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The WRC operates in terms of the Water Research Act (Act 34 of 1971) and its mandate is to support water research and development as well as the building of a sustainable water research capacity in South Africa.

TECHNICAL BRIEF

Water resource management

Water in the Western Cape economy

A completed WRC-funded project investigated possible ways of assessing regional water resources in the Western Cape system from a political-economic and developmental perspective.

Background

There is increasing consensus that water scarcity will increase dramatically in many parts of the world in the next 20 to 30 years. This will have significant social, political and economic consequences.

Awareness of climate change over the past decade has focused broad attention on water as a key resource under threat. This increasing water scarcity will have effects on agriculture, energy, trade, the environment, national sovereignty and international relations as nations who are water scarce continue to deplete their resources while looking to water rich areas to ensure their long term growth and sustainability.

In South Africa, these factors increase the challenge of managing South Africa's limited water resources to achieve economic and social justice imperatives. Historically, water planning has focused on water resources infrastructure development and operation, supported by demand management initiatives to reconcile water requirements and availability.

However, as water resources are increasingly developed and utilised, catchment quantity and quality stress tend to increase. The resulting complexity in management and use requires a shift towards improved governance and balancing of competing economic, social and ecological interests.

Consideration of the nature of water as a development catalyst or possible constraint on economic growth and social development has prompted the establishment of the Water for Growth and Development (WfGD) framework. This implies a shift from water for the economy to water in the economy. WfGD explores the way in which the water sector contributes to economic, social, and environmental imperatives, also considering the relationship between government and the private sector.

At a water management area level, catchment management strategies will increasingly have to adopt a more integrated economic development paradigm in addressing water resources concerns, as technical solutions become increasingly expensive and inappropriate for local development needs.

Water in the Western Cape

A WRC project investigated possible ways of assessing regional water resources in the Western Cape system (Berg and Breede-Overberg WMAs) from a political-economic and developmental perspective. This can be used to inform water management strategy processes (both the National Water Resources Strategy and Catchment Management Strategies) as well as provide the types of information that allow effective engagement with provincial and local government planning processes.

A few considerations must be recognised:

- Increasingly stressed water resources and the uncertainty of climate and development futures have highlighted the close interactions between water, energy and food security at a national level.
- There is significant global and national uncertainty about future pathways in the energy-carbon and food-fibre sectors to meet the population and economic growth projections over the next 20 to 40 years, which is compounded by changing climate conditions.

- All of these have profound impacts on water, and this will require alignment between South Africa's position on water security and positions on energy security and food security, given the water constraints in South Africa.

These considerations raise important dimensions of water in the economy, namely the flow of embedded water through the economy. The concept of embedded water is defined as water that is used to produce a product or service, either directly in production or embedded in (the production of) inputs that are required for the production process.

From this perspective, different sectors are dependent upon water in their production or supply chains. This concept of embedded water and water footprint provides a way of understanding the intensity of water dependency of different sectors (even though their direct use may be relatively small).

Similarly, the flow of embedded water in goods and services that are traded internationally can be assessed. This indicates the amount of water that is either exported or imported from the country, which is a critical implication of trade.

In all of the above, there are obvious spatial, scale and development issues, focusing on different economic imperatives. At a local scale, water use has profound impacts on local economic development (particularly in rural areas), with important poverty, equity and livelihoods issues.

At a national scale, water supports economic growth, with critical issues around the nature of the economy. At a global scale, water in the South African economy impacts directly on trade, security and the current account (which for South Africa is an important issue). Important themes of redress, poverty, equity and spatial underdevelopment must be considered with the growth oriented GDP perspective, particularly in the context of South Africa with its challenges around widespread poverty, rural development and high Gini coefficient.

Project objectives

Following consideration of the context beforehand, the aims of the project are as follows:

AIM 1

To frame possible government and corporate responses at a basin level which reflect the shared risk paradigm, the political economy of water use and the challenges of future development and climate uncertainty

AIM 2

To improve understanding of the economy linked to water use in a river basin. This will be based on the use and movement of embedded water in goods and services, at subsistence local market, regional economic and international trade levels. Linkages into food, energy and water security were considered.

AIM 3

To develop and improve tools and approaches to quantitatively and qualitatively evaluate basin water use and its political-economic implications under future climate and development uncertainties

AIM 4

To foster dialogue between government, corporate and civil society representatives about the use, protection and development of basin water resources to secure political, economic, social and ecological development imperatives. This will be through the lens of shared risk in a basin with increasingly stressed water resources

Methodology

This project must consider the goods and services produced in the Western Cape from comprehensive water, economic, and social perspectives. This analysis, in addition to the current scenario, must look at plausible development scenarios given different economic and political growth trends.

Task 1: Development of an economic analysis tool

Social accounting matrices, economic impact analysis, input: output, and cost benefit analysis etc. are able to integrate economic indicators such as employment, per capita and regional income with commonly used water metrics. This connects water use in a basin with local, regional, national and global economy.
A review was done to identify best practise. Water footprinting was used as it is able to inform basin planning decisions by illustrating how water affects growth and development and how changes in the economy impact water demand.

Task 2: Water in the economy analysis

Through water footprinting, basin water uses in the production of goods and services was done. This enabled understanding of the hydrology and yield of a system on one hand, and the flow of embedded water through the society and the economy at a district municipality level.
The purpose of this assessment was to track water required

to support different parts of the economy and society, and identify how embedded water moves within the Western Cape, nationally and internationally.

Task 3: Institutional arrangements

Policy-legislative and administrative-governance arrangements related to water, energy, agriculture, environment and trade/industry were explored at each district municipality level. This took a governmental and corporate perspective through the shared risk paradigm.

