strong and engaging institutions to guide business' involvement.

With view to addressing pollution impacts, national government has so far placed a strong focus on command and control approaches, which however could not be enforced properly, thus leading to slack behavior on the part of business. To address this situation the South African government has created a consistent institutional setting by re-structuring the water-related departments in 2009. Further steps would include a clear regulatory approach vis-á-vis the mining industry, taking into account past legacies. Activating non-governmental stakeholders and communities, involving them in monitoring and surveillance activities could be a further strategy to follow, as shown in the case of the gold industry.

Furthermore, working with industry leaders, which set a positive example through best practices, management efficiency as well as technological innovations, is a commendable approach, as industry peers are to some extent likely to adopt similar strategies due to mimetic pressures. However, this involvement needs to be carefully designed to avoid co-option by industry and must be directed at the long-term perspective. In addition, a cross-sectoral transfer of best practices appears to be recommendable. While the mining industry offers some good examples, other industry sectors, such as the beverage industry, are even more progressive in this regard.

All this highlights the issue of capacity, which varies significantly across the different governance levels in South Africa. Building consistent capacity throughout the entire system emerges as the main priority, while raising the question: Capacity for what? Administrative capacities are at the foundation, but need to be augmented by sustainability safeguards, that ensure grounded and well-balanced decisions.

While South Africa still displays some severe deficits in this regard, the overall situation is rather promising as capacity is slowly increasing across all levels. Considerations however become increasingly relevant in **other African states** as well, as the mining industry (and other water-intensive businesses) is continually expanding across the continent. Just focusing on the gold mining industry, new operations are currently being set-up mainly in West Africa in countries such as Senegal, Mali and also Burkina Faso. While some of these countries dispose of advanced national legislation pertaining to mining operations (e.g. Senegal), the questions posed in the context of this thesis will continually re-emerge in the local governance contexts, where mines interact with (at times very weak) government in managing water resources as well as other sustainability aspects.

Taking a **global perspective**, businesses across the world and particularly in water scarce regions are currently discovering the world of water, not only as key input factor, but also as a business opportunity and to some extent as a responsibility (BSR & PacInst, 2007; Morrison & Gleick, 2004; WBCSD, 2009b). As experienced in the area of corporate (social) responsibility, we find different positions and interpretations of the concept, ranging from serious commitment to haphazard

activities. Overall, as demonstrated by this study, business disposes of a thus far untapped potential to make a beneficial contribution to sustainable water management. This ranges from taking responsibility for own impacts to providing information and knowledge, watershed planning, fostering technological innovations and also includes contributions to infrastructure development and finance as well as potentially beneficial impacts on policy and learning processes. Still, evidence shows that these activities do not come about automatically.

Recurring on well-established positions on embedded business (Ruggie, 2003), these should probably also guide the debate on business and water at the global scale. Government, whether national or local, or in the guise of transnational organizations, needs to play an important role for the following reasons. Only government devises of the authority and necessary neutrality to govern water as a common pool resource and ensure that water is not only available to a small minority as a club good. Firms tend to adopt a more limited view in this regard, applying a factory-fence perspective or only considering the immediate neighborhood. This is for example also reflected in the comment on private actors and the human right to water, issued by the Independent Expert to the UN Secretary General on the Human Right to Water (Human Rights Council, 2010). While assuring that private actors have an important role to play to ensure this right, government is instituted as the main duty-bearer of the right. Thus, a recommendable approach is probably a careful rapprochement of government and private actors, to elicit joint interests and delineate roles and responsibilities. The importance of involving a wide range of other societal actors is emerging as a broadly accepted consensus.

Eventually, in again broadening the scope, all considerations boil down to the question of what it takes to ensure that business' contributions are sustainable, or more generally what this implies for the (African) state, regulatory capacities and governance for sustainable development. The research conducted in the context of this study confirms earlier claims, which state that a capacitated state is necessary to engage other actors in governance for sustainable development (Van Zeijl-Rozema et al., 2008) and that this capacity needs to allow for different modes of engagement (Hyden, 2002), particularly with view to engaging business (Fox et al., 2002). In concluding and quoting McLennan (2004) 'unless attention is given to developing institutional capacity, sustainable development will remain an imaginary exercise', a case can be made for the development of capacity, which allows for the inclusive and balanced management of economic, social and environmental issues.

As democratic practices and social capital are often viewed as the basis for these modes of governance (Putnam, 1993), current international efforts to support democratization and development in Africa can be considered a welcome initiative. The findings of this study demonstrate that these are inevitable efforts in balancing effects deriving from other international trends, such as increasingly dominating multinational corporations, globalised financial markets as well as global environmental change (Held, McGrew, & Goldblatt, 1998; Held & Young, 2010). The results thus also assist in advancing the understanding of governance requirements to facilitate a transition to sustainable development through a green economy, such as proposed in the Rio plus 20 process.

