Wise management of ecological infrastructure for water security in the Garden Route

'Ecological infrastructure' (EI) refers to naturally functioning ecosystems that deliver valuable services to people. Examples of EI include mountain catchments, wetlands, riparian zones, coastal dunes, kelp beds and spawning grounds. EI is the nature-based equivalent of built infrastructure. However, unlike built infrastructure, EI already exists – we don't have to build it. Like built infrastructure, EI needs to be managed, maintained and in some cases restored.

In South Africa, a well-demarcated example of EI is the country's Strategic Water Source Areas (SWSAs). SWSAs are those areas that supply a disproportionately high amount of surface runoff in relation to their surface area. South Africa's SWSAs make up only 10% of the country's land area but provide 50% of the mean annual runoff, which in turn supports at least 51% of South Africa's population and 64% of its economy. As such, SWSA make a critical contribution to water security in South Africa. However, only 13% of these areas enjoy formal protection.

Protecting water source areas is a cost-effective means of keeping contaminants out of drinking water and delivering a continued supply of good quality water to downstream users. The importance of protecting these areas for enhancing water quality and quantity has been recognised worldwide. For example, in Australia the city of Melbourne set certain catchments aside exclusively for water harvesting more than 100 years ago. These protected catchments are closed to the public and commercial activities (e.g. logging), which prevents contamination of water and consequently Melburnians enjoys some of the highest quality and most affordable drinking water in the world. Similarly, New York City saves millions of dollars on water treatment by 'importing' (through a system of underground tunnels) clean water from well protected catchments in the Catskill Mountains some 150 km north of the city. In a further example dating back to the 1960s, the city of Seattle took full ownership of the Cedar River Catchment that provides 70% of the drinking water to 1.4 million people in the greater Seattle area. They took care to restore natural habitats and even decommissioned the Milwaukee railway line through the catchment to promote good quality and quantity of water from this source.

In the Garden Route, both the Outeniqua and Tsitsikamma Mountains form part of South Africa's SWSAs. Along the Garden Route, water security of a number of towns (e.g. George, Knysna and Plettenberg Bay) is highly dependent on water draining from these mountains, often via a single river per town (e.g. Swart, Touws and Keurbooms-Palmiet Rivers). The associated drainage areas or catchments are essentially the 'water factories' that provide the quality and quantity of water to supports downstream communities and economies. Unfortunately, due to a lack of policy coherence across departments and sectors, several land uses (e.g. urban development, agriculture and plantation forestry) often compete in the same water source areas, which will inevitably result in trade-offs between long-term water security and other developmental goals.

Considering the current influx of people to the Garden Route, combined with the likely impacts of climate change, wise management of SWSAs and key EI that support future water security should be of the highest priority to local government. The entire drainage area of the Garden Route Dam is a prime example of such EI. Based on good practice examples from progressive cities elsewhere in the world, wise management of this EI (the entire drainage area of the dam) would include to protect and restore natural vegetation as far as possible; eradicate alien trees, such as pines, which currently abound around the dam (a recent South African study showed a 15-30% increase in available surface water resources after clearing of mature alien trees); and prohibit any development that might modify natural infiltration and drainage of rainwater runoff, or might cause contamination of water in the dam. Development of further urban infrastructure in close proximity to the dam is likely to contravene most of these wise management rules.

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Further reading:

1. Rebelo, A.J. et al. 2022. The hydrological impacts of restoration: A modelling study of alien tree clearing in four mountain catchments in South Africa. *Journal of Hydrology* 610, p.127771. https://doi.org/10.1016/j.jhydrol.2022.127771
2. Nel, J.L. et al. 2017. Strategic water source areas for urban water security: Making the connection between protecting ecosystems and benefiting from their services. *Ecosystem Services* 28: 251–259. http://dx.doi.org/10.1016/j.ecoser.2017.07.013