

Socio-Economic Benefits of Ecological Infrastructure

Introduction

South Africa faces considerable water challenges in terms of water supply and water quality. Around 98% of the country's total reliable surface water supply has already been allocated to users and South Africa's freshwater resources are becoming increasingly polluted and turbid and are moderately to highly eutrophic. Investments in the maintenance and restoration of Ecological Infrastructure (including wetlands, rivers, and strategic mountain catchments) have been identified as an important measure for not only addressing South Africa's water challenges but also social challenges as they provide opportunities for unskilled and semi-skilled employment growth. These investments also form a key element in South Africa's transition towards a green economy as they foster increases in ecosystem services.

Ecological Infrastructure interventions comprise natural and artificial actions (such as alien plant clearing or artificial wetlands) that enhance chosen ecosystem services in landscapes. Ecosystem services are the benefits people obtain from ecosystems. Water-related Ecological Infrastructure interventions aim to increase water quantity and quality in degraded mountain catchments, including rivers and wetlands. Despite the recognition and increasing evidence of the importance of these investments, there is limited uptake by private sector investors, and investments made by government remain at a relatively small scale in comparison to investments in hard infrastructure.

To stimulate the investment needed to maximize social and water-related benefits from Ecological Infrastructure intervention this innovative research project set out to develop an evidence-based integrated framework and prototype "investment case" for strengthening water-related Ecological Infrastructure. The approach taken by the multi-disciplinary team from the universities of Cape Town, Stellenbosch, KwaZulu-Natal and Copenhagen was to combine the scientific expertise from hydrology, climate science, ecology, and livelihood analysis. The project added knowledge of key stakeholders from government, NGOs and the private sector who are involved with implementing or funding investments into Ecological Infrastructure. This innovative transdisciplinary approach allowed the research team to develop a more sophisticated understanding of the linkages between Ecological Infrastructure interventions, livelihoods for people (i.e. those living near and working in the sites of interventions) and water security.

The project focused on important catchments in South Africa, namely the Berg-Breede catchments in the Western Cape and the uMngeni catchment in KwaZulu-Natal. These catchments contain strategic water sources upstream and large cities downstream (Cape Town, Durban) and have a maximized engineered water supply system with no further built infrastructure options and deteriorating water quality. The researchers examined three Ecological Infrastructure intervention sites in the Berg-Breede catchments and three in the uMngeni catchment to quantify hydrological, ecological and livelihoods impacts.

Results

The projects findings can be divided into three categories: findings related to livelihood analyses, findings from hydrological modelling and estimates on the returns of financial investments in Ecological Infrastructure.

Livelihoods Impacts

We demonstrate that Ecological Infrastructure interventions lead to short-term and long-term income and employment opportunities for workers from poor communities. Livelihoods of workers involved in Ecological Infrastructure projects improve substantially. Their employment leads to better household education (e.g., payments of school fees), health (e.g., better nutrition, payment of medical bills), environmental awareness, and social networks. Intangible benefits, such as increased happiness, pride and self-esteem, also increase for those working on Ecological Infrastructure projects. When interventions are suspended due to funding gaps and shortages, employment options for both skilled and unskilled workers are reduced, resulting in unemployment and missed education opportunities for those already struggling to sustain a living

Water related benefits

We developed fine-scale-models and data to investigate the water security benefits of different Ecological Infrastructure interventions in the catchments, including the risk reduction potential of these benefits under climate

change. We show that investing in Ecological Infrastructure provides significant water-related benefits to society. In addition, we show that the restoration and maintenance of Ecological Infrastructure can reduce the impact of climate change on the severity of extreme drought events. However, the true water-related benefits of Ecological Infrastructure are poorly quantified due to ecological, hydrological and meteorological data limitations for areas important for water supply.

Financial returns on investment

We show that most funding for Ecological Infrastructure interventions in South Africa is from the public sector or philanthropic donors, many of which are corporates through water stewardship programmes. Internationally, many financial mechanisms exist for attracting private sector capital, which require a direct return on investment, of which bonds are the most implemented. To explore the application of a bond to Ecological Infrastructure interventions, we modelled the potential return on investment (and bond structure that this could support) that could be generated from clearing and maintaining the Berg River Dam catchment. However, the annual return is unlikely to be sufficient to entice traditional institutional investors, therefore unique finance solutions, such as blended finance, is required. Blended finance is the strategic use of public sector, development finance, grants, and/or philanthropic funds to mobilise or leverage private capital that require a specific return on investment. With funding from these sources, which are provided under less favourable conditions (lower return, higher risk, longer tenure), a financial mechanism can be established that allows the private sector to capitalise on the potential returns while benefiting from valuable downside risk protection, thereby enhancing the investment case. A further mechanism for providing the private sector with direct returns is the corporate social investment (CSI) mechanism, whereby corporates can earn points for their B-BBEE scorecard as well as tax breaks by contributing to Ecological Infrastructure projects, which have a strong social development component. Criteria for receiving these benefits limits its application to specific contexts.

Conclusions

This project has documented that investing in Ecological Infrastructure can provide significant benefits to society, both in relation to water security, poverty alleviation, investments in human capital and climate change resilience. The multitude of benefits of restored Ecological Infrastructure to nature and society is attractive to a diverse set of investors. However, only a context specific, inclusive, long-term-oriented, and evidence-based approach on Ecological Infrastructure restoration and maintenance can simultaneously enhance water security and contribute to poverty alleviation. A key challenge that makes it difficult to demonstrate the environmental and social impacts is the fact that Ecological Infrastructure interventions rarely incorporate sufficient monitoring and evaluation during and after project implementation.

Recommendations

Based on the findings from this project, we provide a series of recommendations for policymakers:

- Invest financial and human capital in Ecological Infrastructure as a legitimate, and cost- effective approach to increase South Africa's resilience in the face of water insecurity and climate change
- Build an evidence base for the benefits of Ecological Infrastructure investments by allocating funding to support focused, applied and local empirical research.
- Demonstrate, through systematic monitoring and targeted awareness raising, the multiple benefits of Ecological Infrastructure interventions, in order to stimulate private and public investments in these initiatives.
- Provide investors with a set of comprehensive justifications by packaging site-specific and investor-specific benefits of Ecological Infrastructure investments.
- Dedicate funding to strengthen data and research that improves hydrological modelling and socio-economic assessments to deliver evidence that is sensitive to local contexts.
- Support and strengthen existing institutions and platforms that can facilitate collaboration, learning and upscaling of Ecological Infrastructure investments at the catchment level.
- Allocate resources to the design of financial mechanisms that can show direct returns when investing in Ecological Infrastructure interventions to attract private sector capital. Examples include corporate social investment (CSI) mechanism and blended finance options.
- Ensure continuous funding of Ecological Infrastructure interventions to avoid the loss of achieved benefits to society and nature.