

## Regional approaches to food and water security in the face of climate challenges:

### A practical approach to meaningful regional integration

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#### Introduction

The countries of southern Africa are committed to attaining greater integration within the region and beyond. They also recognise that climate change represents a serious challenge to the development of the continent in the medium to long term.

The practical challenges of achieving greater food and water security illustrate how regional integration could increase countries' resilience to climate change. They also highlight some of the obstacles to such integration, as well as measures that are needed to ensure progress.

This brief aims to outline the challenges of food and water security in southern Africa; to consider the impact of climate variability and change; to describe how regional approaches may be more effective than national responses in addressing the challenges; and to put forward recommendations for practical action that could support such regional approaches.

#### Food and water security in southern Africa: A regional challenge

As one of the most basic and urgent development goals, the achievement of food and water security is a priority for all the governments in southern Africa. According to the Food and Agriculture Organisation (FAO, 2011), 23 per cent of people in Africa - of whom almost all are found in sub-Saharan Africa - are undernourished. Even in South Africa, which is one of the richest countries in the region, 22 per cent of households reported having inadequate or severely inadequate access to food and regularly experience hunger (StatsSA, 2011).

Despite having extensive areas of underutilised land, sub-Saharan Africa is

a net importer of agricultural produce. Access to water for household purposes and for industrial and agricultural activity is similarly constrained. Some countries suffer regular droughts which shrink their economies, while others are afflicted by floods that put lives at risk and destroy years of infrastructure investment. Poor households are usually worst affected.

The impacts of such food and water insecurity often spill over national borders and migration is frequently a response by affected communities. Poor harvests in one country can increase prices across the region. Similarly, floods can affect the prosperity of the region as a whole. Where rivers cross national boundaries, there may be fears that upstream use will harm downstream communities. Concern over the potential threat of climate change has been reinforced by foreign investments in agriculture - the so-called "land and water grabs".

There is also a more positive regional dimension, where strategies developed at regional level could improve the food and water security of individual countries while strengthening their resilience to future climate shocks. For such strategies to make a difference, regional cooperation should become more effective.

Seen as a whole, southern Africa has the human, natural and financial endowments needed to address these challenges. However, the strategies available to individual countries are limited by the way these endowments are distributed. For instance, some countries may have more people and money, whereas others may possess more land and water. Yet, if the endowments are considered at a regional level, a range of new opportunities emerges.



In May 2011, a workshop was hosted by the Development Bank of Southern Africa (DBSA), together with the Global Water Partnership, the International Water Management Institute, and South Africa's National Planning Commission (NPC). The workshop was supported by the Southern African Development Community (SADC), the East African Community and the African Development Bank. This group of regional and international partners brought together experts and practitioners in the fields of water, agriculture, energy and climate to consider how regional cooperation and integration could strengthen food and water security in the context of climate variability and change.

A range of useful insights and some practical opportunities emerged, as well as important constraints. Valuable perspectives were gained on how regional approaches could help to achieve southern Africa's shared goals.

In his opening remarks, Minister Trevor Manuel, NPC chairman and champion of the SADC/Nepad North-South Corridor project, highlighted the issues to be addressed (Manuel, 2011):

As we imagine different futures for our different countries, we should also have the courage to imagine ourselves working together as a single region. If we do that, we find that the balance of our endowments looks a little different. If we combine our access to capital as a region, with the diversity of human resources that we have, the independence dividend that is now maturing in the region, with our extensive natural resources [...] a completely different set of opportunities would arise. And while we would still have large numbers of relatively unskilled people, they would have far wider opportunities than if we simply worked as individual countries.

### Key concepts

To aid the discussion that follows, the underlying concepts and issues are defined below in order to enhance understanding of the interactions between them.

#### Food security

Food security exists "when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life. Household food security is the application of this concept to the family level, with individuals within households as the focus of concern" (FAO, 2002). It is not possible to address issues of food security

without considering household livelihoods, in both urban and rural contexts. This, in turn, should guide the development strategies chosen to address other dimensions of food and water security, as well as the more general challenge of mitigating and adapting to climate change.