Task 4: Future scenarios

Future scenarios were developed from the trends and expectations of the local, national and global energy, agriculture, trade, political and water management environments. Quality and quantity implications for agriculture, industry, urban supply and environmental requirements were considered.

Task 5: Recommendations

The recommendations considered a range of platforms and situations whereby this process and information may be useful. These findings came specifically out of the steering committee meetings held, as well as through interviews and meetings with key stakeholders in the province.

Task 6: Multi-stakeholder dialogue

The ultimate objective of this project was to create multi-stakeholder discussions around shared risk at a system level, consisting of the key role players representing different interests and risks. The intention is to observe whether bringing an alternative perspective to water management shifts the planning paradigm of water resources, development and corporate planners.

Results

The following figure frames the attempt through which water footprinting at a provincial level was going to help build communication between the public and private sector. Whether or not this information is truly helpful for the private sector is not certain.

This is possibly because of the district municipality scale, which is not the typical private sector operations scale.

There are a number of cases where understanding the role of water in an economy of a region may be useful. Understanding of the flows of water through an economy may help to build dialogue between different sectors or levels of government.

The method of investigating the role of water in the economy is also useful during integrated planning for a region, as the process indicates the linkages between water and the economy. Improved planning of water resources may be enabled through a better understanding of the water requirements of different sectors.

Key observations

The Western Cape is a water-stressed region, which in many areas is heavily dependent on water in the economy. This is not only true in regions where agriculture is the backbone of further productive activity, but also in terms of tourism, manufacturing (both agriculturally based and industrial) and the tertiary sector.

Although the tertiary sector may use little water volumetrically, a large proportion of the services rendered are related to the agricultural sector of the province for example. Also,

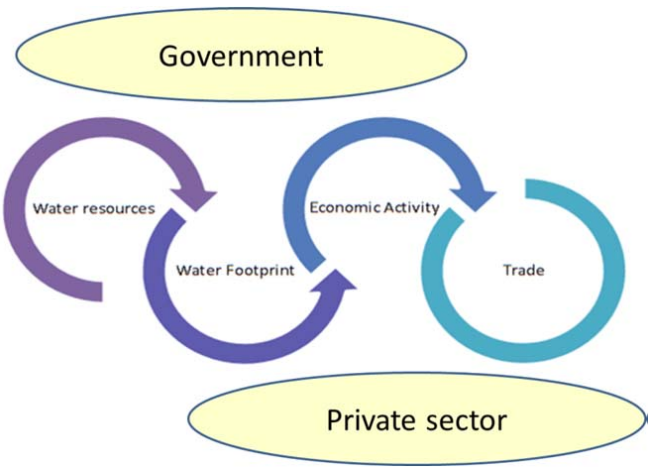

Figure 1: Linking water and the economy with the public and private sector

the quality and assurance of supply need to be higher in comparison to that of agriculture. Not only is the Western Cape economy, but our export economy too, is dependent on water.

The Western Cape is characterised by key development nodes. Each of these has distinct relationships with regard to their economies and water; however, they all have same form of relationship between the economy and water.

Differences between the nodes are related to their relationship between rural and urban areas; or their underlying sectorial value. As a result of the different drivers towards understanding water and the economy in each of the nodes, the management thereof may be nuanced.

Observations of interest relating to the previous case study nodes are specific to the priority sector driving the economy and water management area.

Following the consideration of economic and hydrological factors in each region, makes the following observations regarding the local priority nodes:

- The West Coast Regional Motor is characterised by possible water tensions between the steel processed through the port (which provides 10% of the jobs) and agriculture (which provides 40% jobs).
- The Breede Development Corridor is characterised by a water-based economy through its dependence on agriculture. Agriculture, both irrigated and dry, contributes 15% to the regional economy (and 40% of the jobs). Agricultural manufacturing contributes 20% of the economy and 10% of the jobs, while tourism, which is heavily dependent on the aesthetic value of functioning farms in the region, contributes 10% to the economy (and 45% of the visitors to the Western Cape).
- The Eden District Municipality is characterised by a drought stressed economy (and intermittent floods). Although agriculture is relatively smaller, the region is home to crops which are unable to be grown elsewhere in the country (hops).
- Lastly, the development of the City of Cape Town (the City) as a 'Global City' is characterised by domestic or urban water use. As a Global City, it is primarily a tertiary City. The City contributes 75% of the provincial GDP and is home to two thirds of the provincial population. The City is a provincial growth driver,

Therefore, it is clear that for each node there are distinct considerations to be made regarding the economy and water. By bringing water into the forefront of planning in terms of the LED; development planning is able to take cognisance of the resource constraints. Future development scenario, with a clear understanding of how water underlies the economy, will contribute to further development of each node.

Recommendations

This water in the economy concept needs to be presented to a number of the platforms and processes further to gauge the usefulness of the concept. In addition, it is suggested that the process be repeated with improved data sources to better the understanding of how water flows through the economy.

Data throughout this project has been a challenge. Recommendations going forward would be to use only standardised databases from government or alike in order to interrogate the nature of the economy in different regions. The use of standardised provincial or national data is necessary to ensure that analyses of regions within the Western Cape are comparable.

An in-depth analysis of local level water in the economy implications is required. This is because initial presentations of this work have found the engagement with the private sector less compelling due to the scale of water and economy investigated (district level municipality or water management area).

Therefore, a local level investigation into the Saldanha Bay Local Municipality economy and water scenarios will be carried out in order to better grasp the private sector role in water in the economy. It is assumed that at a local level, the public and private sector responses to understanding the role of water in the economy may be more tangible.

Further reading:
Water in the Western Cape economy (**Report No. 2075/1/13**). To order this report contact Publications at Tel: (012) 330-0340, Email: orders@wrc.org.za or Visit: www.wrc.org.za to download a free copy.