A CASE STUDY OF AN URBAN RIVER REHABILITATION PROJECT IN A TIME OF DROUGHT

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Introduction

Threatened water sources is not only a South African problem. According to the World Economic Forum (WEF), water scarcity is the number one risk in the world[1]. This is largely the result of human behaviour: rampant population growth, unregulated industrialisation, massive urbanisation, commodification of our lifestyles, food choices and the huge power needs required to fuel all of the above result in the kind of water use that is simply unsustainable. Add to this greedy use of water, the way in which unconscious human behaviour results in the further abuse what water resources we have, through unmanaged alien invasive species infestation, pollution of waterways, especially in urban and peri-urban areas, by trash, chemical discharges and sanitation challenges. The final overlay, also a result of human behaviour, is the impact of climate change, and global warming in particular. Frankly, we are currently in a lose-lose situation. As long ago as August 1995 Ismail Serageldi of the Global Water Partnership, warned that "if the wars of this century were fought over oil, the wars of the next century will be fought over water"[2]. These are global issues. Of course, the less resilient parts of the world are affected more grossly than the global north, where the impacts are somewhat hidden by the emperor's grand clothes. Not for long, we are told. Dominic Waughray, head of the Environment and Natural Resource Security System Initiative at the WEF, warns that "We are at the point of the perfect storm right now"[3].

Water & Sanitation facts & figures
According to the United Nations: "3 in 10 people lack access to safely managed drinking water services and 6 in 10 people lack access to safely managed sanitation facilities.
At least 892 million people continue to practice open defecation.
Water scarcity affects more than 40 per cent of the global population and is projected to rise. Over 1.7 billion people are currently living in river basins where water use exceeds recharge.
4 billion people lack access to basic sanitation services, such as toilets or latrines
More than 80 per cent of wastewater resulting from human activities is discharged into rivers or sea without any pollution removal
Each day, nearly 1,000 children die due to preventable water and sanitation-related diarrheal diseases
Approximately 70 per cent of all water abstracted from rivers, lakes and aquifers is used for irrigation."
(https://www.un.org/sustainabledevelopment/water-and-sanitation/)

There are sterling and laudable efforts emanating from various quarters, some of them champions of the earth, some of them frightened economists who recognise the imminent threat to the sustainability of their economic systems. Waughray and many others echo Seragedi by pushing the notion that the only way to prevent mass disaster is through addressing the way in which this fundamentally precious resource is being managed, at a large-scale global level as well as at a small-scale local level.

The Aller River Pilot Project (ARPP) is an example of a global issue being tackled at a local level. Along with at least eight other community-based projects around South Africa, the ARPP is working on one river in a small geo-social space to explore what methodologies can be forged on the catchment-face to contribute to this urgent and critical struggle to thwart an imminent and terrifying water crisis.

This reprot profiles the efforts and learnings of the ARPP over a 34 month period, from conception in early 2016 to adolescence in September 2018! We are still learning, but some key lessons are shaping our focus on four main aspects, namely: Community awareness building; waterway health monitoring

[1] https://www.raconteur.net/sustainability/water-shortage-is-the-number-one-world-risk
[2] http://www.serageldin.com/Water.htm
[3] https://www.raconteur.net/sustainability/water-shortage-is-the-number-one-world-risk

(catchment, water quality and sanitation impacts) and biodiversity restoration; solid waste management; and adaptive learning through ongoing monitoring evaluation and knowledge management.

Why did the eThekwini Conservancies Forum initiate the Aller River Pilot Project?

