

# TRANSFORMATIVE RIVERINE MANAGEMENT PROJECTS IN DURBAN: IMPLEMENTATION INSIGHTS

## About the C40 Cities Finance Facility

The C40 Cities Finance Facility (CFF) is a collaboration of the C40 Cities Climate Leadership Group and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. The CFF supports cities in developing and emerging economies to develop finance-ready projects to reduce emissions to limit global temperature rise to 1.5°C and strengthen resilience against the impacts of a warming climate. The CFF is funded by the German Federal Ministry for Economic Development and Cooperation (BMZ), the UK Department for Business, Energy and Industrial Strategy (BEIS), the Children's Investment Fund Foundation (CIFF) and the United States Agency for International Development (USAID).

## About the C40 Cities Finance Facility's support to eThekweni Municipality

With support from the CFF, the eThekweni Metropolitan Municipality is building a case for upscaling riverine management to encompass all rivers in the city. The project vision is to build a compelling business case for transformative urban riverine management which works in partnership with all affected stakeholders to rehabilitate and sustainably manage all riverine corridors in the city in a manner that:

- is resilient to the impacts of climate change;
- transforms riverine corridors into clean, safe, healthy, valuable and pleasant open spaces;
- generates social and economic opportunities;
- impacts positively on the city.

Funding partners:



Implementing agencies:

## Executive summary

**Riverine management projects, such as eThekweni Municipality's Sihlanzimvelo Stream Cleaning Programme, demonstrate the vital social, economic and ecological benefits of keeping rivers in good condition. Such programmes are increasingly recognised for their importance in buffering the municipality, vulnerable citizens and businesses from escalating risks and costs associated with climate change.**

Transforming the human and economic relationship with riverine areas must be part of a sustainable approach to reducing climate change vulnerability and building resilience. As rivers are complex social-ecological systems, addressing riverine conditions and their associated risks is a multifaceted, transversal, long-term process. eThekweni Municipality has recognised the important role that rivers play in delivering life-supporting ecosystem goods and services, as well as cost-effective municipal service delivery. Since 2012, it has become increasingly invested in managing riverine areas on its own land and supporting river stewardship elsewhere as a climate risk-management approach.

This report draws insights from five riverine management projects in Durban that demonstrate how different riverine management approaches produce transformative outcomes in support of enhanced climate resilience. These projects represent a variety of city-led and public-private partnership approaches.

A project implementation analysis suggests the following key lessons:

1. **Transformative approaches** may challenge deeply entrenched power, policy and technical norms, so demonstrating significant benefits through pilot programmes is crucial.
2. Recognising and addressing **structural policy problems** hindering effective action is key to transformative riverine management.
3. **Adequacy and continuity of funding** are critical to operational sustainability and to maintaining a positive trajectory towards transformative outcomes.
4. Developing **human capital** underpins sustainable socioeconomic benefits from project investments.
5. Building capacity, social cohesion and effective partnerships can help mobilise long-term **river stewardship** action by communities and businesses.

## Objectives of the report

This report is the second in a three-part series presenting Durban's learnings from the establishment, implementation and planned upscaling of transformative riverine management projects. It contrasts the impact and outcomes of five different riverine management projects in the eThekweni Municipal Area:

- **Transformation:** Practices that resulted in positive changes to systems, financial flows, skills and climate-action implementation at scale, including improvements in transversal working arrangements and horizontal integration between sectors and stakeholder groups.

- **Operational sustainability:** Practices that underpinned the sustainability of investments and secured positive outcomes.
- **Human and social capital development:** Practices that built people's skills, community institutions, capacity and/or levels of social cohesion, fostering a multiplier effect.
- **Partnerships and collaboration:** Practices that built relationships between the city and other groups, including those that catalysed broader action, impact or investment.

