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**WATER, SANITATION AND HYGIENE:
SUSTAINABLE DEVELOPMENT AND MULTISECTORAL APPROACHES**

**The strategic role of water in sustainable economic growth
and development: The case of South Africa**

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REFEREED PAPER 185

This paper analyses the strategic role of water in South Africa's economy at the macro and sectoral levels. At the macro-economic level, an analysis of the correlation between precipitation and economic growth shows that although the country is relatively water scarce, investment in water infrastructure and diversification has played an important role in building the economy and reducing vulnerability. However, the country's current per capita water storage of 700m³ is very low compared to other middle income countries and may compromise attainment and sustenance of the targeted 6% economic growth rate. At the sectoral level, the paper highlights efficiency and water productivity issues that require urgent attention especially in agriculture. The paper concludes that there is a strong correlation between water and the economy highlighting the impact of floods and droughts in other SADC countries and makes the case that investing in water infrastructure, management and services is absolutely essential and a necessary prerequisite for sustainable economic growth, poverty alleviation and social development.

Background

At the 4th World Water Forum, held in Mexico in 2006, the global community emphasised the need to manage and develop water resources in such a way that promote growth and alleviate poverty in a responsible and equitable manner. In April 2007, South Africa launched the theme of *Water for Growth and Development* as a driving paradigm for the water sector (DWAF, 2008). This, together with the launch of the Accelerated and Shared Growth Initiative of South Africa (ASGISA), shifted focus of the water sector beyond the provision of basic water and sanitation services, and called for a comprehensive national plan that address the dynamics of water, growth, poverty, and development

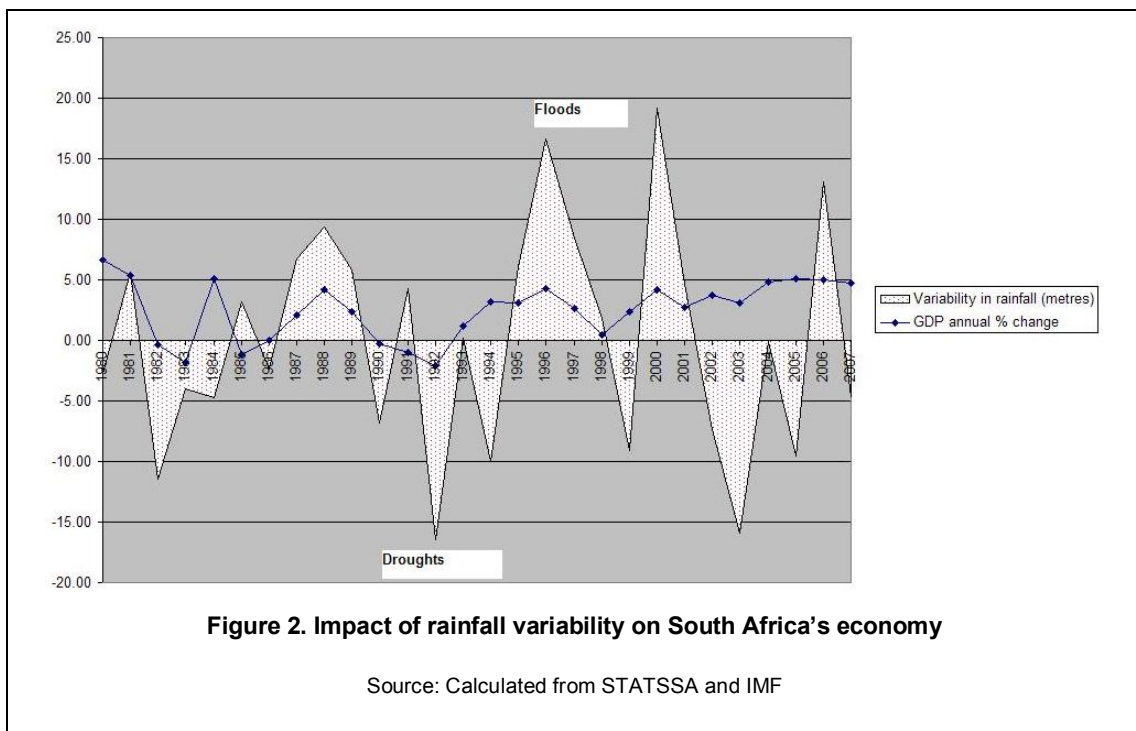
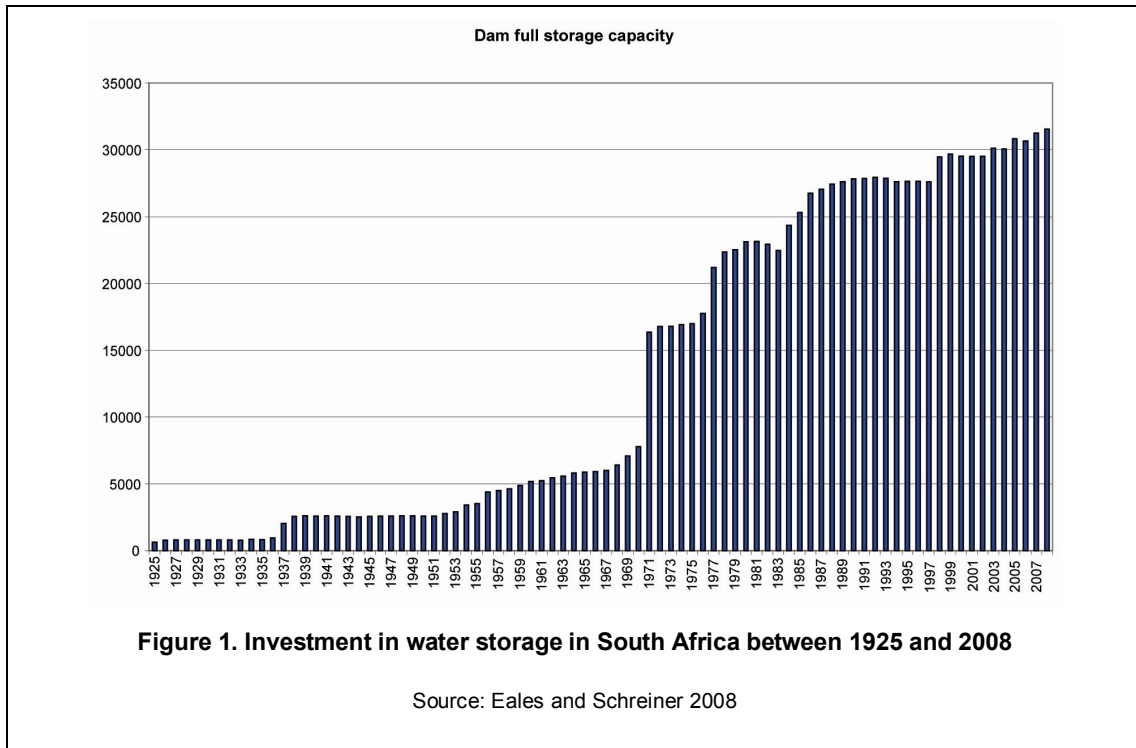
The role of water in South Africa's economy

