Study explores vulnerability of southern Cape coast

Some 44% of the Eden District Municipality coastal zones are at risk of sea level-induced coastal erosion and inundation, 69% are at risk of groundwater contamination from salt water intrusion and 44% are at risk of large storm surges.

These are the findings of a study prepared for the Western Cape Provincial Government Department of Environmental Affairs and Development Planning. The study was undertaken by earth sciences consultancy Umvoto Africa, who uncovered a number of high risk coastal zones in the Eden municipal area.

Regions most at risk of sea-induced coastal erosions include Mossel Bay and the Wilderness to Knysna area, with the highest risk ranking including Wilderness West, Sedgefield-Swartvlei and Knysna. The majority of the Eden District Municipality is comprised of hydraulically conductive and therefore vulnerable primary and fractured quartzitic aquifers, which are accessed along the coastline for water supply. In light of this, coastal areas with the highest ranking for groundwater contamination from salt water intrusion include Wilderness West, Sedgefield-Swartvlei, Knysna and Pletternberg Bay.

According to Umvoto, areas that reflect low gradient headland-adjacent or inlet/pocket bay beaches in association with high population and extensive development close to the shoreline are most at risk from extreme events such as storm surges and tsnunamis. These areas include Stilbaai, Mossel Bay and the Plettenberg Bay to Nature's Valley area.

Recommendations for each coastal hazard have already been developed. This includes a collective response from both municipalities and local residents so that long-term institutional, accommodation, retreat and soft protective measures are undertaken to manage long-term coastal evolution.

Special award for Sedgefield project

The submission 'Life beyond our rivers – a Sedgefield case study' has received a Special Recognition Award in the Technical Excellence category for SSI Engineers & Environmental Consultants, at the recent South African Institution of Civil Engineers' National Awards for Engineering Excellence.

SSI developed a demand-based solution to solve the water supply crisis in the small southern Cape town, which has been gripped in one of the worst droughts in the area in living memory. The town falls in the Knysna municipal area. The consultant succeeded in developing something that was both economical and took weeks rather than years to implement.

Sedgefield, which is home to 6 000 permanent residents (a figure which doubles during peak holidays) ran out of water when its main source of supply, the Karatara River, ran dry. Water had to be trucked in and the Knysna municipality consequently adopted SSI's approach to supplement surface supply from alternative sources.

The surface water supply from the Karatara/Hoogekraal rivers was thereafter curtailed to 1,5 Mℓ/day; while a new 0,5 Mℓ/day groundwater supply was developed. A further 1,5 Mℓ/day is provided by a small mobile desalination plant located at Mayoli beach.

To meet the long-term demand of 4,5 Mℓ/day it is proposed to supplement the surface, ground and desalination water with the re-use of final effluent from the wastewater treatment works. The additional 1 Mℓ/day is expected to provide for Sedgefield's potable water needs to 2034.

Such has been the impact of the Sedgefield scheme that SSI has provided similar solutions all along the Garden Route, including Mossel Bay, George, Knysna, and Plettenberg Bay with combinations of effluent reuse and/or desalination technologies.

Water resources study enters final year

A three-year study into availability of water resources in South Africa's northern towns has passed the halfway mark.

The Northern Regions Reconciliation Study was initiated by the Department of Water Affairs (DWA) in 2008. The study area comprises the water management areas of Limpopo, Luvuvhu and Letaba, Crocodile (West) and Marico, and Olifants.

The main objective of the study is to provide first order water supply reconciliation strategies to ensure the availability of water resources now and into the future for all towns in the Northern Planning Region. Towns must be studied in a prioritised order based on availability of water and reconciliation strategies completed in that sequence.

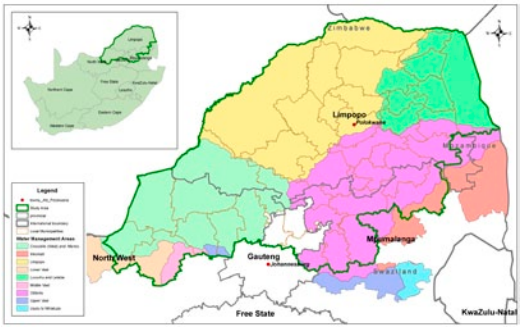
Consulting engineering firm SRK Consultants was appointed to undertake the study for DWA. According to Sarah Skinner, SRK principal scientist, most of the regions under review are water stressed. "Many dams are struggling to provide sufficient water to satisfy domestic requirements as well as water for economic growth and development. The potential for using groundwater to augment water supply is therefore of paramount importance in consideration of any water resource management strategy."

Information regarding the surface water resource used for each of the clusters, as well as the related yields of the resource were collected from previous study reports, explains Skinner. The algorithms for the water situation assessment model were applied where detailed analysis was not carried out. "Appropriate adjustments were made to account for upstream land-use activities such as small dams, abstractions and return flows," explains Skinner.

The groundwater component included a review of groundwater resources on the basis of the geographic location, potential aquifer boundaries, exploration potential of the regional aquifers, current groundwater usage for domestic and irrigation purposes and, taking cognisance of possible sources of contamination, the probable water quality.

"The study is in its second year, and a number of challenges have had to be overcome to generically identify the groundwater sources of supply in the study area while still providing sufficient information for the development of a conclusive strategy," notes Skinner. "These challenges have included the sheer extent of the study area (some 2 000 towns), disparity in data sources and contradictory information in the available data sources.

At the time of writing feasibility studies were in progress for about 80% of the area and completed for about 40% of the area.