## Why adopt a transformative approach to riverine management?

### **Riverine areas are essential providers of life-giving services, such as fresh water and spaces for recreation and spiritual activities.**

Riverine areas provide ecosystem services that are vital for human wellbeing, healthy economies and effective municipal service delivery. These include surface water supply, flood reduction, regulation of dry-season flows, erosion and sedimentation reduction, food production, water-quality maintenance, solid waste capture, biodiversity habitats and conservation, maintenance of transport access,<sup>1</sup> carbon capture and storage, bioenergy, visual amenity, elevated property values and recreation. However, there are very few rivers in South Africa that have escaped degradation from human activity and which now suffer reduced capacity to deliver beneficial services. Climate change is compounding the damage to river ecosystems significantly, driving up human, financial and economic risks and costs.

Riverine management projects such as eThekweni Municipality's Sihlanzimvelo Stream Cleaning Programme are demonstrating that good-condition, well-managed rivers can help buffer the municipality, citizens and businesses from the escalating flood and human health risks associated with climate change. They also make a positive contribution to societal wellbeing and cost-efficient municipal service delivery (for example, as a sustainable source of water or for urban stormwater management). By contrast, riverine areas in poor condition tend to have negative impacts that come at a cost to government and society.

People, land use and economic activities around rivers can both strongly influence and be influenced by river conditions and functions. The effective management of these areas, therefore, requires a social-ecological systems approach (Cote and Nightingale, 2012; Dunham et al., 2018).

Globally, river-related adaptation to climate change has tended toward interventions that incrementally improve social and economic capacity to cope with escalating risk and negative impacts. By contrast, a transformative adaptation approach seeks to transform the human and economic relationship with rivers as part of a sustainable approach to addressing climate change vulnerability and building resilience.

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<sup>1</sup> Naturally functioning rivers provide protection for road and bridge crossing points.

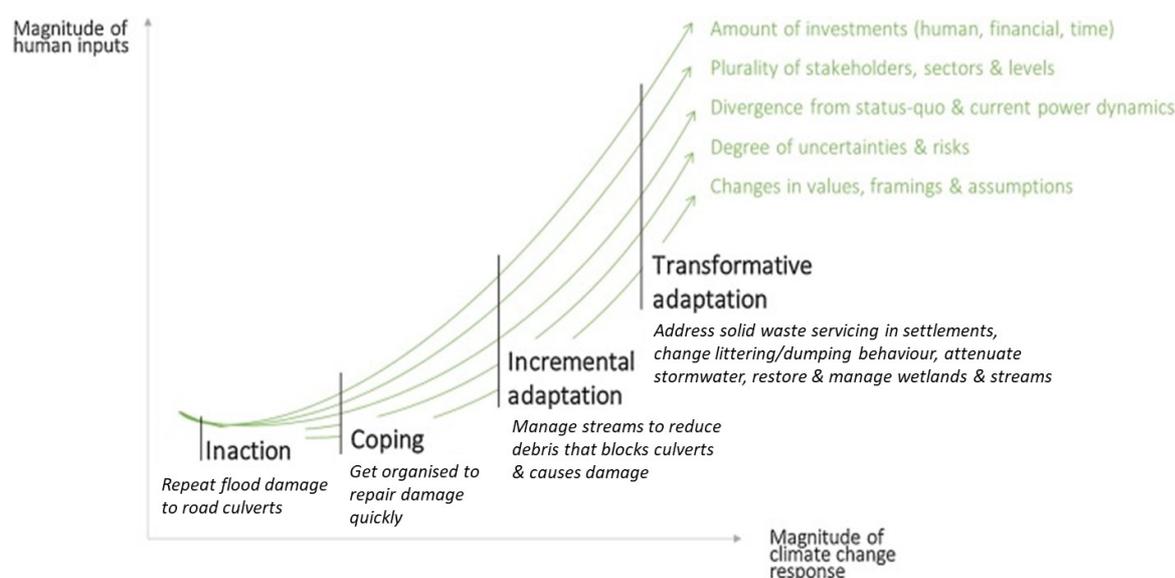


Figure 1: Conceptual continuum of riverine climate-adaptation responses from inaction to transformative adaptation  
Source: Adapted from Fedele et al. (2019)

As part of developing a business case for upscaling investment in riverine management, eThekweni Municipality and the CFF have modelled the effect of climate change and adaptation-focused riverine management on the delivery of vital riverine ecosystem services. This shows that investing in the management of river corridors would be almost sufficient to keep ecosystem services at current levels, even with the added pressures of climate change. Consequently, a basic level of riverine management is needed to limit the social, economic and financial losses associated with the decline in river conditions due to climate change.

