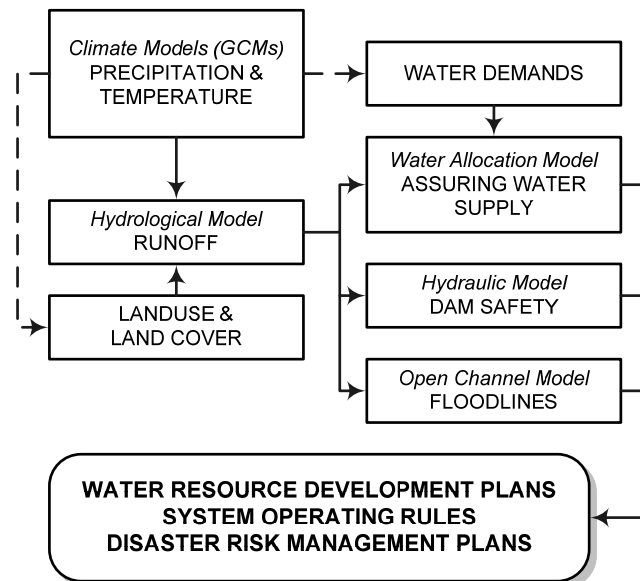


Identifying the potential impacts of a changing climate on water security

Mark Summerton

Umgeni Water, mark.summerton@umgeni.co.za, 033 3411265

A water planning framework (see Figure) has been developed to determine the possible impacts of a changing climate on water resources and assurance of supply. Simulations from 9 General Circulation Models (GCMs) have been added to a daily hydrological model coupled with a water yield model to enable simulations of future water resources, yield and security in a changing climate. This “framework” has been applied to one of South Africa’s key strategic catchments viz. the Mgeni in KwaZulu-Natal.



Results to date from the Mgeni are not definitive with for example the potential impact on water yield in the intermediate future (2046-2065) ranging between -15 and +30%, with the Swedish Meteorological and Hydrological Institute (SMHI) and University of Cape Town (UCT) models seeming to be relatively dry and wet respectively. There are a number of possible reasons for this including that the models have been downscaled using different techniques by different institutions, and that the UCT models are now dated, around 5 years. Furthermore, there is no scientific (or any other) basis to support the credibility of any 1 model or scenario over another. In other words, any one of the 9 scenarios has an equal possibility of representing the climate of the future. The discipline of performing impact studies, such as water resources, based on scenarios of future climates is a relatively new and complex one, and is partly responsible for increasing the uncertainty and diverging results from different GCMs.

There are, however, several improvements that are currently being included to improve the modelling process. At the heart of these improvements is the inclusion of new scientific developments from the Water Research Commission (WRC), and a further 26 GCM scenarios that recently became available. It is hoped that this further analysis will provide converging results, and at the very least agree on the direction of change.

Acknowledging that there exists a high degree of uncertainty in these results, Umgeni Water is developing flexible adaptive strategies to cope with climate change and the potential impact of other “stressors” on the sustainable provision of water. These strategies are implemented through water resources development plans, system operating rules and disaster risk management plans.