The South African example demonstrates specific challenges as well as potential solutions in the national context and thus also points to important aspects for the development of future international efforts in the area of sustainable development.

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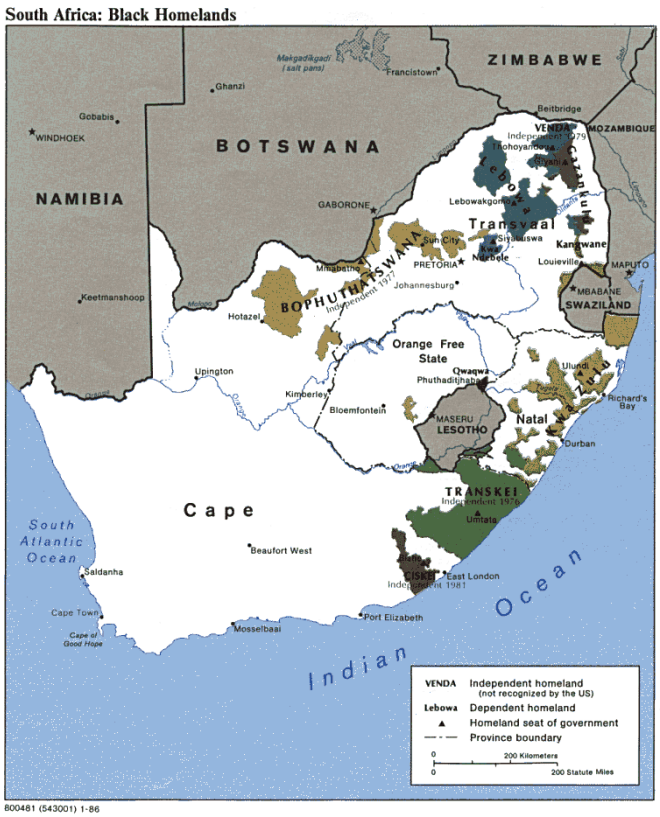
K. Annex

K.1. Provincial Structures before and after Apartheid



K.2. List of Interviews (Position and Affiliation at the Time of Interview)

Case Study 1: WITWATERSRAND Gold Mining

1. Barnard, Sylvia, Township Resident, 1 December 2008, Kagiso
2. Du Toit, Stephen, Mohale City Municipality, 31 October 2008, Krugersdorp Game Reserve
3. Ellis, Jozua, Environmental Management Department, AngloGoldAshanti, 22 August 2008, Johannesburg
4. Fine, Alan, Public Affairs Manager, Anglo Gold Ashanti, 25 March 2007, Marshalltown
5. Gilmore, Robert, Environmental Manager, Harmony Gold, 13 November 2008, Randfontein
6. Hollesen, Paul, Vice President Environment and Community Affairs, Anglo Gold Ashanti, 22 August 2008, Johannesburg
7. Jacobs, Phillip, Sustainable Development, South African Operations, Gold Fields, 6 August 2008 Johannesburg
8. Jacobsz, Willie, Senior Vice President, Gold Fields, 20 March 2007, Parktown
9. Keet, Marius, Deputy Director, DWAF Gauteng Regional Office, 29 August 2008, Pretoria
10. Keller, Sarel, Environmental Manager, Harmony Gold, 13 November 2008, Randfontein
11. Klopcic, Igor, Technical Manager, Harmony Gold, 13 November 2008, Randfontein
12. Kruger, Kevin, General Manager: Environment, DRD Gold, 6 August 2008, Johannesburg
13. Lea, Irene, Group Environment Manager, Pamodzi Gold, 12 November 2008, Springs

14. Liefferink, Mariette, Activist WestRand, Several meetings July – September 2008, Johannesburg
15. Maree, Basie, Group Executive – Operations, Mintails, 13 August 2008, Pretoria
16. Mqulwana, Pamela, Environmental Officer, DWAF Region, Water Quality, 15 November 2008, Krugersdorp
17. Myburg, D.L. Manager. Disaster Management, West Rand District Municipality, 4 December 2008, Randfontein
18. Noge, Rosemary, Sustainable Development Manager, Gold Fields, 20 March 2007, Parktown
19. Novhe, Obed, Environment Department, DME Region Gauteng, 28 August 2008, Johannesburg
20. Parsons, Andrew, Environmental Advisor, Anglo Gold Ashanti, 22 August 2008, Johannesburg
21. Ramsuchit, Danny, Environmental Manager, Gold Fields, 6 August 2008, Johannesburg
22. Rex, Harry, Manager: Environmental Management, Sustainable Development, Africa Underground Region, Anglo Gold Ashanti, 22 August 2008, Johannesburg
23. Schoeman, Jaco, Managing Director, Western Utilities Corporation, 31 October + 7 November 2008, Centurion
24. Stoffberg, Susan, Environmental Officer, Western District Municipality, 30 November 2008, Randfontein
25. Sutton, M., Engineering Department, Anglo Gold Ashanti, 22 August 2008, Johannesburg
26. van der Walt, Dick, Group Chief Executive, Mintails, 23 September 2008, Pretoria
27. Zorab, Rex, Environment Manager, Harmony, Chairman of WBEC, 13 November 2008, Randfontein