There are, however, some riverine ecosystem services where riparian management actions alone are not enough to entirely mitigate climate change-related losses. Managing both the riparian and broader catchment zones improves most ecosystem service levels by an average of 10%, even with the effects of climate change. This suggests that a 'transformative' approach to riverine management, which addresses the sources of negative impacts and restores and manages riverine areas, would not only reduce the city's exposure to future climate-related risks, but also help address current societal, financial and economic disadvantages from rivers being in a poor state.

Transforming the human and economic relationship with riverine areas must be part of a sustainable approach to reducing vulnerability to climate change and building resilience. As rivers are complex social-ecological systems, addressing riverine conditions and their associated risks is a multifaceted, transversal, long-term process. The opportunity to link riverine management to a thriving, innovative, inclusive and labour-intensive green economy, thus expanding the positive social and economic benefits of riverine areas, is significant given the spatial extent of rivers in the eThekweni Municipal Area.

Transformative riverine adaptation investments, as envisaged by the eThekweni Transformative Riverine Management Programme, will focus on: (1) restructuring and shifting social, economic and ecological systems on various scales; (2) having a radical, large-scale, long-term and sustained positive impact; (3) catalysing replication, multiplication or upscaling of positive impacts; (4) addressing the root causes of social and economic inequality, such as participation, rights and environmental sustainability; (5) new innovations; and (6) continuous learning and re-evaluation.

The complexity of a systems focus and transformational ambition can be overwhelming. Durban's experience suggests that transformative adaptation can be part of a process of change (Pasquini et al., forthcoming), whereby capacity-building, learning-by-doing and strategic alignment underpin longer-term, sustainable shifts in riverine governance, institutions and social-ecological systems.

## Five project examples

The insights in this document have been drawn from the following five riverine management projects, which represent a variety of city-led and partnership approaches. Information was gathered from published project reports, literature, interviews with project managers and a survey of a select number of community partners and beneficiaries.

**Table 1: Five Durban riverine management projects that demonstrate diverse approaches**

Project	Project lead agent and partners	Transformative objectives	Operating model	Funding	Timescale
<b>Sihlanzimvelo Stream Cleaning Programme</b>	<p>Led by the city department responsible for roads and stormwater maintenance</p> <p>Eleven city departments participate in a project steering committee</p>	<p>Reduced cost of repairing flood-damaged culverts by removing litter and waste and invasive plant species from stream areas</p> <p>Create local employment and develop skills in high-density, low-income settlements</p>	<p>Community cooperatives are employed to clean 300km of stream banks and culverts from waste and invasive species</p> <p>Streams are located in high-density, low-income settlements where poor river quality has human health risks and flooding impacts</p> <p>Cooperatives receive training and mentorship as part their employment</p>	<p>eThekwini Municipality Roads and Stormwater Maintenance departmental operating budget</p> <p>Embedded programme management staff</p>	<p>Approved in 2009, work started in 2012 and is ongoing</p>
<b>Palmiet Catchment Rehabilitation Project</b>	<p>Partnership project between several municipal departments, communities and research institutions</p> <p>Coordinated by eThekwini Municipality's Environmental Planning and</p>	<p>The Palmiet Catchment was selected as eThekwini Municipality's proof-of-concept case study for assessing the value of ecological infrastructure in securing water in the uMngeni Ecological</p>	<p>The project is implemented by a Community of Innovators, a voluntary partnership between local communities, the University of KwaZulu-Natal (UKZN) and eThekwini Municipality, based on a joint</p>	<p>Funding in kind from all participants</p> <p>Research funding through UKZN and eThekwini Municipality</p> <p>Funding also provided by the</p>	<p>Started in 2015 and ongoing</p>

