

## Climate change

### Adaptation to climate change impacts

## A completed WRC project investigated the role of institutions in climate change adaptation to water access at local community level.

### Climate change and adaptation in South Africa within the international forum

The 2007 IPCC report confirmed that it was widely accepted that the climate system was warming, and also that greenhouse gases emissions by humans were the dominant cause thereof. In response to the impacts of climate change communities could seek to mitigate and/or to adapt.

In the IPCC's fifth assessment report of 2013, it is observed that the surface temperature will continue to increase due to the cumulative level of CO<sub>2</sub> that has already been released. As such, adaptation will be a necessity even when all CO<sub>2</sub> emissions are stopped.

Both the Kyoto Protocol and the post-Kyoto International Climate Change Conventions have continued to stress that developing countries should focus on adaptation, with more emphasis on mitigation being placed on developed countries.

It has been established that the developed countries are responsible for most of the past and on-going CO<sub>2</sub> releases. While climate change occurs at a global level, the nature of impacts varies for different locations and communities, and also differs within the same locations. The United Nations Framework Convention on Climate Change (UNFCCC) Treaty, of which South Africa is a signatory, has been spearheading the development of adaptation plans as well as their implementation.

South Africa has since met one of its obligations by submitting the national communication report to the UNFCCC. A national adaptation policy is now available to lead adaptation programmes throughout the country in both private and government establishments.

### Special focus on a bottom-up approach

The motivation for this research was to increase our understanding of community vulnerability, and how institutions



*The WRC study aimed to increase understanding on the vulnerability of communities to climate change.*

can assist communities to adapt to climate change and climate variability with respect to water access and use. Vulnerability in systems or communities was described by capturing their exposure to hazards, their sensitivity and their adaptive capacity. Exposure was characterised by changes in temperature and rainfall, and the likelihood of extreme events.

Indicators of sensitivity included social factors such as location, income and education levels, as well as days with no water access. Adaptive capacity is the ability to adjust to change. Strong institutions and well-functioning systems are indicators of adaptive capacity.

Values were assigned for these indicators. These values enabled the comparison of vulnerability between different communities within case study areas and between case study areas.

To address community adaptation and establish the role of municipalities, a bottom-up approach was emphasised. This meant that communities provided the initial inputs used to characterize the nature of water access issues both at present and in the future.

A limited top-down approach was also applied to incorporate the institutional perspective in water access issues. The study approach was informed by an appreciation of adaptation options available at grassroots level as well as those informed by literature.

Four case study local municipalities were selected to be the focus for the research. The areas differed in terms of geographic location, climate, main economic activity, on the scale from urban to rural, and in terms of historical legacy. The four local municipalities were:

- Thulamela Local Municipality, in the district of Vhembe, in Limpopo Province
- Msunduzi Local Municipality, in the district of uMgungundlovu, in KwaZulu-Natal Province
- Madibeng Local Municipality, in the district of Bojanala, in North West Province
- Letsemeng Local Municipality, in the district of Xhariep, in the Free State Province.

A GIS-based framework for adaptation was central to the conceptualisation of data and information on climate change impacts, and vulnerability indicators and possible adaptation options for communities and institutions in the study areas. Using this tool, better understanding of each study area, including village level climate change and adaptation information is readily available through the interactive software.

## Observations and findings

Investigations of institutional support in different case study areas revealed that the district and local municipalities are the main role-players in the delivery and maintenance of infrastructure for water access. Several other private institutions are also mentioned as having a role in water access for local communities.

The extent of support by these institutions, however, is usually small and targets a few specific villages, while the municipality has a more holistic approach for addressing water access in the whole municipal area.

The history of an area was observed to have a major bearing on the quality and completeness of current water services delivered to communities and most likely in the future. Municipalities inherited from the former homelands like Thulamela in Vhembe District and Madibeng in Bojanala District demonstrated poor performance in current water access and general service provision, with even poorer prospects for the future.

Other municipal areas which inherited reasonably good services, such as most of Letsemeng and the former urban area of Msunduzi case study areas, which were never part of a homeland, had better water service delivery and better community access to the services.

The focus of the Department of Water Affairs (DWA) has been to extend water services to those communities not yet served. This study revealed, however, that there were many communities whose water use was mostly of a domestic nature in all four case study areas.

Although most community members are connected to a reticulation system, they were experiencing challenges in accessing water of adequate quantity and/or quality. This was true for both high- and low-income communities. The adaptation support needs are not the same for different communities. These are dictated by three main factors, namely the nature of impacts, vulnerability and sensitivity to impacts.

Among other variables, the study found that existing functional water access infrastructure meant that the community is less vulnerable to climate change impacts. It was also noted that a number of recently developed water services delivery installations were not functioning. This was especially the case in installations for communities located in Madibeng and Thulamela local municipalities.

A list of factors could be cited for this state of affairs. At the top of the list are factors such as very low levels of skills, along with high vacancy rates in municipalities, poorly conceptualized, designed or constructed infrastructure, as well as inadequacies in operation and maintenance. Non-functioning water service infrastructure tends to reduce institutional and community resilience to climate change impacts on water access.