At the macro-economic level

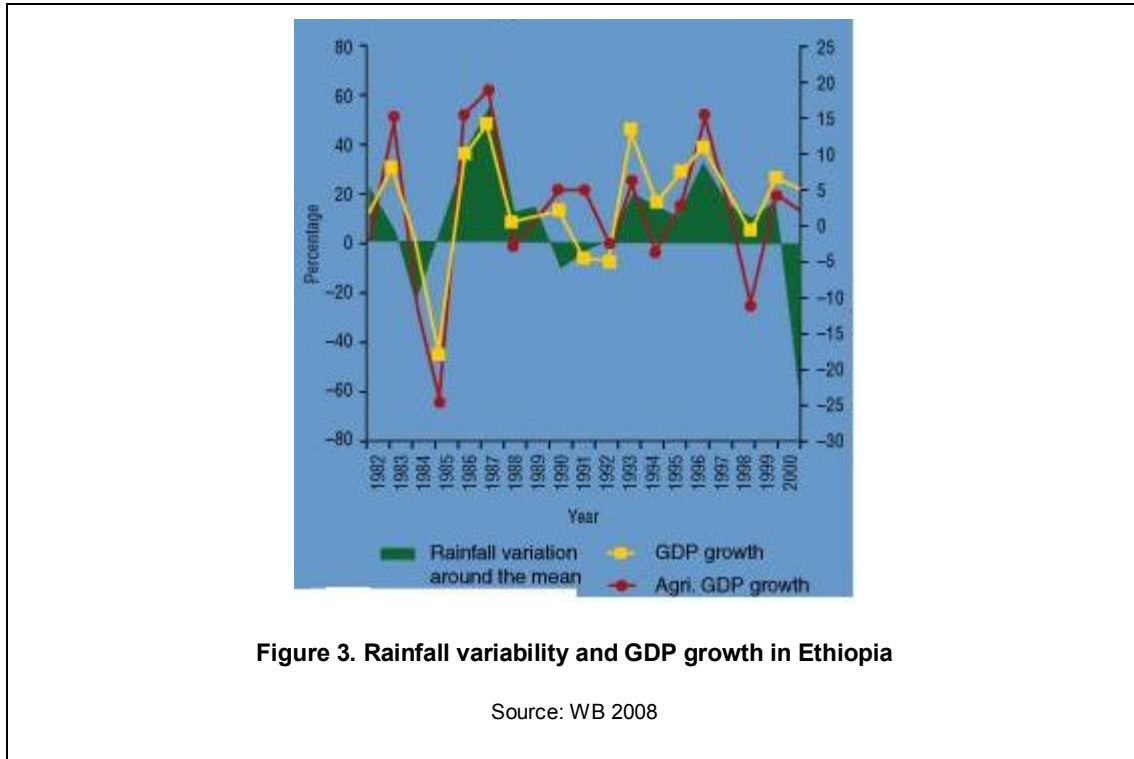
Water has always played, and continues to play a critical role in sustainable economic growth and development. Most of the earliest civilisations succeeded by harnessing and managing water resources to support economic activities (Grey and Sadoff, 2005). As then so today, water resources development and management remain a crucial part of economic growth, development and poverty alleviation. Globally, countries that have cushioned their economies from weather shocks (droughts and floods) by investing in hydrological infrastructure and in human capacity to manage these investments have more stable economies (ibid).