	Climate Protection Department (EPCPD)	Infrastructure Partnership  The project seeks to address the source of river impacts at a catchment scale as a transformative adaptation approach	Catchment Action Plan	Development Bank of Southern Africa as an ecological infrastructure investment requirement of funding for the Northern Aqueduct project	
<b>Aller River Pilot Project</b>	Led by the Kloof Conservancy, a community-based organisation promoting environmental awareness and protection  Partnerships with non-profit organisations for implementing different aspects of the project  Several city departments contributed to project activities	Mobilisation of community and business river stewardship as a long-term solution to addressing poor river quality	Eco-Champs were employed to build community awareness of rivers and mobilise stewardship. Included a strong focus on youth development	eThekweni Municipality Environmental Planning and Climate Protection Department funded first phase, later phases funded by Cambridge University, National Lotteries Commission and EDANA, among others	2016 to 2020
<b>Wetland Rehabilitation for Climate Adaptation in the uMhlangane River Catchment Project</b>	Coordinated by eThekweni Municipality EPCPD  Implemented in partnership with eThekweni Coastal Stormwater and Catchment Management, eThekweni Economic Development Unit, Green Corridors NPC, and Riverhorse Valley Business	Demonstration of the benefits of wetland and riverine restoration and management in the uMhlangane River Catchment supports the argument for policy reform that permits investment in ecological infrastructure restoration using municipal capital funding	Implementation included the rehabilitation of a 41.5-hectare wetland and establishment of a long-term, partnership-based management system for it  Removal of invasive alien plants in 54 hectares of riverine area upstream of the wetland  Establishment of a continuous water-quality and	Donor funding from the German Federal Ministry for Economic Cooperation and Development (BMZ) and the Durban-Bremen Climate Partnership	2013 to 2016

	Management Association		flow monitoring station downstream of the rehabilitated wetland		
<b>Wise Wayz Water Care Project</b>	<p>Led by i4Water in partnership with Acacia Operations Services and ImproChem</p> <p>eThekweni Municipality has supported the initiative in various ways, including by providing community skills training</p>	<p>The project supports community enterprise development and promotes river stewardship by the Folweni and Ezimbokodweni communities to safeguard the Ezimbokodweni Catchment and improve the livelihoods of communities living within the catchment</p>	<p>Community partners are trained in a variety of technical and management skills and are assisted in establishing businesses that can serve project needs, as well as broader markets</p> <p>Riverine areas are cleared of alien plants and solid waste and river water-quality monitoring takes place</p>	<p>Funding provided by AECI Community Education and Development Trust</p>	<p>Started in 2016 and ongoing</p>



Figure 2: Sihlanzimvelo community cooperatives clean streams in high-density formal and informal residential areas  
Source: Gumede (2019)

## Riverine management implementation insights

### LEVERAGING TRANSFORMATION THROUGH SUCCESSFUL IMPLEMENTATION

**Transformative approaches** may challenge deeply entrenched power, policy and technical norms, so demonstrating significant benefits through pilot programmes is crucial.

The Sihlanzimvelo Stream Cleaning Programme uses a labour-intensive riverine management approach to enhance the resilience of municipal road infrastructure to the impact of more frequent and intense flash flooding. The programme has made a significant contribution to municipal learning on how climate resilience can be enhanced by transforming traditional approaches to service delivery. Sihlanzimvelo creates work opportunities for more than 600 people each year through 86 community cooperatives that now have the capacity to engage in economic opportunities beyond Sihlanzimvelo. Creating employment through cooperatives has been effective in reducing the administrative load associated with employing individual labour on short-term municipal contracts.

Interviews with community partners suggest that employment by community cooperatives has increased individual pride in the work being done, with employees feeling they have to do a good job for their communities. Beneficiaries have also cited the business skills training provided as having helped them in other areas of their lives, such as growing vegetables and starting small businesses. Better stream conditions create tangible social co-benefits, such as reducing crime associated with overgrown vegetation around rivers and health risks linked to poor water quality, as well as creating accessible green spaces in high-density urban residential areas. These achievements have raised the programme's political profile and increased awareness in the municipal administration of the value of rivers, sparking a wider focus on river protection.