In late 2015, the eThekwini Conservancies movement was engaged in a self-reflective exercise to consider ways in which its impact on local conservation efforts could be aggregated and amplified. It was felt that there was a need for the organisation, which represents all the conservancies in eThekwini, to identify interventions with a municipality-wide relevance and impact. The global, national and local water crisis made focussing on rivers a no-brainer. A sub-team was mobilised and an intervention formulated based on the vision of restoring the rivers of eThekwini to functionality. Acknowledging the centrality of conscious and appropriate water resource management to the vision, the Take-Back-Our-Rivers (TBOR) Theory of Change (TOC) was constructed in response to the conditions on the ground geo-physically, socially, economically politically as well as in respect of a range of city-wide challenges, including ageing infrastructure; coastal flooding; disease outbreak; drought; heat waves; rainfall flooding; and rising sea level and coastal erosion. That Durban was part of the Rockefeller 100 Resilient Cities (100RC) programme made aligning the approach with this initiative logical.

Take Back Our Rivers

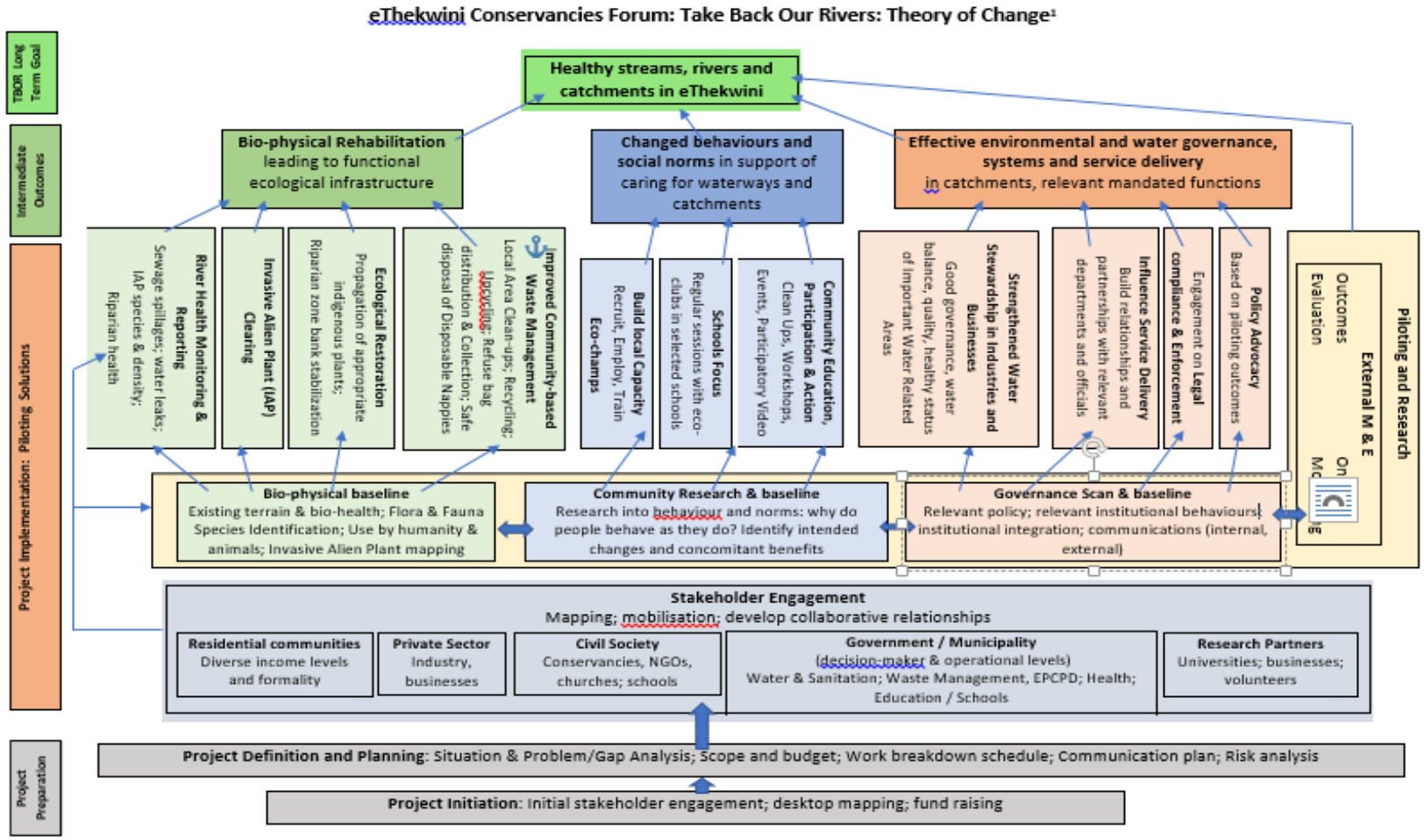
The TBOR initiative is a three-dimensional programme which emphasises both community and the environment. The goal is that communities increasingly become involved in the care of the health of their environment and water courses, in collaboration with mandated authorities. The flagship ARPP focuses on the Clermont and New Germany communities, with activities focussing on education and training, field work and community engagement. The vision is that as local custodians of local environments become embedded in local areas and have mutually beneficial and service-delivery oriented relationships with mandated authorities, so project initiators (ECF) can step back and move on to the next catchment.