Water plays a critical role in South Africa's economic sectors particularly agriculture, mining and manufacturing. The role of agriculture in a country's economy and the related effects of weather shocks (droughts and floods) depends on the complexity of the economy. South Africa has a fairly complex economy with well developed inter- and intra-sectoral linkages as well as international linkages through trade. In addition, the economy is also broad-based and well diversified. These factors together with huge investments in water storage, and well developed irrigation infrastructure have cushioned South Africa from

weather shocks such as droughts of 1982, 1992, 2003 and 2005 (See Figure 2). Less than 7% of variation in GDP is explained by variability in rainfall showing that the country is reaping the benefits of early investment in water infrastructure. Gauteng Province (Johannesburg and Pretoria) is the economic hub of South Africa generating 33% of national GDP and a phenomenal 10% to the GDP of Africa as a whole yet it is located in a semi-arid region with highly variable rainfall. Strategic investment in inter-basin transfers with seven other river systems and 16 major dams has ensured economic resilience in Gauteng.



Elsewhere droughts and floods have had devastating effects on economies of countries with weak water infrastructure as clearly demonstrated by the cases of Ethiopia, Mozambique and Kenya. Figure 3 shows the striking and shocking correlation between rainfall and GDP in Ethiopia—a typical example of an economy held hostage to hydrology. In Kenya, floods and droughts cost the country a stark US\$4.8 billion between 1997 and 2000. The sectors worst affected were agriculture, transport, energy and industry. In Mozambique, floods in 2000 cost the economy US\$550 million or 12% of GDP (Grey and Sadoff, 2006).



However, South Africa should not be complacent. Although the country is successfully addressing catastrophic water risks, it has not yet achieved the infrastructure and institutional capacity to manage its water resources in a manner that optimizes economic benefits and spurs sustainable development. For example, growth in the agricultural sector is still hampered by rainfall variability and human capacity is inadequate to manage water resources and infrastructure, emphasizing the importance of investing in water institutions. The country's current per capita water storage of 746m³ is very low compared to other middle income countries. Brazil for example, has a per capita water storage capacity of 3,225m³ almost 5 times that of South Africa while Zimbabwe, a low income country, has a per capita storage capacity 10 times that of South Africa (7,500m³ with Kariba dam) (WRI, 2008).

Therefore, although an analysis of the correlation between rainfall and South Africa's economy depicted in Figure 5 suggests that the country may have established the minimum platform of water infrastructure¹, meeting increasing water demand associated with high economic growth will require the country to increase its storage capacity through construction of new facilities as well as practicing effective water demand management. Furthermore, South Africa is projected to experience "*water scarcity*" by 2025 assuming current consumption patterns continue. *Water scarcity* is a more severe situation that can hamper food production, economic growth and development unless the country develops and apply new technologies for water use, conservation, or reuse (WRI, 2008).

At the sectoral level

At the sectoral level, water is an important input in almost all production processes particularly in the main water-using sectors such as agriculture, manufacturing, and mining. The Agriculture and Forestry sector in South Africa is by far the largest water user accounting for 67% (8.7 billion cubic meters) of total water withdrawals. Of this, 93% goes to irrigation with the remainder shared between forestry (4%) and livestock and game (3%). Domestic use is the second largest user accounting for 16% of all water withdrawals. Water

use by sector is presented in Figure 4. Combined together irrigation and domestic use account for almost 80% (9.9 billion cubic meters) of total water supply yet 12% of this is lost during distribution (STATSSA, 2006). Issues of water productivity and efficiency therefore require urgent attention in these two sectors.