Case 2: MPUMALANGA Coal Mining

1. Bopape, Goodness, DWAF Mpumalanga Regional Office, 21 October 2008, Bronkhorstspruit
2. Bosman, Carin, former DWAF, now independent consultant, 29 August 2008, Pretoria
3. Bouwer, Rudolph, Acting Chief Civil Engineering, Steve Tshwete Local Municipality, 22 October 2008, Middelburg
4. Clark, Sharon, Environmental Advisor, bhp Energy Coal South Africa, 23 October 2008, Witbank
5. Cogho, Vik, Environmental Manager, bhp Billiton, 3 November 2007, Witbank
6. Cogho, Vik, Environmental Manager, Optimum, 23 October 2008, Middelburg
7. Garner, Richard, Environmental Services Manager, Anglo Coal, 28 August 2008, Johannesburg
8. Ginster, Martin, Water and Waste Advisor, Safety, Health and Environment Centre, SASOL, 26 September 2008, Rosebank
9. Gunther, Peter, Environmental Manager, Anglo Coal, 29 July 2008, eMalahleni
10. Lodewijks, Henk, Anglo Coal, Olifants River Forum, 30 October 2008, Johannesburg
11. Mfolo, Yvonne, General Manager Public Affairs, Anglo Coal, 28 August 2008, Johannesburg
12. Mokonyane, Martha, Assistant Director, DME Region Mpumalanga, 15 October 2008 (phone)
13. Ntekele, Risimathi, Nkangala District Council, 22 October 2008, Middelburg
14. Pretorius, Koos, Independent Farmer Mpumalanga, 31 July 2008, Pretoria
15. Tshwete, Lendela, Head of Department: Water, eMalahleni Municipality, 19. Aug 08, eMalahleni
16. van Aswegen, Johan, Director, DWAF Mpumalanga Regional Office, 20 October 2008, Bronkhorstspruit
17. van Niekerk, Dr. Andre, Director, Golder Associates, 30 September 2008, Midrand

18. Wegmann, Mattia, Advisor, Strengthening Local Governance Programme, GTZ Mpumalanga Rural Development Programme, 10 December 2008, Pretoria

Case 3 and 4: NORTH WEST & LIMPOPO Platinum

1. Ahi, Alfie, Manager Process Technology, Randwater, 14 July 2008, Johannesburg
2. Bierman, Bertus, Manager Engineering, Spatial Development, Anglo Platinum, 3 November 2008, Johannesburg
3. Botha, Anita, Independent Consultant, WZC (Pty.) Ltd., 30 October 2008, Johannesburg
4. Botomani, Pogiso, Rustenburg Environmental Coalition, 9 October 2008, Rustenburg
5. Bullock, Stephen, Head of Sustainable Development, Anglo Platinum, 3 November 2007, Johannesburg
6. Brink, Ilma, Associate Director, Bigen Africa, 3 December 2008, Pretoria
7. Capel, John, Director, Benchmarks Foundation, 23 March 2007, Johannesburg
8. Coombes, Peter, Head of Environment, Anglo American, 28 October 2008, Johannesburg
9. de Jongh, Koos, Municipal Manager, Sekhukhune District Municipality, 3 December 2008, Groblersdal
10. Eric, Luka Environmental Forum, 8 October 2008, Rustenburg
11. Heimann, Eric, Environmental Manager, Anglo Platinum, 25 November 2007, Johannesburg
12. Ireton, Karen, Head of Sustainable Development: Markets and Economics, Anglo American, 28 October 2008, Johannesburg
13. Jackson Nkadimeng, Acting Director Water Services Department, Sekhukhune District Municipality, 3 December 2008, Groblersdal
14. Juta, Monde, Head of Water and Sanitation, Madibeng Municipality, 8 December November 2008, Brits
15. Keyser, Alicia, Senior Project Management, TCTA, 4 November 2008, Centurion
16. Khutsoane, Lesego, Manager Economic Development, Bojanala Platinum District Municipality, 13 November 2008, Rustenburg
17. King, Patrick, Head of Infrastructure Development and Planning, Royal Bafokeng Administration, 28 November 2008, Rustenburg
18. Kleingeld, Dirk, Projects Director, Bigen Africa, 3 December 2008, Pretoria
19. Koitsioe, Gontse, Bojanala Platinum District Municipality, 13 November 2008, Rustenburg
20. Krzyzanowska, Josephine, Environmental Manager, Impala Operations Rustenburg, 10 October 2008, Rustenburg
21. Lourens, Pierre, Impala Platinum Limited, Group Executive for Sustainable Development, 5 November 2008, Illovo
22. Mabunda, Adelaide, IDP Manager, Sekhukhune District Municipality, 3 December 2008, Groblersdal
23. Mahuma, Teboho, Manager, Impala Bafokeng Trust, 12 November 2008, Illovo
24. Makhoana, Tikologo, Engineering Department, Moses Kotane Local Municipality, 4 December 2008, Kroondal
25. Malan, Jacobus, Regional Manager, Anglo Platinum Operations Rustenburg, 30 October 2008, Johannesburg
26. Malau, Tina, Social Development Manager, Impala, 1 December 2008, Rustenburg
27. Maynard, Mark, Senior Manager Engineering, Lonmin Platinum, 28 November 2008, Mooinooi
28. Mokwena, Barnard, Vice President. External Affairs, Lonmin, 4 December 2008, Mooinooi
29. Molefe, Matshidiso, Manager: CSI, Royal Bafokeng Holding, 12 November 2008, Illovo