## Conclusions and recommendations

The bottom-up investigations pursued in the study revealed that while communities struggle to access water in rural areas, they do not generally need the water for agriculture, but mostly for basic uses. The majority of community members do not have land for viable agricultural practices and hence water needs are generally limited to basic needs.

The study revealed that communities with well-developed water infrastructure for agriculture, such as parts of Letsemeng and Madibeng, were less vulnerable to the impacts of climate change despite high water usage for agriculture. The water sources for the irrigation schemes are systems of connected catchments where the overall effect is at least 99% demand satisfaction level in both cases.

Some of the farmers in these areas explained that rainfall in their area was more of a disadvantage as it tends to disrupt the well-planned irrigation regimes. It follows that making agricultural land, water and reliable agricultural and water conveyance infrastructure available for unemployed community members will reduce their vulnerability to climate change impacts.

The study established that there was an extremely high dependency rate on social grants in both urban and rural communities. The nature of income source, community settlement structures and income levels were observed to be major determinants of current water access levels and prospects for future water access.

General livelihood improvements such as capacitating community members with no income by creating employment will reduce community vulnerability to climate change impacts. Employment creation is one way of enhancing community resilience to the impacts of climate change.

The links between the role of institutions in community adaptation to climate change impacts on water access, and their current role in water service delivery are yet to be

established. Their current challenges are likely to become insurmountable in the future only if climate change responses are not incorporated into current water service delivery and planning processes.

Municipalities have to incorporate climate change response strategies, including adaptation, into current and future development needs. Furthermore, policies and other provisions for IDPs must direct municipalities to start dealing with climate change impacts and adaptation.

Climate change adaptations entail dealing with specific climate impacts. Definition of these impacts and the conceptualisation of some of the solutions common to most areas should be led and guided by national institutions such as SALGA, and the national Departments of Water Affairs, Environmental Affairs and Co-operative Governance.

The municipalities and other local institutions will then maintain the role of using national data and information to determine what options are best suited for their specific cases. These can then be included in planning programmes such as the IDPs.

At local level, the state of service delivery is also worsened by the lack/absence of skilled human resources and an inadequate income base to sustain the needed resources. In some municipalities such as Thulamela as many as 80% of posts were vacant in 2012.

The discussion with municipal authorities showed that they were mostly concerned with motivating and securing large grants despite the glaring absence of personnel to ensure that these grants are efficiently spent. This mind set requires changing to ensure that productivity and effectiveness is central in the governance of municipalities.

The target should be for municipalities to become sustainable without government grants. The ethos driving municipal governance in practice should seek to include excellence in satisfying communities, becoming the best in employment creation, attracting local and international investment, excelling in employment conditions, and being able to implement comprehensive billing and effective revenue collection programmes.

Once this type of ethos is mainstreamed in the municipalities, community support for service delivery will improve drastically. Sustainable and high quality services mean reduced community vulnerability to external stressors such as climate change.

## Implications for policy

Several municipalities are currently not providing all services in accordance with the provisions of national legislation, including the targeted Municipal Structures Act and Municipal Systems Act. In many cases some of the services are not provided at all, or have to be taken over by other government organs. This calls for either policy change or restructuring of the municipal institutions.

The study revealed that it will be better if major developments in the understanding of climate change and the dissemination of adaptation options were to take place at national government level, with local institutions having the role of interpreting the recommendations for local use.

The poor resource levels in local institutions have to be taken into account when looking at their designated mandate, roles and obligations in responding to climate change, including adaptation. There is a need to look at what is provided for in the current legislation/policies and to seek to either revise these provisions or restructure municipal governance and functions.

In addition to building infrastructure, and in particular development in local communities, the latter have to be understood to include major projects to generate employment and income. The provision of funding from national government to provide services that are hardly paid for is not sustainable in the medium to long term.

Municipal structures should seek to establish viable business models. A good business model does not mean that the concept of water access for all is lost, but that it becomes even easier to establish and maintain in the long run. With a well-conceptualised business model, impacts caused by the continuing climate change will be taken into account.

The involvement of large-scale private water providers such as Rand Water and Umgeni Water eases the pressure on struggling municipalities and drastically improves water access to communities. The general improvement in water access in Madibeng was attributed to Rand Water's new and well-planned water conveyance and provision systems in parts of this area.

In Msunduzi, communities in areas that are served by Umgeni Water receive better quality and more reliable water services. Water provision policies should seek to enhance the participation of large water boards in broader water service delivery.

### Further reading:

To obtain the report, *The role of local community institutions in the adaptation of rural and urban communities to the impacts of climate change on water access and use*, (WRC Report No. 1963/1/14) contact Publications at Tel: (012) 330-0340; Fax: (012) 331-2565; Email: [orders@wrc.org.za](mailto:orders@wrc.org.za) or Visit: [www.wrc.org.za](http://www.wrc.org.za) to download a free copy.