In so far as the focus on rivers is concerned, the TBOR Concept Note, states: “Durban’s water scarcity challenge has led to the imposition of water restrictions and has shaped the city’s short and long term water resources planning. Within overall water resources management, river health is a primary factor in the ability of rivers to provide ecosystem services and act as ‘water factories’. A 2005 – 2007 study assessment of the health of Durban’s rivers found 11 of the 18 main rivers to be particularly polluted and/or impacted, with 30% of the river sample sites found to be in a poor condition” (Swan, 2017).

The TOC is represented in figure 1[4], and sums up the approach that underpins the TBOR, where the emphasis is on aiming for the vision (i.e. Healthy rivers and catchments in eThekwini) through actions that address four aspects defined as being necessary to achieve the vision: 1. Bio-physical Rehabilitation (leading to functional ecological infrastructure); 2. Changed behaviours and social norms (specifically in support of caring for waterways and catchments); 3. Supporting effective governance and service delivery in relevant mandated functions; and 4. Adaptive learning through ongoing piloting and reflection supported by research by an independent research institution[5]. Fundamental to the four focus areas and the founding tenet of facilitating behaviour change for sustainability is continuous and comprehensive stakeholder engagement. This implies that stakeholders in the target site are identified at the outset, and include civil society (local communities, community-based organisations), the private sector (local businesses) and relevant government departments, mostly at a local level but also at a provincial and national level where appropriate.

[4] This ‘Theory of Change’ (ToC) applies to the TBOR approach for eThekwini’s rivers and catchments generally, and is intended to be adapted when applied to any specific river and catchment.

[5] In this case the School of Built Environment and Development Studies, University of KwaZulu-Natal.



[1] This 'Theory of Change' (ToC) applies to the TBOR approach for eThekwini's rivers and catchments generally, and is intended to be adapted when applied to any specific river and catchment.

Figure 1. Take Back Our Rivers Theory of Change

At the heart of the TBOR approach are a number of guiding principles, all of which are embedded in the TOC. Like the other community-based water stewardship initiatives, the TBOR has grappled with defining and then piloting a methodology that aligns with the principles. An important principle is that the TBOR sees itself as being part of a wider global effort. Within the context of global climate change, the TBOR concept resonates strongly with the UN Global Sustainable Development Goals, in particular:

- Goal 6: Ensure access to water and sanitation for all
- Goal 11: Make cities inclusive, safe, resilient and sustainable
- Goal 12: Ensure sustainable consumption and production patterns
- Goal 13: Take urgent action to combat climate change and its impacts
- Goal 14: Conserve and sustainably use the oceans, seas and marine resources
- Goal 15: Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss.
- Goal 17: Partnerships for the Goals.