Seventy percent of the debris removed from rivers through the Sihlanzimvelo programme is invasive alien vegetation, with the remainder solid waste. The financial and environmental costs of transporting and disposing of this material in landfills are substantial. A partnership between eThekweni Municipality's Roads and Stormwater Management Department and its Economic Development Unit has established a pilot project at the KwaMashu Waste Beneficiation Centre, using collected glass and unrecyclable plastics to make paving stones. The project is run by Green Corridors, a non-profit organisation supported by the municipality. The inclusion of alien plant fibres in the pavers and composting the organic biomass are also being explored. The re-use and recycling of organic and inorganic waste collected from rivers offers significant potential for entrepreneurial businesses at the site of collection, expanding the income generation potential and social benefits of riverine management investment.

In the Palmiet Catchment Rehabilitation Project, a key innovation included the successful piloting of an early-warning system for floods in the Quarry Road West informal settlement, highlighting the important social value of proactive municipal disaster management amid growing climate change risk. In addition, the project has facilitated community-based hazard mapping, which has increased local understanding of the risks and helped to enhance communities' ability to respond effectively to them.

Transformative adaptation is an ambitious goal that may challenge deeply entrenched systems and perspectives. Successful project pilots that demonstrate significant benefits from new approaches often catalyse transitions in thinking and associated investment patterns, ultimately leading to transformative outcomes.

Recognising and addressing **structural policy problems** hindering effective action is key to transformative riverine management.

In the Palmiet Catchment Rehabilitation Project, limited municipal service delivery in informal settlements is a structural policy problem requiring resolution, as the settlements are likely to be a permanent feature in the landscape of rapidly growing cities such as Durban. There is also an urgent need to solve the challenge of pollution from formal municipal sewerage systems. A key innovation is a pilot early-warning system for floods in the Quarry Road West informal settlement, underscoring the value of proactive municipal disaster management amid increasing climate change risk.

The Wetland Rehabilitation for Climate Adaptation in the uMhlangane River Catchment Project demonstrated the value of restoring ecological infrastructure as part of the municipal stormwater system. Such projects often require both capital and long-term operational funding, which is difficult to raise when the ecological infrastructure is not included in the municipal asset register. The project highlighted this structural problem and demonstrated the case for functional ecosystems to be recognised as municipal infrastructure that requires adequate capital and ongoing maintenance funding, the same as built infrastructure does. It also highlighted a need to unlock new ways of raising capital for major ecological infrastructure projects by way of loans. The project also highlighted that when there is shared value in ecological infrastructure between a municipality and other actors, investment in co-management can be advantageous.

## SUSTAINING PROJECT BENEFITS

**Adequacy and continuity of funding** are critical to operational sustainability and to maintaining a positive trajectory towards transformative outcomes.

The five projects are all focused on improving the condition of streams and rivers in specific locations within the eThekweni Municipal Area. However, each has a unique set of objectives to which project funding is linked. Some projects are entirely municipality funded and others are joint initiatives funded from multiple sources, including donor funding, contributions in kind and corporate social investment.

A key constraint on most projects has been intermittent funding. The jobs created have tended to be short-term contracts, often with lengthy gaps between contracting opportunities as project funding cycles are renewed, new funding is found or procurement processes are undertaken. As most job beneficiaries have no other source of income and limited opportunities for alternative employment, greater continuity of funding and efficient supply-chain management processes are critical to ensuring that the socio-economic benefits of these investments are optimised (including sustainable reductions in climate vulnerability).

A further constraint highlighted by participants was the impact of exchange-rate fluctuations, particularly in relation to funding from international sources with agreements in foreign currencies. Because of these fluctuations, some projects have received less funding than expected, resulting in trade-offs between different project activities and interventions. While exchange-rate shifts can also have the opposite effect and lead to unexpected windfalls on foreign currency-based projects, shortfalls in project funding can be detrimental to achieving project objectives, so contingency planning is key from the outset.

