



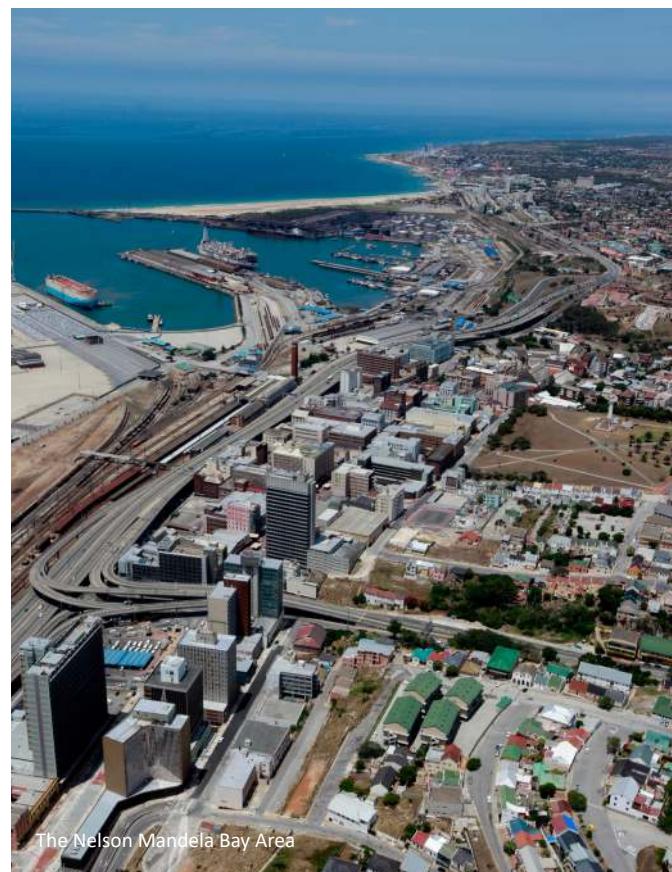
## The economic impacts of water insecurity and investing in water security in the Nelson Mandela Bay City Region

This report briefly summarizes the findings of a macro-economic study that researched the impact of water scarcity on economic growth and the wellbeing of the population of the Nelson Mandela Bay (NMBM) Metropolitan Municipality. The study analyzed the effects of different mitigation scenarios which could be considered. It found that improving water saving and reducing non-revenue water will have the most positive effects in terms of GDP and employment. It noted that other measures such as water pricing, water reuse and desalination will have little or no positive effects. Not addressing water scarcity will have the most negative effects with a decrease of GDP and loss of jobs. As the mitigation measures have different macro-economic impacts, policies need to be designed carefully. A combination of different measures, for instance, investing in water saving measures in combination with reducing non-revenue water, is a recommendable solution to increase positive impacts.

### Context and approach

Knowledge about the local macroeconomic impacts of water scarcity is crucial for a municipality in order that it could take the right measures to enhance economic growth and improve the wellbeing of the population. This is particularly relevant for water scarce regions such as NMBM and South Africa as a whole, where high water-infrastructure losses and droughts driven by climatic variations remain one of the most prominent challenges. With a foreseen national water deficit of about 17% by 2030 according to the National Water and Sanitation Master Plan, water security is one of the most prominent challenges for the City Region. This applies especially to local government and public entities mandated with the delivery of water and sanitation services to residents and businesses as well as the management and supply of water, treatment of water, bulk supply of water, distribution of water, wastewater collection and treatment.

However, the specific macroeconomic impacts of water scarcity by 2030 remain largely unknown



in NMBM, setting important challenges for the economy of the metropolitan area and its management of water resources. Establishing and quantifying how water scarcity impacts on economic growth and the wellbeing of population is challenging since it requires the development of complex macroeconomic models.

