Policy Research Brief

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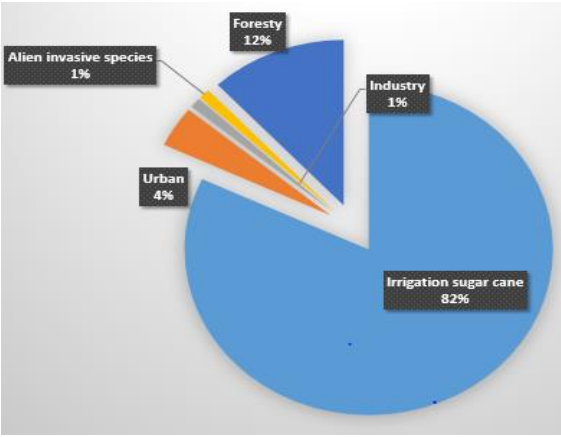
STRATEGIC POLICY TECHNICAL ANALYSIS

The Impact of Climate Change on Water Resources in Swaziland: The National and Transboundary Implications for National Water Policy Reform

UNDP in support to the National Water Authority

Background:
The increasing global climate change impacts on the SADC Region including the Kingdom of Swaziland, intensifies the need for Integrated Water Resources Management (IWRM) at both national and transboundary levels. Swaziland is characterized by high dependency on agro-based economy for growth, with sugar accounting for 21% of GDP in 2014 and 82% of the national surface water, a resource vulnerable to climate risks.

Figure 1: National Surface Water Balance



The recent 2014/15 El Nino-induced drought resulted to food insecurity due to decreased crop production (68%) leading to food aid distribution for 26% of the just over one million population, and intense water rationing in urban areas.

Climate Research and Projections
Future climate change projections suggests future warmer temperatures for the country with an estimated increase 1.5^{0}C to 3.2^{0}C by 2050, while the overall annual rainfall amounts across the studied river basins, Komati, Usuthu and Mbuluzi indicates unlikely change over the periods 2025 or 2050.

During the peak summer months, December to February, there are indications of a possible increase (5-10%) in rainfall amounts. Towards the end of the season, the consensus in projecting a slight precipitation reduction. Envelopes of downscaled rainfall projections across the models (HadGEM1, CGCM3.1, ECHO-G, GFDL and CM2.0) imply possible contraction in the rainy season, and longer drought periods with intense flash floods.

Water deficits
The climate modelling study (2014) to assess the impact of changes to water supply conditions in the country also identified deficits which will become more pronounced in the future.

Table 1: Sugar-equivalent Water Deficits

Year	Deficit (Kt)	Red. Sugar Eq. (Mm³/a)	Red Prod Eq. (Ha)	Reduction (%)
2014	26	31	2,272	4
2025	86	266	19,492	33
2050	137	327	23,962	40

Most pressure will come from economic growth by 2025, projecting a 33% reduction in sugar-equivalent, and 40% by 2050, projected on the 2014 national sugar production, baseline. According to the study, the projected 2050 deficit will be mainly due to climate change. Adding application of Agreements' allocation with South Africa there would be 11% and 13/14% deficit 2025 and 2050, respectively.

Growth implications

The dominant factor for the country for improved management and increased investment in water resources infrastructure is related to the growth in demand resulting from agricultural and industrial progression and population expansion.

This study also highlights a steady decline of available flows at the border crossings in the future, reduced hydro-power generation, as well as higher deficits during drier years for water use within Swaziland. This is mainly due to the increased water demand targets that will often not be fully met due to a combination of insufficient runoff, inadequate climate adaptive practices, water inefficiencies and inadequate water storage infrastructure.

Challenge

The balance between climate change related policies and implicit water demands remains key. Practices such as metering of non-priority uses, affordability of smallholder farmers to pay for water and abstraction permits given climate impacts on volumetric quantities, and industrial and domestic water efficiency efforts, have not factored in financial costs of management neither the economic value of water scarcity. Investments and national development planning lacks projections of water user demands and incentives for water-use efficiency. Lastly, catchment land-use activities impacts on rainwater infiltration and storage.

Conclusion

The dominant factor for better management and increased investment in water resources infrastructure is related to the growth in water demand due to industrial growth and population expansion in light of climate variability and associated risks.

The *Position Paper on Management of National Water Resources Management against the backdrop of Climate Change* strategic proposal to the National Water Authority points out that Swaziland is benefiting from an under-utilisation of the abstraction limits by South Africa. Projected decreased rainfall patterns in South Africa could increase its water demands and put pressure on Swaziland and Mozambique to reduce their water consumption. Effort for improved national water storage infrastructure would optimise gains on water availability given the high water run-offs. Such an address would be complemented by enabling national policy reform with an undertaking towards water-use efficiency.

Recommendations

The amendment of the 2003 National Water Policy to: guide the strategic IWRM taking into account industrial and population growth needs; flow variations and ecological requirements; water efficiency and incentivised water allocation mechanisms; and investment in research for innovative technologies application is an option in light of the unprecedented impacts of climate change on water. Advocacy and public awareness for climate adaptive practices at various levels to facilitate policy reform, building on institutional capacities and community resilience.

Catchment management through adoption of rangelands, forests and wetlands management, control of Alien Invasive Species, and generation of monitoring data on land degradation to inform rehabilitative practices including livestock management. Investments in water storage (and research) by taking advantage of flash flood water and run-offs through adaptive practices such as household and institutional rainwater harvesting, sand dams' construction, wetlands and ecosystem and catchment management. This will include research and modelling projections and assessment of river basins and dams for water stress implications and flow monitoring and forecasting systems to inform the transboundary platforms.

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