



Adaptation is...

Managing climate risk
in South Africa's Western Cape

"We fruit farmers are totally dependent on water for irrigation. In the worst case scenario, Western Cape fruit farmers will be forced to stop producing certain types of fruit, or stop farming altogether.

– Trevor Abrahams, Western Cape farmer

The Western Cape is an eden of wine and fruit production – a critical source of jobs and revenue in a region struggling with competing demands for water from farmers, industry, and a growing urban population. Climate change scenarios consistently predict even less rainfall in this already arid region. A diverse team of researchers, led by the University of the Free State, is working in the Western Cape to give planners and farmers access to improved climate information and a range of options to help them prepare for a water-scarce future.



Western Cape water supply and demand – by numbers

30% reduction in farm output in 2004-2005 drought

45% growth anticipated in water demand, 2007-2020

20% annual supply shortfall anticipated by 2020



The problem: *meeting growing demand with shrinking supplies*

The winter rains were exceptionally good in the Western Cape in 2007, but nobody is fooled.

The Western Cape's climate is Mediterranean – warm and sunny, with most rainfall during the winter months. In the last decade, the region experienced some unusual droughts which in 2004-2005 cut agricultural production in the Berg River basin and led to municipal water rationing.

It is not clear yet whether these droughts reflect long-term climate change or short-term variability, but they are projected to occur more frequently in most climate change scenarios.

Peter Johnston of the University of Cape Town's Climate Systems Analysis Group says the most immediate challenge is balancing scarce water supply with rising demand.

"This scarce resource needs to be equitably and efficiently divided between the ecological reserve in rivers on the one hand, and domestic, industrial, and agricultural use from rivers and dams."

And there is an added problem of know-how: "Water resource managers currently do not have the skills and tools to do this."

The Western Cape contributes almost one-quarter of national gross farming income and employs 17.8 per cent of farm workers. The Cape's fruit and wine sector employs at least 200,000 farm workers and that number or more in secondary industries.

Tourism, another big water user, is growing by over 10 per cent annually and employs 9.6 per cent of the province's workforce. Meanwhile, the Western Cape's population is booming and job seekers are flocking to the region. Water demand in metropolitan Cape Town has more than tripled since the late 1970s. Across the province it grew by 60 per cent between 1996-2006.

Recent land and water reforms aim to transfer at least 30 per cent of South Africa's agricultural land and water to people defined as "previously disadvantaged" during the apartheid era. The process has been slow, but some of the most successful land reform projects have been in the fruit and wine industry. This sector, however, is extremely vulnerable to climate change.

The idea: *using integrated models to frame choices*

This project combines the hard science of predicting climate impacts with the delicate art of helping institutions apply that knowledge to water resource policies and planning. It brings a multidisciplinary team of scientists together with farmers, community and industry groups, and a range of local planning authorities.

Cover: *Trevor Abrahams worries about his farm's water supply. Photo: L. Brodie*

Page 2: *Near Wellington: most Western Cape fruit production is under irrigation. Photo: C. Van Rooyen*

Page 3: *Sandrivier Estate, Wellington: much of the Cape's farm labour force is female. Photo: C. Van Rooyen*

Page 4: *Project leader Daan Louw wants climate change factored into planning. Photo: S. Louw*

With input from stakeholders, the research team will use an integrated modelling approach – one that combines climate change scenarios, a hydrological model, and an economic model to analyse and suggest the most practical and efficient ways of sharing water.

The models will demonstrate costs, benefits, and risks associated with likely changes in the climate, and different approaches to land and water use. The modelling tools aim to separate short-term variation in the region's weather – say, a short run of unusually wet years – from the likely long-term, enduring changes that may result from climate change. These models and the options they produce will be shared with stakeholders so they can make better-informed decisions about investments and water use.

For Jabavu Nkomo, a senior program specialist with the Climate Change Adaptation in Africa program, the project's value lies in what it will bring to water resource users.

"This project will build the capacity of water users and the political bodies trying to ensure adequate and equitably-shared water supplies for the future. It will see the results and skills developed shared with those most affected by changes in water supply."



To develop these models and transfer the knowledge of how to apply them, the research team draws on a range of expertise in climate modelling and prediction, economic and hydrological modelling, and capacity building. Partner institutions include the University of Cape Town's Climate Systems Analysis Group; the agricultural economics department at the University of the Free State and Optimal Agricultural Business Systems; the UNEP Risoe Centre on Energy, Climate, and Sustainable Development; the International Research Institute; and the University of KwaZulu-Natal School of Bioresources Engineering and Environmental Hydrology.

On the ground: *involving users from the outset*

At this early stage, the project team is identifying stakeholders, planning farm surveys, and doing regional outreach. Raising awareness is an important first step.

"We need to overcome bureaucracy in the different institutions," says UCT's Peter Johnston.

Cape farmers already are concerned about climate risk and water supply.

According to Billy Bourbon-Leftley of Loevenstein farm located on the Berg River, "the past six years have already shown a different weather pattern than what we were used to. Although this winter's rainfall was high, we had very strict water restrictions for two years because of previous dry seasons and insufficient water resources."

The Berg River basin northeast of Cape Town supplies water to the city and to surrounding fruit farmers. The Berg River Catchment Management Agency (CMA), in which all water users are represented, is therefore a key stakeholder.

The Berg CMA illustrates the pressure on planners dealing with water and climate



issues. Construction of the Berg River Dam has just been completed and more reservoirs are on the drawing board. But there are few other suitable dam sites left for development on the river and those under construction are small.

One early success has been to see the Berg CMA add climate change to its standing agenda so that it is part and parcel of the water authority's planning and implementation processes.

Project leader Daan Louw of the University of the Free State says that as they design their water resource policies, it is extremely important that institutions in developing countries combine planning for economic development with planning for climate change.

The goal: *informing sound decisions in tough times*

In bringing together disparate stakeholders with interests in Western Cape water management, the research aims to build relationships that endure as water allocation gets tougher in future. Those involved

will face hard choices on contentious issues such as water supply and pricing.

Better-informed planning will be crucial to prevent job losses in commercial farming and reduce risks for small and resource-poor farmers. By engaging in water management issues, poor communities will learn more about water supply mechanisms, and be able to more efficiently use water.

Financial investments also are at stake. If climate change brings long-term water shortages as projected, new water reservoirs and new institutions for allocating water must be put in place. Research will be needed on crops more suitable to the predicted changes.

Looking ahead: *from conflict to collaboration*

The lessons of this Western Cape project may extend to others across Africa facing similar conflicts over shared water resources expected to diminish in the face of climate change. The team intends to create a centre of excellence for integrated modelling that will draw students from across the continent to study climate change adaptation.

For Daan Louw, the search for solutions to potentially crippling water shortages may yet hold a silver lining:

"Climate change adaptation will add strength to the glue that binds us together as Africans in the decades to come." 

Christa Van Rooyen



"Managing climate risk to water and agriculture in South Africa" is a research project led by the University of the Free State, with support from the **Climate Change Adaptation in Africa (CCAA) research and capacity development program**. The CCAA program is jointly funded by Canada's International Development Research Centre and the United Kingdom's Department for International Development.

For further information, visit www.idrc.ca/ccaa