In this context, GIZ NatuReS (formerly International Water Stewardship Programme-IWaSP), within the framework of the Nelson Mandela Bay Water and Economic Resilient Partnership, commissioned a macroeconomic study (published in May 2020) by the Toulouse School of Economics (TSE) to estimate the costs of water insecurity in NMBM by 2030 and to evaluate economic benefits of various water mitigation measures. A Computable General Equilibrium (CGE) model, which is a powerful tool to analyze the macroeconomic effects of public policies and can provide valid recommendations for decision-making related to water policy, was used to analyze different scenarios in NMBM. This macroeconomic study considers all water users and sectors, while taking full account of macroeconomic constraints and intersectoral linkages and can be seen as a useful tool to inform policy and decision makers of the links between water security and economic growth.

## The CGE Model

The NMBM CGE macroeconomic model has been used to assess the impact of water-scarcity and water security mitigation scenarios closely involving local stakeholders in a highly participative consultation and design process. Five scenarios of changes have been developed and assessed up to 2030. These were:



The first scenario “Water scarcity” calculated which impacts inaction and the projected increase of water deficit by 17% as projected in the National Water and Sanitation Master Plan would have on GDP, welfare and employment. The second scenario “Water saving” still took into account a water deficit of 17% but in combination with an increase in water saving by 10%. This means that water is used more efficiently by producing more output with the same quantity of water or producing the same output with less water. A third scenario “Non-revenue water” assessed the situation of a water deficit of 17% with a simultaneous reduction of non-revenue water from 44% to 30%. Here 14% less water is “lost” on the way to the customers by, for instance, leakages or theft. The fourth scenario “Water pricing” looked at the impact of an increase of the tap water price by 10% for all customers and a water deficit of 17%. The last scenario “Reuse & desalination”, in turn, analyzed the impacts of water deficit with a concurrent increase of wastewater reuse and desalination of seawater by 50% making previously unused water fit for use.



### Water Scarcity

Increase of water deficit by 17%



### Water Saving

Increase of water deficit by 17% and increase in water saving by 10%



### Non-revenue Water

Increase of water deficit by 17% and decrease in non-revenue water to 30%



### Water Pricing

Increase of water deficit by 17% and increase in tap water price by 10%



### Reuse & Desalinate

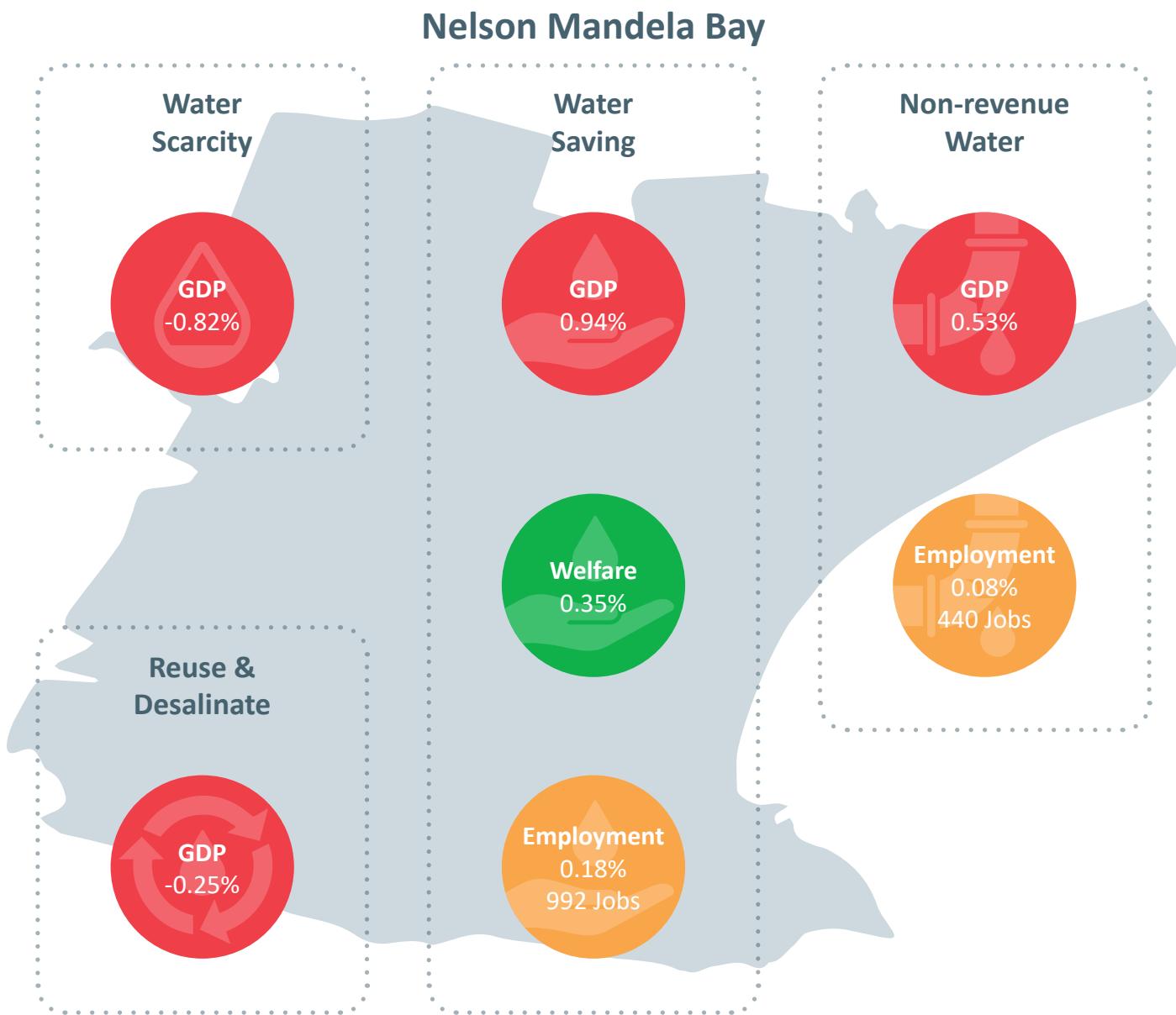
Increase of water deficit by 17% and increase of wastewater reuse and seawater desalination by 50%