30. Molokoane, Comfort, Municipal Manager, Bojanala Platinum District Municipality, 13 November 2008, Rustenburg
31. Moopelwa, Gloria, IDP Manager, Rustenburg Local Municipality, 9 October 2008, Rustenburg
32. Moraka, William, Manager: Water Services, SALGA, 3 November 2008, Menlyn
33. Mutamba, Jeremiah, Water Manager, Environmental Center of Excellence, Lonmin, 10 November 2008, Mooinooi
34. Myeza, Thabani, Executive Manager of Randwater Services, Chair of the NEPAD Business Forum, Randwater, 2007, Melrose
35. Olivier, Andre, Director, Bigen Africa, 14 November 2008, Pretoria
36. Paxinos, Kimon, Independent Consultant, Afcap Consulting, 7 October 2008, Pretoria
37. Pretorius, Nik, Engineering Manager, Rustenburg Local Municipality, 1 December 2008, Rustenburg
38. Ramagaga, George, Director Engineering Services, Moses Kotane Local Municipality, 4 December 2008, Mogwase
39. Sheppard, Chris, General Manager, Lonmin Platinum, 12 November 2008, Bryanston
40. Slabbert, Friedrich, Director, UWP Consulting, 10 October 2008, Rustenburg
41. Tau, Johanna, Transformation Manager, Impala Platinum Limited, 1 December 2008, Rustenburg
42. Townsend, Vaughan, Senior Manager Engineering, Impala Operations Rustenburg, 11 November 2008, Pretoria
43. Zitha, Malmsey, Transformation Manager, Anglo Platinum, 10 November 2008, Rustenburg

National Government; Research and Science

1. Ashton, Pete, Principal Scientist Natural Resources and the Environment, CSIR (several meetings between July and September 2008), Pretoria
2. Bahri, Girum, Project Manager, GTZ, 29 July + 1August 2008, Pretoria
3. Botes, Hermien, NBI, 24 July 2008, Johannesburg
4. Claassen, Marius, Manager: Water Resources, CSIR, 8 July 2008, Pretoria
5. Coetzee, Henk, Senior Scientist, Council for Geosciences, 26 August 2008, Pretoria
6. Cross, Jessica, Chief Executive Officer, Minelife, 30 May 2008, London, UK
7. Eccles, Neil, Project Manager, UNISA CCC, 25 August 2008, Pretoria
8. Fourie, André, Chief Executive Officer, National Business Initiative, 23 March 2007, Johannesburg
9. Groom, John, Chief Operating Officer, ICMM, 30 May 2008, London, UK
10. Guthrie, Byron, Deputy Director (Mineral laws administration), Government Task Team on Mine Closure, DME, 11 November 2008, Pretoria
11. Hemraj, Sharlin, Tax Policy Unit, Treasury Department, 31 October 2008, Pretoria
12. Hobbs, Phil, Research Hydrologist, CSIR (several meetings between July and September 2008), Pretoria
13. Klins, Ulrich, Advisor UN Global Compact Regional Learning Forum, GTZ, 29 July + 1 August 2008, Pretoria
14. Lesufi, Niks, Senior Executive health and Environment, Chamber of Mines, 25 September 2008, Johannesburg
15. Lindley, David, WWF Working for Wetlands, 29 July 2008, Centurion
16. Manase, Gift, Water Resource Economist, CSIR Built Environment, 1 November 2008, Johannesburg

