POLICY BRIEF

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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.

Guiding municipalities towards adaptation amid projected climate change

Climate change is already negatively impacting societies and ecosystems around the world, and many of these impacts are expected to increase as global temperatures continue to rise. Adapting to the changes that are already underway, and preparing for future climate change, can help reduce the risks societies face in the light of the changing climate. A new guide from the Water Research Commission (WRC) describes a number of ways in which local authorities can successfully adapt to the impacts of climate change, strategically positioning the sector for a better response.

Background

The South African water sector is expected to be especially hard hit as a result of projected climate change. We have already seen evidence of this during the recent El Niño event, and the entire water services chain is vulnerable to the effects of climate change, from the raw water source, through to the purification and distribution processes and subsequent wastewater treatment.

Increased temperatures will affect existing water treatment infrastructure and conveyance systems. Storage tanks, flocculation chambers, and the pipeline network used for water distribution may be exposed to increased corrosion as a result of higher temperatures. In turn, an increase in extreme events, such as floods, may damage infrastructure.

An increase in temperature will also lead to a concomitant increase in water demand and use despite a decrease in available water at the source due to higher rates of water loss, especially from dams. This will result in an increased level of pollutants in water resources, which will translate to an increase in the cost of treatment, an important area for municipalities to be able to put in place the necessary plans to adapt to these changes.

All of these changes will be an added burden to municipalities, who are already having to cope with eradicating service backlogs in support of improved service delivery, ensuring proper operation and maintenance of water and wastewater systems and ensuring water security amid rising demand and dwindling water supplies.

This WRC research project therefore developed a water sector adaptation guide specifically for municipalities. The guide deals with the selection of relevant water sector adaptation technologies and approaches for specific climate change impacts over the short-, medium- and long term. The following themes are covered by the guide: climate change impacts; vulnerability to climate change; capacity to adapt; and potential development opportunities.

Municipalities' role in climate change adaptation

South Africa's national response to climate change is framed by its commitments to the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. As a signatory to this convention, the national government of South Africa has committed to a goal of achieving a 34% reduction in greenhouse gas (GHG) emissions, against a business-as-usual trajectory, by the year 2020. South Africa has also recently signed the Paris Agreement on climate change which emphasizes on increasing the ability to adapt and to foster climate resilience.

In line with these commitments, the Department of Environmental Affairs (DEA) has published the National Climate Change Response Policy (NCCRP), which prescribes the means by which these international commitments will be achieved. The NCCRP deals with both climate change mitigation and climate change adaptation.

The NCCRP White Paper has recognised local government as an important sphere of climate change mitigation and adaptation. In particular, Section 1Ø.2.6 identifies the key Constitutional mandates of local government that are critical in developing the South African national climate response. These include: planning and urban development; municipal infrastructure and services; water, energy and waste demand management, and local disaster response. It is upon this premise that the current output of the WRC research aims to support the fulfilment of this obligation.

Main findings

When municipalities compose their climate change adaptation response, as they are now being encouraged to do, they should consider their specific local circumstances. The options selected should optimise prevailing and anticipated environmental, social, economic and cultural aspects. Options should also be associated with a favourable economic assessment after accounting for the social components for which monetary returns are not expected.

Rural municipalities have the poorest adaptive capacity according to the study, making them more vulnerable to the additional stresses. The research established that large urban municipalities (often served by large water boards such as Umgeni Water and Rand Water) were associated with a higher level of service delivery, thus reducing vulnerability.

Blue- and Green Drop scores also point to the nature of vulnerability in water and wastewater services. A poor score also means that the institution and the service delivery process are highly vulnerable to the impacts of external factors such as climate change. As such, these vulnerabilities have to be dealt with before accounting for climate change.

Water sector bylaws and management of restrictions are evolving at a slower pace which do not necessarily cater for the threat of climate change to water service provision but rather attempts to respond to disasters already in dire situations. The plans for implementing climate change adaptation are still failing to make it onto the list of prioritised projects for the municipalities, even though several climate change strategies may have been developed. This often results in failure of cities to respond to disruption in water supply for example in case of extended and unusual drought which are the modern features of the changing climate.

Recommendations

Since South Africa is a fully integrated member of the global community, international protocols and obligations to which the country is signatory determine the nature of response adopted by the South African national government. In turn, this needs to be translated into local strategies, programmes and projects to ensure successful implementation.

Adaptation technologies and approaches should aim to meet increased resilience to climate change in local government and should not be seen to be compromising local development but rather help to improve efficiency and sustainability. The science and trends that lead to adaptation selection must be well considered and precise, based on local information. This should in a way help to strengthen South Africa's international obligations to climate treaties in a bottom up approach and also encourage societal benefits from ecosystem-based adaptation within municipal scales with adaptation technologies and approaches that are specific to South Africa's vulnerability and sensitivity to climate change.

The focus should mainly be on improving the state of services through adaptation, and averting loss and damage as they occur. In highly vulnerable areas, modular structures that can be easily modified should be utilised. Win-win adaptation technologies can also be utilised. These are technologies and approaches that are effective irrespective of the kind of climate change impact that occurs.

Generally, the implementation cycle for adaptation to climate change within the South African local government can be schematically illustrated as shown in Figure 1.