Pollutants don't discriminate between rich and poor

Homes in low-income and affluent communities have similar levels of endocrine disrupting compounds (EDCs), according to US research. Levels of EDCs were also found to be higher in the home than outside it.

The researchers, from the Silent Spring Institute, Massachusetts, took samples of air and house dust in homes from two different communities in the San Francisco Bay area. These samples were then tested for 104 different substances, including 70 suspected EDCs. The sampling included 40 homes in an urban, industrial, low-income area and ten homes in an affluent, coastal community.

Levels were generally higher indoors than outdoors. The scientists expressed surprise at finding higher concentrations of some phthalates outdoors near urban homes contributing to higher indoor levels as well, but concluded that EDCs 'are ubiquitously common across socio-economic groups."

The study appears in the American Chemical Society journal, *Environmental Science & Technology*. To read the article Visit: http://pubs.acs.org/stoken/press-pac/full/10.1021/es100159c

Aussie farmers oppose Murry-Darling plan

A government plan to reduce irrigation diversions in the Murray-Darling Basin apparently has farmers in Australia up in arms.

Water news site, www.circleof-blue.org, reports that the draft plan, which proposes a reduction of water entitlements in the region by up to 29% to protect the river's environmental function, has been vehemently opposed by residents of the basin, with some staging public protests. The guide is reportedly the first step in a process of adopting new water use regulations in Australia's largest river system.

At the centre of the controversy are the sustainable diversion limits – the amount of water that can be removed from rivers for consumptive use. Current basin-wide diversion of 13 700 gigalitres do not leave enough water in the river system for it to function properly. The proposed cuts will affect areas that grow wheat, rice, and cotton. Agricultural areas without diversified economies will also feel the pinch.

Study on dust storms to help scientists see climate clearer

The University of Leeds, in the UK, is leading a £1-million project to study the giant desert storms of the Sahara which will help improve climate and weather prediction models.

Extreme sandstorms like the fast-moving 'walls of dust' seen in Hollywood film the Mummy may look spectacular, but their effects on weather systems and climate change are even more dramatic. These storms, known as 'haboobs', sweep large quantities of mineral dust off the sands of the Sahara into the atmosphere, where it exerts a wide range of effects on the environment.

According to project leader Dr Peter Knippertz, dust is a really important player in the climate system, for example, dust from the Sahara provides most of the nutrients needed to fertilise the Amazon rainforest. "But the harsh desert environment of the Sahara means very few measurements have ever been made there."

Dust is one of the main sources of iron to the oceans where it is important in the formation of CO_2-guzzling phytoplankton. In the atmosphere, dust particles affect how much energy from the sun enters and leaves the planet, which has a longer-term impact on climate, and dust also deteriorates overall air quality and therefore has direct implications for human health.

"We do not know for sure how much of the dust within these storms ends up in the atmosphere and how much returns to earth once the winds have died down," explained Dr Knippertz. "This project will help us answer this question and to produce a comprehensive representation of the global dust cycle with the view to developing more accurate models."

Ultimately the project team hopes that the study will help eliminate some of the uncertainties in predicting climate, weather and the impacts on human health.

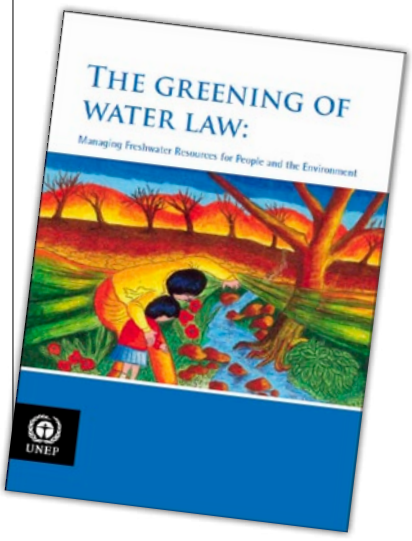
Governments must ramp up action to ward off looming water crisis – UN report

With competition on the rise between humans and other species for the world's limited water supplies, governments must take environmental issues into consideration when drafting laws on the use of water to avert an impending water crisis, cautions a new United Nations report.

Although more than two-thirds of the planet is covered in water, only 2,5% is freshwater, most of which is stored deep underground or in glaciers, leaving only 1% available for human use. A key challenge facing countries is how to meet the water needs of a growing human population, while maintaining freshwater ecosystems and supporting environmental sustainability, says *Greening Water Law,* the new publication launched by the United Nations Environment Programme (UNEP).

If the international community does not take action to improve freshwater supplies for drinking, sanitation and hygiene, up to 135 million preventable deaths could occur in the coming decades, the report warns. The unsustainable use of freshwater also drives biodiversity loss, it says, citing the example of North America, where nearly 30% of continental freshwater fauna populations are threatened with extinction due to depleted and contaminated water resources.

"Achieving a better balance between human and environmental water needs will require significant changes in legislation – and you need legal tools to do this," reports Gabriel Eckstein, the report's lead author. In Australia's New South Wales, for example, the Water Management Act dictates that in the event of a severe water shortage, freshwater will first be allocated to meet basic domestic and municipal needs, then in response to environmental necessities and then finally for all other purposes.

The Water Resources Act in Paraguay ranks the water needs of aquatic ecosystems as second to humans but ahead of agriculture, power generation and industry. "These laws recognise the immense value of freshwater resources," notes Eckstein.

The UNEP study also points to the economic gains that can be derived from having freshwater resources protected by national law. The world's wetlands, for example, are estimated to provide as much as US$15-trillion in ecosystem services through their natural ability to purify and detoxify water.