## Main findings of the macroeconomic study for the city region

The analysis of the data showed that in Nelson Mandela Bay, water scarcity will have a strong impact on the city region economy by 2030. With an increase of water scarcity by 17%, NMBM will face a decrease in GDP by -0.82% in 2030, but with a negligible impact on the unemployment rate.

On average, the welfare of households in NMB is expected to decline by 3% due to increased water scarcity by 2030. However, the impact differs across household income categories, low-income households being the most negatively impacted by water scarcity.

This result calls for implementing specific policies targeted at low-income households. Comparing the different mitigation measures, water saving appears to be the most effective to mitigate water insecurity. A 10% increase of water saving erases the negative GDP impacts of water scarcity and creates an additional 0.94% GDP in the local economy by 2030, as well as contributes to 992 additional jobs. Reducing non-revenue water from 45% to 30% can also create positive effects in terms of GDP and employment, while reuse and desalinate have far fewer positive effects and water pricing almost none.



The impact of the different scenarios on GDP, employment and welfare

## Policy Implications



The negative macroeconomic impacts of increased water scarcity on GDP call for the implementation of specific policies. Different policies will have different macroeconomic impacts and, hence, they must be carefully designed.



This macroeconomic study offers a useful way to test policies and to assess ex ante their impact.



The most promising policy for NMBM appears to be investing in water saving measures (primarily) and reducing non-revenue water (secondly). Other policies, such as increasing water prices and investing in desalination and water reuse, will have only limited effects for mitigating long-term impacts of water scarcity, and are, therefore, less recommendable.



Water policies will have differentiated impacts on different economic sectors and household income groups. This calls for a careful design of such policies, and

the need to consider redistribution schemes across sectors or household income groups. Differentiation of economic policy scenarios according to household type and/or economic sector could be a valid option to consider.



Combining different policy scenarios might be a relevant way to identify an optimal policy mix for mitigating long-term impacts of water scarcity.

## What does this study mean for the City's investment portfolio?



Investing into the right measures to tackle water scarcity will not only reduce the negative impacts of inaction but even yield returns with regards to GDP, welfare and employment



It also encourages joint collaboration between public and private stakeholders on strategic economic development initiatives where economic development is assured in spite of a water security challenged region.

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