17. Maree, Jannie, Divisional Fellow for the Division of Water Technologies, CSIR, 18 August 2008, Pretoria
18. Mathe, Shirley, Environmental Officer, DME, 26 August 2008, Pretoria
19. Mohr-Swart, Maryna, Assistant Environmental Adviser, Chamber of Mines, 25 September 2008, Johannesburg
20. Motaung, Solly, Senior Scientist, CSIR, 18 August 2008, Pretoria
21. Mudau, Stephinah, Senior Environmental Officer, DME, 11 November 2008, Pretoria
22. Muller, Mike, Graduate School of Public and Development Management, University of the Witwatersrand, 30 November 2006, Johannesburg
23. Munnik, Rianna, Water Quality, Mine Water Management, DWAF, 4 August 2008, Pretoria
24. Musee, Ndeke, Senior Research, CSIR, (several meetings between July and September 2008), Pretoria
25. Oberholzer, Michael, Government Task Team on Mine Closure, DME, 11 November 2008, Pretoria
26. Oelofse, Suzan, Senior Scientist, CSIR, (several meetings between July and September 2008), Pretoria
27. Phala, Lesshidi, Government Task Team on Mine Closure, DME, 11 November 2008, Pretoria
28. Pyke, Peter, Chief Engineer, National Water Resource Planning, DWAF, 5 December 2006, Pretoria
29. Rademeyer, Seef, Chief Engineer, National Water Resource Planning, DWAF, 16 October 2007, Pretoria
30. Rascher, Jeanette, Research Group Leader, CSIR, 25 August 2008, Pretoria
31. Reeve, Charles, Project Officer, Delegation of the European Commission in South Africa, 27 October 2008, Brooklyn
32. Roberts-Davis, Tanya, International Women and Mining Network, 25 November 2008, Westonaria
33. Tekateka, Reggie, Independent Advisor, Former DWAF, 16 January 2010, Dakar, Senegal
34. Turton, Anthony, Research Group Leader: Water Resource Governance Systems, (several meetings between July and September 2008), Pretoria
35. Van Koppen, Barbara, Principal Researcher, Poverty, Gender and Water, IWMI, 2 December 2006, Pretoria
36. van Rooyen, Johan, Director of National Water Resource Planning, DWAF, 21 August 2008, Pretoria
37. van Zyl, Fred, Director Water Services, DWAF, 4 November 2008, Pretoria

K.3. Sample interview guidelines

Questionnaire
Draft: August 4, 2008
Nicole Kranz, Freie Universität Berlin/CSIR

Nota bene:
This questionnaire serves as a guideline for interviews to be conducted in the context of empirical work for my dissertation project.
It should be noted that the questionnaire will be administered in a semi-structured mode, i.e. allowing for additional questions and more details where the interviewee feels that more information should be provided or where it is necessary to tailor the questions to a specific situation or case. Interviewees are free to decline any question without need for explanation.

Goal for this interview

- To learn more about the interaction between corporate actors, regulators as well as other actors in the West

Rand Gold Mining area with specific focus on the issue of water pollution due to mining activities,

- To see how this is embedded in the overall strategy and organizational structure of the respective company.

Intro to project and model
See explanation and model in PowerPoint presentation attached

1. **Interviewee identification**

Please briefly describe your position/tasks/areas of responsibility in the company

2. **Discussion of main issues**

What according to your perspective are the main issues and problems from an environmental perspective in the West Rand Basin?
(Please also refer to how these are related to social issues)

How would you describe your company's stake and role in this regard?

What could be your company's contribution to addressing/solving these issues?

What are major opportunities, what are major constraints?

What impact could your activities have?

What are the major compromises that need to be made at the moment with regards to possible solutions?

3. **Interaction with other stakeholders**

a. **Government**

How would you describe the role of government actors in this scenario?

How would you describe your interaction with government actors at different levels?
Describe the role and type of interaction with these government actors (at the national, local etc. level)

What were the main issues and challenges encountered here and how are they addressed?

What role does legislation play in addressing these issues? Do you think that legislation is sufficiently covering these issues?

What other types of regulation (i.e. guidelines, incentives, ….) are of relevance?

What would be an ideal mix of binding as well as non-binding forms of engagement regarding the problems in the West Rand Basin?

b. **Other mining companies**

In what way and in what terms are you working together with other mining houses in order to address these challenges?

How is this collaboration institutionalized?

What role does the Mining Interest Group play? Are there other similar fora in place?

c. **Other actors**

What other actors are relevant with regards to the issues at hand?

What has been the role of NGOs/ community and CBOs/ labour/ scienctific community?

How would you describe your interaction with these?

4. **Integration with overall company strategy**

What effect does the involvement in the West Rand have on overall company strategy, how is it embedded?

What are the main determinants/drivers for the strategy adopted towards these issues by your company?
(List of possible drivers: national policies & legislation, international discussion on sustainable development and the mining sector, investors and shareholders (national, international), benchmarking with industry peers, home country regulation (where applicable), reputational risks, ...)