**Developing human capital** underpins sustainable socioeconomic benefits from project investments.

The Wise Wayz Water Care project focuses on training and mentoring community beneficiaries for successful business development and operation. It aims to ensure that project investments lead to sustainable income-generating opportunities for project beneficiaries. Several viable small enterprises have been set up through the project, serving both the project and a broader customer base. This sets the Wise Wayz Water Care project apart from the other projects, which tend to create short-term jobs and include skills development as part of the approach. By shifting emphasis from paying salaries to paying for training, the project is a useful example of how investing in human capital development can have transformative socio-economic outcomes.

## MOBILISING RIVER STEWARDSHIP

Building capacity, social cohesion and effective partnerships can help mobilise long-term **river stewardship** action by communities and businesses.

All five projects demonstrate the worth of community and business stewardship of rivers. In urban areas, the value created for people and businesses by functional, healthy riverine areas is shown to be sufficient incentive for them to contribute to river restoration and/or maintenance, including reporting pollution events to enable faster municipal response. As rivers receive the outputs of the urban settlements around them, community and business river stewardship is also key to ensuring behaviour that limits polluting effects.

The Aller River Pilot and Palmiet Catchment Rehabilitation projects employ local 'Eco-Champs', who are trained to raise awareness and educate their communities with a view to positively changing behaviour. The project facilitated a participatory video initiative, in which short videos showing community members explaining their relationship with the river were filmed and screened at community events, with local leaders in attendance. This method was highly effective in building social cohesion around the value of rivers.

The Aller River Pilot and Wise Ways Water Care projects both include community-based monitoring and reporting of river health. This includes citizens monitoring water quality, invasive alien plant infestations, dumping, liquid effluent, untreated sewage spillages and other biophysical issues, such as blocked water courses. These interventions have been effective in improving river health.

The Palmiet Catchment Rehabilitation Project uses a Community of Innovators platform to facilitate multi-sector partnerships focused on catchment rehabilitation and protection. Ensuring each partner understands the mandate and capacity limitations of others has been key to managing partner expectations. Learning from several of the projects suggests that facilitating localised partnerships where stakeholder interests intersect most directly can be a highly effective approach.

## Conclusions

**Rivers influence and are influenced by the people, land use and economic activities that surround them. Transforming the human and economic relationship with riverine areas needs to be part of a sustainable approach to reducing climate change vulnerability and building resilience.**

These are the lessons learned from implementation of various city-led and partnership-based riverine management projects in Durban. This is the second in a series of three reports focused on sharing knowledge on the establishment, implementation and upscaling of such

projects. The third report will cover lessons learned from developing an investment case for transformative riverine management, while there will be a further report on eThekweni Municipality's journey to reduce wastewater impacts on rivers.

As rivers are part of complex social-ecological systems, improving the state of rivers is a multifaceted, transversal, long-term process. To progress from an incremental climate-adaptation approach to a transformative approach to riverine management requires a focus on structural and systemic changes that tackle the root causes of negative river impacts. Demonstrating the social and economic value associated with healthy rivers can help to change mindsets and foster greater willingness for river stewardship in communities, businesses and government. Linking rivers to green and circular economies is emerging as a key opportunity to expand such benefits from existing riverine management investment. At the heart of this transformative approach is the need to build human, social, ecological and institutional capital that supports riverine protection and management.

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## Relevant websites

- eThekweni Municipality Environmental Planning and Climate Protection Department web page:  
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- eThekweni Municipality Roads and Stormwater Maintenance Department web page:  
[http://www.durban.gov.za/City\\_Services/engineering%20unit/Roads\\_Stormwater\\_Maintenance/Pages/default.aspx](http://www.durban.gov.za/City_Services/engineering%20unit/Roads_Stormwater_Maintenance/Pages/default.aspx)
- Green Corridors website: <https://www.durbangreencorridor.co.za/>
- Kloof Conservancy website: <https://www.kloofconservancy.org.za/>
- Take Back our Rivers Project (Aller River Project) web page:  
<https://www.kloofconservancy.org.za/projects/take-back-our-rivers-project/>
- Wise Wayz Water Care Project web page:  
<https://wisewayzwatercare.wordpress.com/about/>

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