After implementation, assessment of selected options is necessary. This is to either re-engineer selection options for maximum effectiveness, or to select alternative adaptation options in cases where the first selected option fails to achieve the required results. It is important for municipalities to note that adequate time should be allowed before alternative options are considered. This is to ensure that selected options are indeed inadequate before moving to different options.

The functionality of implemented options can be addressed through the use of a feedback mechanism whereby community residents are able to provide feedback regarding the implemented options. This should provide an avenue for implemented options to be re-engineered after evaluation to ensure that maximum benefits are obtained from them.

Other instruments can be used to enhance climate change adaptability within municipalities. For example, it is recommended that the Blue Drop and Green Drop certification programme be aligned to ensure that institutions are indeed adapting to climate change by measuring the performance of water and wastewater treatment works in correlation with the implemented adaptation options. This will enforce adaptation across all regions as municipalities aim to achieve maximum scores on the Blue Drop and Green Drop scales.

It must be borne in mind that South Africa is a developing economy; hence there are other competing needs that

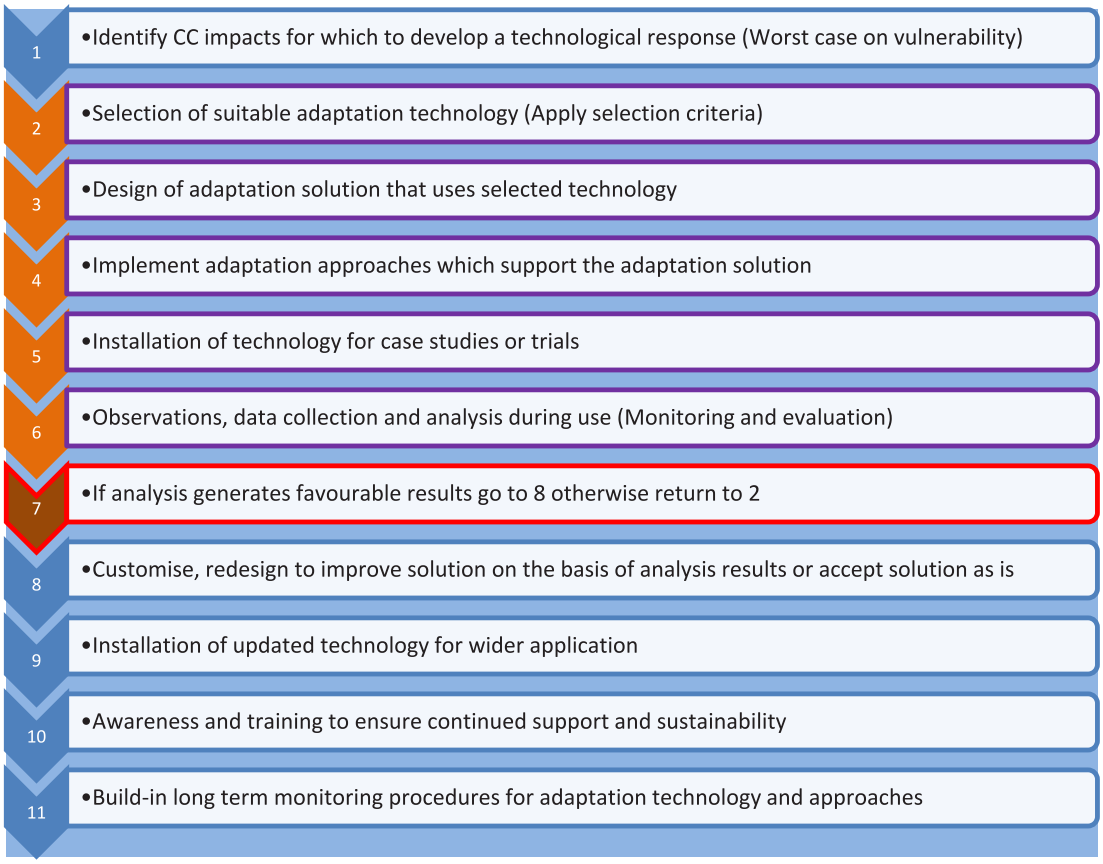

Figure 1. Implementation cycle for adaptation technologies and approaches.

must be addressed. Service delivery backlogs and the need for socio-economic development take precedence over emerging issues.

It is important that climate change response is in line with these two factors. In other words, the funds assigned can be used to address service delivery backlogs and improve the economic standing of the municipal area in such a way that it builds the climate resilience of societies. This requires excellent decision-making when selecting improvement options for the water services sector of any region and will reduce adaptation costs and planning.

Community members also have a major role to play in water services adaptation. Knowledge on climate change has to be shared with communities to ensure that they are actively involved when municipalities seek to drive climate change response strategies. Local authorities need to embark on intensive climate change awareness campaigns with the aim of bringing understanding and knowledge to local communities as a forerunner to the introduction of adaptation strategies.

Further reading: To order the report, *Adaptive climate change technologies and approaches for local governments: Water sector response* (**Report No. TT 663/16**), contact Publications at Tel: (012) 761-9300 or Email: orders@wrc.org.za or Visit: www.wrc.org.za to download a free copy.