#### Water security

Water security has been defined as "the availability of an acceptable quantity and quality of water for health, livelihoods, ecosystems and production, coupled with an acceptable level of water-related risks to people, environments and economies" (Grey & Sadoff, 2007). Sharing water resources between different users and protecting these resources from pollution is a complex task. For instance, an upstream source of water may be accessed by people who have little incentive to limit their use or protect the resource, as the impact of their actions will only affect downstream users. Moreover, since rivers cross political and administrative jurisdictions, many water management issues require a polycentric approach to governance (Ostrom & Hess, 2007). Effective governance of this "common pool resource" is, therefore, integral to water security.

#### Climate variability and change

Climate change, which is predicted to alter rainfall patterns, is a matter of global concern although its effects are only expected to become significant over the next few decades. Although the mitigation of, and adaptation to, climate change, in particular global warming, has attracted much attention, current climate variability is still the main challenge facing southern Africa. National economies are already substantially affected by rainfall variability, which is often closely correlated to their gross domestic product.

It is thus necessary to consider current climate challenges, as well as the way in which the climate may change in future. Should funding become available to assist countries in adapting to climate change, a further consideration is how this could contribute to the broader development goals of food and water security.

#### Energy

Food and water security is linked to a range of energy issues, both through climate change as well as more directly. These include the potential impact of the large-scale cultivation of crops for biofuels on land and water security, as well as opportunities for biofuel production to help improve livelihoods and support the development of land and water



resources. The region's significant hydropower potential offers great opportunities to move to a more sustainable energy system, although conflicts may arise between the use of water for irrigation and for generating hydropower. Multipurpose water resource development could serve both irrigated agriculture and power generation, while hydropower reservoirs are already helping to reduce the impacts of floods.

Southern African countries also have very different energy endowments. Some, such as South Africa, Angola and Mozambique, are major producers of hydrocarbons with South Africa's coal generated electricity creating a large carbon footprint which may become a development constraint while others, such as the DRC, Mozambique, Zambia and Angola have extensive hydropower resources as well as biofuel opportunities, which could make Southern Africa a relatively "green" economy.

#### Interrelationships between food, water, energy and the climate

Although there has been growing interest in the food/water/energy/climate nexus in recent years, these relationships are still seldom discussed, and much less managed, in a coordinated manner. They are briefly analysed below:

- *Food and water:* Agriculture is by far the largest water user in the region and the interrelationship between food production and water availability appears straightforward, since the former is impossible without the latter. The challenge, however, is to make water available where and when needed. Even in areas where water is plentiful, the high cost of the infrastructure required to make it available for use often creates "economic scarcity".
- *Food and energy:* The production of food requires energy, not just for cultivation activities but also to produce inputs, such as fertilisers. Crops, such as sugar and soybeans, which are grown for biofuels, may compete with food crops for land and water. Conflict may also arise where the use of water flowing downstream to generate hydropower competes with the use of water to irrigate crops upstream, which reduces the river flow.
- *Water and climate:* Water is an integral part of the climate cycle and the availability of water resources (in rivers and lakes, and underground) derives from rainfall and climate change impacts will be transmitted primarily through the medium of water. However, the complexity of the hydrological

cycle means that few firm predictions can be made regarding impacts such as increased flooding, more intense droughts and changing seasonal patterns of rainfall (Sadoff & Muller, 2009). More attention will thus have to be paid to water resource management as countries and communities seek to understand and adapt to this increased uncertainty.

- *Water and energy:* Hydropower remains the largest source of renewable energy despite global investments in wind and solar power. Hydropower harnesses the solar energy that evaporates water from the sea, produces rainfall on higher terrain that can generate electricity as the water flows back down to the sea. However, the management of water may also consume large amounts of energy when large volumes of water are transported by pumping. Treatment processes (e.g. desalination) are also energy intensive and cannot produce water economically for agricultural purposes.