Who is involved in the management of these issues within the company, at what level are the dealt with and decided upon and which levels do you have to report to?

How would your company define sustainable development? What are the most important aspects for your company and how is this reflected in the strategy?

What are the major trade-offs you encounter when dealing with water issues in the West Rand Basin? What is your approach towards dealing with occurring trade-offs?

K.4. Short Summary

This interdisciplinary study aims to provide further insights into the intricate question of whether and how private for-profit actors, i.e. business, can make a contribution to sustainable development and more precisely what drives or motivates them to do so. Put differently: can business, which is often perceived as part of the sustainability challenge, be part of a potential solution? While this question has been addressed quite extensively in business as well as public policy literature alike for the context of Western, industrialized countries, the thesis takes on a different perspective by considering the situation in an emerging economy - South Africa - with somewhat weakly developed regulatory capacities. It is claimed that especially in developing countries and emerging economies, governments are faced with the double burden of managing multiple and often highly complex sustainability challenges, ranging from poverty alleviation, economic growth and environmental protection, while at the same time lacking the capacity to effectively monitor and control corporate actors as well as the ability to facilitate much needed corporate contributions to address sustainability challenges.

In order to approach these complex dynamics, the study undertakes several empirical concentrations. First, it focuses on sustainable water management as a proxy for and integral component of sustainable development. Water resources worldwide are under severe pressure due to pollution, abstraction and climate change impacts. Access to water services, which is increasingly considered as a fundamental human right, is still not universally available. Both aspects constitute a veritable concern in the South African setting as well. A second focus is introduced by specifically analyzing the dynamics in the mining sector. This industry not only has massive impacts on water quality, but also potentially significant repercussions with view to water infrastructure development. Mining is considered an inherently 'unsustainable' business, while at the same time mining firms often become deeply involved with governance processes at the local government level.

The following research questions have been identified to elicit the underlying dynamics and combined into a preliminary model. In the first place, the model seeks to conceptualize the type of potential business contributions to addressing the water challenge as well as the modes of interaction with other actors in delivering these contributions, while paying attention to potential long-term trajectories with view to sustainable development (dependent variable). Secondly, the independent variables are conceptualized as those factors that motivate and influence corporate actors to make a contribution to sustainable water management. Specific emphasis is placed on the role of government actors and the underlying capacity necessary for taking on certain roles in interacting with business actors.

The methodology employed to address these questions and validate the preliminary model is based on a qualitative, case-oriented and empirically-rich research approach. Involving a small number of cases, this method allows for an in-depth analysis of processes and dynamics. Empirical data was collected through semi-structured interviews conducted during field research in South Africa in 2007-2008. Case study selection roughly follows the principles of a most different systems design in that there is variation of the independent variables. Four cases are analyzed looking at mining operations in four different South African provinces with a varying industry structure and commodities mined as well as varying government capacity at the local level. The case studies are subject to detailed within-case analyses and a structured focused comparison.

Looking at the results, it is remarkable that by and large the immediate contributions to addressing the water challenge of companies do not vary considerably across the four cases. Firms are involved

with planning and monitoring activities, technological innovations, infrastructure development and financing, but also capacity-building and awareness-raising and agenda-setting activities. There were no case-specific patterns in terms of the mode of interaction as well; rather there is a correlation between certain contributions and the respective mode of interaction employed (e.g. capital – intensive infrastructure contributions were mostly realized through collaborative and partnership approaches). While long-term dynamics in the individual case studies are difficult to gauge, preliminary assessments indicate not only considerable uncertainties, potential shortcomings with regards to integration with other policy field as well as potentially negative feedback on government capacity in some of the cases.

The role of government actors, ranging from mandatory (i.e. regulation monitoring and enforcement) to more facilitation-oriented approaches, as well as resource-based considerations, i.e. firm internal factors emerged as the most decisive drivers. The latter include the relevance of the resource water, available financial resources as well as the overall disposition of firm to address sustainability and water challenges. Detailed within-case analyses furthermore display interactions among these as well as between these and other drivers, such as social drivers (NGOs, community groups and traditional authorities) as well as competitive (market, prices) and normative (international and national norms) drivers, which often exert an enhancing effect. Furthermore, a sequence of drivers could be identified, where certain drivers lay the foundation for the introduction of others. Next to strong government intervention, also certain weakness of (especially local) government actors constitutes a veritable driver in some cases.

Thus, in terms of the policy implications that can be drawn from the research conducted, a combination of different drivers and building on the respective inherent disposition of companies appears to be advisable for eliciting a corporate contribution to addressing water challenges. The necessity for governments to play a strong role, to interact with a wide range of actors and to diligently combine different policy tools remains a valid demand, especially with view to beneficial long-term implications. However, the capacity necessary to fulfill this role probably needs to be viewed more differentially than before. Capacity-building measures are still warranted in areas of limited statehood and should be targeted not only at creating a shadow of hierarchy and improving the financial viability but also at improving government ability to cooperate and engage with corporate actors and activate their internal motivation to take action.