Long term trends show a gradual shift in water use away from agriculture and towards domestic use. Compared to 1990, water use in agriculture and industry fell by 10 and 6 percentage points respectively while domestic use increased by 15 points. This trend warrants detailed analysis and the results used to inform long-term planning in the Department of Water Affairs and Forestry (DWA).

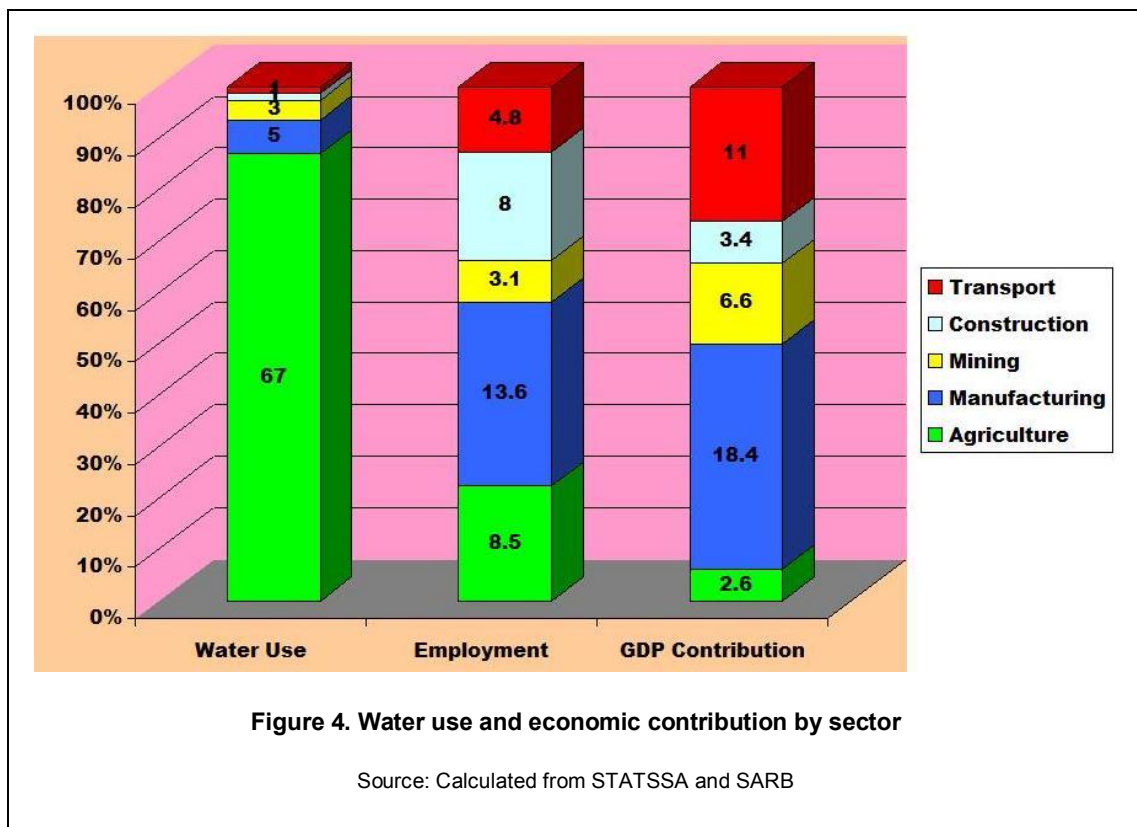
In terms of economic contribution, the three main water-using economic sectors (agriculture, mining and manufacturing) combined, generated R287 billion³ and used an estimated 10 billion cubic meters of water in 2006. Although water is far from being the only driver of economic growth, it is crucial to understand the link between water use and economic growth measured, in this case, by value added and employment.

The agriculture and forestry sector which uses 67% of total water withdrawals, accounts for 8.5% of total employment and contributes less than 3% towards GDP. On the other hand manufacturing which uses 5% of total water withdrawals employ about 14% of the workforce and contribute 18.4% to GDP. The same figures for mining are 3%, 3.1% and 6.6% (see Figure 4).

A simple back-of-the-envelope calculation shows that agriculture generates about R3 million per M³ of water compared with R188 million in mining, R262 million in manufacturing and a huge R10 billion in Trade and Services. This is consistent with findings of a more rigorous economic model run by the World Bank (2005) which show that:

- Industry generates about 100 times the value added per unit of water used when compared to irrigated agriculture; and
- Industry generates about 10 times the employment per unit of water used in relation to irrigated agriculture.