#### Regional cooperation and integration

While the elements of the food and water nexus are often considered at a national level, they are part of a regional system and significant benefits may be accrued to all concerned if they are managed as such. However, this requires appropriate mechanisms of regional cooperation and integration which are not yet fully in place. The SADC's vision is that of a common future within a regional community for the benefit of all the people of southern Africa. The expectation is that regional integration will help to unlock the region's economic potential by enabling trade, investment, people and goods to flow freely across national borders but progress to date has been disappointing.

#### Regional distribution of endowments and markets

National development strategies should reflect a country's endowments of human, natural and financial resources. This is in line with the SADC's development integration approach, which "recognises the political and economic diversities of regional integrating countries, including their diverse production structures, trade patterns, resource endowments, development priorities, institutional affiliations and resource allocation mechanisms" (SADC, 2008). The SADC's Regional Indicative Strategic Development Plan (RISDP) is the basis for its development strategy. However, beyond the general prescription of trade liberalisation, the RISDP does not indicate how the SADC will develop strategies to take advantage of its overall regional resource endowments and the synergies between them, particularly when these cross sectoral boundaries.



## Discussion: Challenges and strategies

When the challenges of food and water security are assessed against the background provided above, new opportunities become clear. The following three practical sets of proposals with a regional perspective arose from the expert workshop.

### Water security through realignment of production

It has been suggested that South Africa should take a regional approach to finding solutions to its water scarcity (DWA, 2010). Specifically, the country should source more foodstuffs from other southern African countries that have more arable land and water. South Africa's food security would then be better served and its development less constrained by water scarcity, while the interests of the region should benefit.

Data suggests that the current balance of agricultural trade is firmly in South Africa's favour (Vink, 2011). However, given their resource endowments, countries such as Zambia, Mozambique, Angola and Tanzania are better placed than South Africa to produce food staples competitively. Recent economic research suggests that a country like Tanzania could actually profit from climate variability and change by producing more grains when other countries are experiencing drought (Ahmed et al., 2011).

However, food security is not just about the production of food or the allocation of natural resources, but more crucially about the social structure of production. Household food security requires households to produce sufficient food for their needs, or to generate income for food from other sources. Any strategy should, therefore, be assessed in terms of its impact at household level. If regional production is reallocated simply by reducing tariffs and freeing trade, it will not improve wealth or welfare, except in South Africa, where commercial producers are most efficient (Mutambatsere, 2011). A more nuanced approach to production arrangements at local level would be needed to ensure that households, and not just national economies, benefit from a regional strategy.

### Income security and climate resilience through regional bio-energy

Analysis of a sugar-based bio-energy complex highlighted the opportunities offered by a regional approach. It was suggested that southern Africa's endowment of land water and people, which is comparable to that of Brazil, could produce the ethanol equivalent of 20 billion litres of petrol and 10 000 MW of electricity energy as well as sugar. Such a programme would use no more than 6 per cent of the region's cropland and, if designed with social

impact in mind, could generate three million jobs and livelihood opportunities (Fechter, 2011). The development of associated rural infrastructure would also allow additional land to be used for the small to medium-scale production of other crops.

One barrier to such development is lack of finance, particularly funding for infrastructure to support new plants and farm development. The main challenge, however, is regional coordination and regulation, as SADC frameworks (for energy, climate change, agriculture, water, infrastructure, and development funding) would have to be aligned. Regulation would need to allow a freer flow of electricity and liquid fuels between SADC countries. Specifically, ethanol markets and standards would have to be developed, and changes made in automotive sector policy throughout the region.