The results have their clear implications for the debate on governance for sustainable development and the relationship of private actors and the state in emerging economies. From a more global perspective, they are of relevance for advancing the discourse on business and water management.

K.5. Kurze Zusammenfassung

Die vorliegende interdisziplinäre Arbeit befasst sich mit der Frage, ob private, gewinnorientierte (Wirtschafts-) Akteure einen Beitrag zu nachhaltiger Entwicklung leisten können und im Besonderen unter welchen Bedingungen sie dies tun. Anders gefragt: können Unternehmen, die oft als problematisch mit Hinblick auf viele Nachhaltigkeitsaspekte wahrgenommen werden, Teil einer Lösung, eines Beitrages zu nachhaltiger Entwicklung sein? Während diese Frage schon verschiedentlich in der Wirtschafts- und Policy Literatur für westliche Industrieländer diskutiert worden ist, fokussiert sich diese Arbeit auf die Zusammenhänge in sich entwickelnden Schwellenländern – am Beispiel Südafrikas – mit eher schwach ausgeprägten regulativen Kapazitäten. Entwicklungs- und auch Schwellenländer sehen sich im Bezug auf nachhaltige Entwicklung oft einer doppelten Belastung gegenüber. Zum einen haben sie mit vielfältigen Herausforderungen, von Armutsbekämpfung, über fehlendes Wirtschaftswachstum bis hin zum Umweltverschmutzung zu kämpfen. Zum anderen fehlt Ihnen zudem die Kapazität, Unternehmen adäquat zu überwachen, kontrollieren und sanktionieren sowie ggf. effektive Partnerschaften mit den Akteuren einzugehen, die unter Umständen einen Beitrag zur Lösung einiger Herausforderungen leisten können.

Um sich diesen komplexen Fragestellungen zu nähern, nimmt die vorliegende Studie folgende Fokussierungen vor. Zum einen konzentriert sie sich auf nachhaltiges Wassermanagement, als Spiegel und integralem Bestandteil nachhaltiger Entwicklung. Wasserressourcen stehen weltweit unter einen hohen Belastungsdruck infolge von Verschmutzung, Übernutzung und auch dem Klimawandel. Der Zugang zu Wasserdienstleistungen, mittlerweile als Menschenrecht erachtet, kann bisher noch nicht weltweit gewährleistet werden. Beide Aspekte stellen auch in Südafrika große Herausforderungen dar. Des Weiteren setzt sich die Arbeit mit den relevanten Prozessen in der südafrikanischen Bergbauindustrie auseinander. Dieser Industriesektor ist oft nicht nur für massive Wasserverschmutzung und – verbrauch verantwortlich, sondern hat auch unmittelbare Auswirkung auf Wasserversorgungs-Infrastruktur. Bergbau gilt im Allgemeinen als genuin nicht-nachhaltig; andererseits sind Bergbauunternehmen oft in Verwaltungsprozesse auf lokaler Ebene involviert.

Die folgenden Forschungsfragen wurden abgeleitet, um die zugrundeliegenden Dynamiken abzubilden, und in einem vorläufigen Modell zusammen geführt. Im ersten Schritt bildet das Modell die verschiedenen Arten des unternehmerischen Beitrags zu nachhaltigem Wassermanagement ab; ebenso werden die verschiedenen Interaktionsformen bei der Erbringung der Beiträge, sowie mögliche langfristige Entwicklungsszenarien untersucht (abhängige Variable). Zweitens werden die unabhängigen Variablen als diejenigen Faktoren eingeführt, die das Firmenverhalten motivieren und beeinflussen. Besonderer Schwerpunkt liegt hierbei auf der Rolle des Staates sowie der jeweiligen Kapazität verschiedener staatlicher Akteure zur Ausfüllung dieser Rolle.

Der methodische Ansatz zur Analyse dieser Fragestellung und somit zur Validierung des vorgeschlagenen Modells basiert auf einem qualitativen, Fallstudien-basierten Forschungsdesign. Aufgrund der kleinen Fallanzahl bietet sich die Möglichkeit einer detaillierten Analyse der entsprechenden Prozesse und Dynamiken. Daten wurden zumeist mittels halb-strukturierter Interviews während der Feldforschungsphase in Südafrika in den Jahren 2007 bis 2008 gesammelt. Die Fallauswahl folgt im Ansatz einem ‚most-different-systems' Ansatz, der Variation der unabhängigen Variablen vorsieht. Vier Fallstudien werden untersucht, die in vier verschieden südafrikanischen Provinzen angesiedelt sind. Unterschiede ergeben sich unter anderem durch den jeweils abgebauten Rohstoff, die Struktur des Sektors sowie die Kapazität der Verwaltung auf lokaler

Ebene. Zusätzlich zu einer Einzelfallanalyse werden die Fallstudien mittels eines strukturierten Vergleichs miteinander in Beziehung gesetzt.