Low value added per drop in agriculture is in part due to inefficiencies in irrigation as well as the nature of the outputs of this industry. Water productivity gains in agriculture are critical if other growing demands for water are also to be met.



At the micro-economic level

Close to 6 million South Africans do not have access to a reliable source of safe drinking water while 13 million do not have access to adequate sanitation which is seen more as a result, rather than a cause, for economic growth (DWAF, 2008). Consequently, water and sanitation related diseases still have a considerable public health significance in the country. For example, diarrhoea is among the top ten causes of death in South Africa claiming 13 600 lives annually (or 2% of all deaths). **That is 2 lives every hour!** In addition 479 000 Disability Adjusted Life Years or DALYs² are lost annually due to diarrhoea (WHO, 2002). Time losses due to inconvenient water supply and sanitation are also substantial. Studies estimate that rural women in South Africa may spend over four hours a day gathering fuel and water (Morna, 2000).

Therefore, the explicit and implicit costs of poor water supply and particularly poor sanitation to society in terms of medical costs, low productivity due to ill health, cholera outbreaks, are substantial. In the current environment where a number of priorities dominate the national development agenda, there is need to quantify the economic benefits of improved water supply and sanitation. Based on studies conducted by Hutton and Haller (2004), SIWI (2007), WSP (2007), this section quantifies the benefits of improved water and sanitation and puts a case for investment in water and sanitation as one of the most effective and sustainable ways of promoting equitable economic growth and social development.

A rigorous cost-benefit analysis conducted by Hutton and Haller (2004) for the WHO quantified the benefits of improved water supply and sanitation in terms of hospital costs saved; productivity and school days gained due to less diarrhoeal illness; convenience time savings; and avoided deaths. Results of this analysis show benefits for South Africa that range from R200 per person per year for access to simple improved water and sanitation facilities to R900 for access to regular piped water supply and household sewage connection. Total convenience time saving due to improved water supply and sanitation constitute the largest share of total benefits. Given that 6 million South Africans do not have access to safe drinking water while 13 million do not have access to adequate sanitation, then the economic benefits of meeting water and sanitation backlog are at least R1.2 and 12 billion per annum, respectively.

Conclusions and recommendations

Water plays a critical role in South Africa's economy and has the potential to stall economic growth unless investment in water resources development and institutions increase and at the same time efforts to conserve water are intensified. The economic benefits of meeting the water and sanitation backlog in South Africa are at least R1.2 and 12 billion per annum, respectively. Globally, a number of cost benefits analyses (Hutton and Haller, 2004; SIWI, 2005; and WSP, 2007) have shown that investing in water and sanitation makes good business sense; return on a R1 investment is in the range of R11 to R15.

However, current water allocation mechanisms in South Africa do not take into consideration the opportunity costs of and rate of return on investment in water. There is a need therefore to allocate water among sectors in such a way that optimizes economic growth and to enhance the integration of water into long-term economic sector plans as well as into the broad economic growth and poverty reduction strategy development process. It is critical that the economic benefits of investment in water infrastructure and institutions are understood, clearly articulated and included in macro-economic, sectoral and local decision making.

It is recommended that:

- Development plans such as Integrated Development Plans (IDPs) should be developed through a participatory process that includes multistakeholder consultations including the water sector. DWAF should identify key "entry points" in development processes and use these to ensure that water is addressed explicitly in all development plans at national, sectoral, provincial and district levels;
- Investment in water should increase from the current annual level of 1.2% of national budget to 3% in line with other middle income countries; and
- Issues of water productivity and efficiency in agriculture and domestic water supply are given urgent attention. Water productivity gains in agriculture and efficient domestic water supply are critical if other growing demands for water are also to be met.

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Notes

1. Grey et al (2005) postulates that there is a basic level of “water security”- which incorporates the idea of a “minimum platform of water infrastructure”. Below this minimum platform the economy is vulnerable to water shocks.
 2. The Disability Adjusted Life Year or DALY is a health gap measure that extends the concept of potential years of life lost due to premature death (PYLL) to include equivalent years of ‘healthy’ life lost by virtue of being in states of poor health or disability (1). The DALY combines in one measure the time lived with disability and the time lost due to premature mortality. One DALY can be thought of as one lost year of ‘healthy’ life and the burden of disease as a measurement of the gap between current health status and an ideal situation where everyone lives into old age free of disease and disability.
 3. The exchange rate for the South African Rand (ZAR) to the US\$ was 1ZAR = US\$0.10 as of 6 November, 2008.
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