### Hydropower as a catalyst for food and water security

There is a direct connection between energy production and water security. For instance, existing hydropower dams on the Zambezi River contribute to water and food security by controlling floods that may otherwise devastate agriculture on Mozambique's flood plains. There is still significant untapped hydropower potential in southern Africa's Zambezi basin, as well as a number of rivers in Angola and the Congo basin. The key to unlocking further hydropower development is to link it to electricity demand and agricultural development. However, this will require cross-sectoral cooperation between several countries.

### Reshaping the regional response

From the three cases described above, it is obvious that significant development impact could be achieved by combining the region's natural resources and potential markets. Indeed, if national endowments are viewed regionally, many problems may become opportunities. However, in order to achieve social impact, programme design would have to focus as much on people's livelihoods as on investors' products and profits. Should funds become available to help countries increase their renewable energy production and build their resilience to climate change, such programmes would be obvious candidates for support.

When the SADC was established in 1992, it opted for a development integration approach that recognises countries' diverse production structures, trade patterns, development priorities, institutional affiliations, resource endowments, and resource allocation mechanisms. The explicit intention was to address issues such as social inclusion by managing



programmes in an integrated way which would allow member states “to define the scope and sectors of cooperation, and to identify appropriate strategies and mechanisms to overcome impediments to integration and to address regional imbalances between member states” (SADC, 2008).

The South African Development Communities’ (SADC) policies include: achieving complementarity between national and regional strategies and programmes; promoting and maximising productive employment and utilisation of the region’s resources; and achieving sustainable utilisation of natural resources and effective protection of the environment. However, this has not yet been adequately reflected in practice, perhaps because the SADC’s structure is itself too fragmented.

A bio-energy programme, for example, requires not only infrastructure and agriculture, but also trade facilitation across three distinct product areas - sugar, liquid fuels and electricity. Regional hydropower, if it is to contribute to poverty reduction and human security, should be part of the countries’ trade, poverty and infrastructure programmes. So too, regional food security requires transport infrastructure as well as agricultural development.

It has been suggested that SADC infrastructure investments have thus far failed to reduce transport prices because they focus more on the development of physical facilities than on policy regarding constraints, and “regional agreements, corridor operations and the streamlining of regulations affecting transport have often been neglected” (World Bank, 2011).

The SADC’s structure separates responsibility for key trade, infrastructure, agriculture and poverty programmes into different directorates, each with its own priorities. This is perhaps one reason why so few regional opportunities have been exploited successfully.

### The way forward

President Jacob Zuma of South Africa recently called for a process of “developmental regional integration” to create sustainable economies of scale and productive economies (RSA, 2011). A practical approach to exploiting the opportunities identified in order to address food and water security across sectors and national borders would fit in well with such a vision. Key interventions are highlighted below.

#### Greater integration of regional markets

An immediate priority is to achieve greater coordination in decision making and the integration of markets for energy and agricultural produce,

since production potential is greatest in those countries that do not have sufficient market size to absorb it. Such integration will have to go beyond simple trade liberalisation, and address the policy and regulatory obstacles as well as the investment needs specific to individual programmes.

#### Practical engagement of the private sector and civil society

While intergovernmental relations should underpin regional coordination and integration, private sector entities should be engaged systematically as full partners, as they have the ability and incentive to implement economic projects. At the same time, civil society should be involved to ensure that development programmes achieve their socioeconomic goals.

#### Strengthened intersectoral planning and coordination

While there is structured intergovernmental coordination within individual sectoral programmes of the SADC (such as trade, agriculture, energy and water), there has been limited success in promoting intersectoral programmes across national boundaries. More substantive engagement between national planning authorities is thus needed to identify opportunities, and to develop effective mechanisms for promoting their implementation.

#### Managing the food/water/energy/climate nexus

Food security and water security are inherently interlinked, and are also closely connected to energy and climate challenges. While the food/water/energy/climate nexus is too complex to use for practical analysis, the systemic connections should be identified when considering how to achieve specific strategic objectives involving any one of its elements. This should guide inter-sectoral cooperation. In particular, this perspective should help to achieve the effective use of climate adaptation funds.



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