Betrachtet man die Ergebnisse, so ist zunächst auffällig, dass sich die einzelnen Fallstudien in den geleisteten Beiträgen zwar ein wenig, jedoch nicht signifikant unterscheiden. Firmen beteiligen sich durch Planungsaktivitäten, das Erstellen und auch Bereitstellen von Wassermonitoring-Daten, technologische Innovationen, die Entwicklung und Finanzierung von Wasserinfrastruktur, sowie Kapazitätsaufbau und –transfer und Beiträge zu Lernprozessen im Wassermanagement. Ebenso ergibt sich kein dezidiertes Muster hinsichtlich der Interaktionsformen in den einzelnen Fallstudien; dies ist allerdings der Fall bei den einzelnen Beiträgen, die jeweils typische Interaktionsformen aufweisen (so werden beispielsweise kapitalintensive Infrastrukturvorhaben durch kollektive oder Partnerschaftsmodelle realisiert). Langfristige Entwicklungsszenarien in den Fallstudien sind nur schwer abzuleiten, erste Abschätzungen weisen jedoch auf mögliche Unsicherheiten bezüglich des Beitrages zu Nachhaltigkeit, Schwachstellen bei der Integration mit anderen Politikfeldern sowie mögliches negatives Feedback auf staatliche Akteure in einigen Fällen hin.

Staatliche Akteure, in der Rolle als Regelsetzer oder auch als Vermittler, spielen als treibende Kräfte für das Firmenverhalten eine große Rolle in allen Fallstudien. Hierbei ist nicht immer ein starkes Eingreifen des Staates entscheidend, sondern auch eventuelle Schwäche bei der Bereitstellung von Dienstleistungen. Darüber hinaus stellten sich in allen Fällen Faktoren, die mit firmeninternen Ressourcen in Zusammenhang stehen, also verfügbare finanzielle Mittel, Relevanz der Ressource Wasser, sowie die allgemeine Disposition der jeweiligen Firma im Bezug auf Nachhaltigkeitsfragen. Darüber hinaus ergab die Einzelfallstudie ein Zusammenspiel dieser beiden Faktoren untereinander sowie mit anderen untersuchten Faktoren, wie gesellschaftlichen Faktoren (NGOs, Bürgergruppen und traditionelle Autoritäten), kompetitive Faktoren (Märkte und Preise) sowie normativen Faktoren (nationale und internationale Nachhaltigkeitsnormen). Ebenso konnte in einigen Fallstudien eine Abfolge verschiedener Treiber festgestellt werden, wo bestimmte Faktoren die Grundlage für jeweils andere darstellen.

Bezüglich der Implikationen mit Hinblick auf die Ausgangfragestellung, die sich aus diesen Ergebnissen ableiten lassen, erscheint die Kombination mehrerer entscheidender Faktoren unter Berücksichtigung der jeweiligen firmeninternen Disposition als eine empfehlenswerte Strategie, um einen Beitrag von Unternehmen zu nachhaltigem Wassermanagement zu erwirken. Die wichtige Rolle des Staates und der Aspekt der notwendigen Kapazität, verschiedene Ansätze kombinieren zu können und mit einer Vielzahl von Akteuren zu interagieren, ist gerade mit Hinblick auf langfristige Entwicklungen von zentraler Bedeutung. Die hierfür benötigte Kapazität ist jedoch differenziell zu sehen. Kapazitätsbildende Maßnahmen sind notwendig wo diese bisher nur schwach ausgeprägt sind. Neben der Stärkung des Schattens der Hierarchie und finanzieller Kapazitäten, sind auch die Fähigkeit mit Unternehmen zu interagieren und ihre intrinsische Motivation zu aktivieren, sich entsprechend zu engagieren.

Die Ergebnisse der Arbeit tragen zum Diskurs über Nachhaltigkeits-Governance und der spezifischen Rolle von Unternehmen in Schwellenländern bei. Ebenso lassen stellen sie eine Grundlage für ein besseres Verständnis der Rolle von Unternehmen im Bezug auf Fragen des Wassermanagements dar.

K.6. CV

Mein Lebenslauf wird aus Gründen des Datenschutzes in der elektronischen Fassung meiner Arbeit nicht veröffentlicht.

Due to reasons of data privacy protection, my CV is not included in the electronic version of my thesis.

Curriculum Vitae

For reasons of data protection,
the curriculum vitae is not included in the online version