

NATURAL CAPITAL

Greening the city: A framework for integrating natural capital into urban asset management systems

Like many countries, the increased urbanisation and industrialisation of South Africa have led to significant amounts of environmental degradation. This has made cities more vulnerable to multiple climatic crises, resulting in many seeking to adopt successful adaptation strategies. Unfortunately, still more follow unsustainable development pathways. Article by Kyle Harris.



Through extensive literature review, natural capital, such as wetlands, rivers and forests, have been recognised as having the potential to complement grey infrastructure while reducing the adverse effects of economic practices on societies and the environment. Several case studies have proved that a drop in property value follows degradation of the natural capital. Much like grey infrastructure, natural capital can be seen as an asset and delivery of ecosystem services can be described as the annual rent received from the asset. The presence or condition of ecosystems is similarly linked to the economics of associated built infrastructure. These conceptual similarities and linkages between natural capital and built infrastructure provide a valuable opportunity for exploring the integration of these natural assets into existing urban asset management.

Despite the increasing awareness of the importance of natural capital, few formal institutional arrangements, specifically economic policy instruments, exist that formalise and internalise decision-making around these assets into day-to-day economic decision-making. An ongoing Water Research Commission (WRC) funded project (**WRC project no. C2021/2022-00788**) is investigating a municipal asset management system as a specific economic policy instrument for the formal institutionalisation of urban or municipal water-related green infrastructure. The central hypothesis is that the structure of existing municipal asset management systems can accommodate natural capital, as defined by existing natural capital delineation systems. The project seeks to test the hypothesis at the hand of a case study, located within the City of Tshwane (CoT).

The Hartbeesspruit, which incorporates the Colbyn Valley Wetland, is an ideal urban river system for piloting this project for multiple reasons. Firstly, the Colbyn wetland system covers a wide area and is currently in fair condition, indicating that it has the capacity to provide key ecosystem services to residents of the CoT. Secondly, most of the riverine system is in close proximity to urban built-up areas and performs an important role in reducing erosion, regulating flow regimes and regulating nutrients and toxins at little to no operational or capital cost, a huge saving to the Metro. These are benefits that the residents of the CoT essentially receive for free and could be enhanced through the rehabilitation of this ecosystem.

To integrate natural capital into the asset management systems of the CoT, we propose the following framework:

- **Asset delineation:** The geographical boundaries of each natural capital component are delineated using desktop studies and ground truthing. Attribute data was collected for each wetland and mapped across the catchment. Attributes refer to the specific properties of an asset component, such as type, size, class, condition, location, and identity.
- **Asset classification:** The assets are then classified based on their function, asset type, or a combination of the two.
- **Valuation of the asset:** Valuation of the natural capital asset will be based on the financial benefits the municipality derives from the asset. This will be calculated using a cost-benefit analysis (CBA) where the cost of rehabilitation of the ecosystems by the CoT and the benefits to the residents and the CoT are calculated.
- **Integration:** Integration into the asset register: The asset is then integrated into the CoT's asset management system.

The integration of natural capital into the CoT's asset management systems presents an opportunity to transform our methods for creating sustainable and resilient urban landscapes. It also provides the chance for us to review practical means for linking ecological valuation studies with urban economies and asset planning structures. The successful implementation of the proposed framework will enable the city to benefit from the green ecosystem services offered by these assets more effectively, improve public health and well-being and mitigate the impacts of climate change, through adaptation and resilient systems.

Utilising this framework will also elevate the city's environmental credentials (i.e. making a case for the value of natural capital in mitigating urban degradation and resulting risks, trajectories of change, future loss of benefits and working towards Sustainable Development Goals, like 6, 13 and 15, in particular), changes that will likely attract more investors and foster economic growth. This framework emphasises the need for collaboration among various stakeholders, including local government authorities, citizen scientists, community groups, private sector entities, and environmental experts. Moreover, it highlights the importance of data-driven decision-making, long-term planning, and continuous monitoring and evaluation. As CoT takes decisive steps towards incorporating natural capital into its asset management strategies, it can pave the way for other municipalities to follow suit and build a greener, more sustainable future for generations to come.



There can be no successful business and healthy society on a sick environment. The images illustrate the need to maintain the natural capital as it would be to any asset.