The TBOR approach has attempted to use the guiding principles to shape the objectives, the programme management as well as the activities of the interventions. More generally, the TBOR is guided by the need to contribute to environmental sustainability and resilience-building efforts within eThekwini. We believe that just as environmental degradation is an outcome of human actions, so the solution must lie in behaviour change. This is ultimately the way in which long term sustainability and resilience can be achieved. To this end, the model of building a small team of capacitated “change agents” (named as Eco-champs) is core to the TBOR action plan. A further principle is that the solution should be the result of a shared responsibility of a partnership between communities (civil and industrial) and government whose mandate it is to be custodians of local environments. Mobilising local communities who are (or should be) beneficiaries of local natural assets is seen to be the most direct way to build a sense of custodial ownership which itself contributes to strengthening the relationship between people and place. There is an assumption that if a place serves the needs and desires of people in varying ways, then they are more likely to protect those met needs by protecting the place. Finally, the TBOR chooses an approach that is informed, responsive and solutions-based rather than one that is reactive and punitive.

The Aller River Pilot Project

The Aller River Pilot Project (ARPP) was established by the eThekwini Conservancies Forum in 2016 to pilot the TBOR approach and methodology. As a particular approach supported by a defined methodology, the ARPP was drawn directly from the concept outlined in the TBOR Concept Document. The original plan was defined by a set of activities designed by the TBOR team from the ECF, directed to the stated vision which is: All rivers in eThekwini must be in a condition that the communities that live on them can benefit from them. Throughout the methodology and the implementation a conscious thread was drawn linking environmental justice rights to civic responsibility as core principles. While the project plan was quite detailed at the outset, the TBOR Team was clear, that as a pilot, the ARPP would embrace adaptive learning, defining and refining the process on the ground. The TBOR Team was aware from the start that a “one-size-fits-all” solution was impossible and inappropriate. The methodology needed to be sufficiently robust and grounded in principles to guide activities towards the vision, but flexible enough to respond to local conditions, real time, in all their complexity. For this reason, an external / independent baseline and evaluation process was included as critical to the learning process. This was carried out by researchers from the School of Built Environment and Development Studies, UKZN.

The basic implementation plan for the first phase of the ARPP included the following elements[6]:

- The objective of the ARPP would be to mobilise "river communities" to get involved in the rehabilitation and restoration of the catchment through the agency of a trained group of Eco-champs (three volunteers from the New Germany area and seven stipended from the Clermont area).
- It was planned that the ARPP would be managed along a 5,8km stretch of the Aller River, selected because it traversed at least four geo-social use-types: New Germany middle class residential, New Germany Industrial, Clermont working class informal and natural landscape.
- At the outset, the mandate of the Eco-champs would be to raise awareness about conservation in general and river catchment health in particular; monitor and report on the state of the river; and get involved in maintaining a clear catchment and a clean river.
- A professional paid project manager (PM) was to be employed for a designated number of days per month to ensure effective activity and budget compliance.
- A paid Community Liaison Officer (CLO) would be employed to assist the PM, and to develop relationships with "host" communities, local leadership, schools and other key stakeholders.
- A voluntary Project Steering Committee (PSC) would be selected from key eThekwini-wide agencies from the triad sectors of government, private sector and organised civil society, and would be mandated to provide oversight and guidance to the implementation team.
- A TBOR team would provide voluntary tactical support to the implementation team and would take responsibility for programme management, including final deliverable compliance and financial accountability.
- The Kloof Conservancy made its institutional functionality available to the ARPP as a voluntary contribution, acting as the legal and financial partner in place of the as yet unconstituted ECF.
- A capacity development programme was identified as being critical to bring the Eco-champs to a state of knowledge and skill to successfully mobilise and inform communities, and to "read" the state of rivers, as well as to use technology sufficient to monitoring, recording and reporting on catchment health. The capacity development service provider needed to be both experienced and competent to deliver on the desired scope of work.
- Strategic partnerships was another key element of the approach, to ensure co-responsibility, cross-pollination, critical insights and input, leveraging useful experience, shared costs and forging common cause with relevant stakeholders for a shared vision. The first two active partnerships were forged with Duzi uMngeni Conservation Trust (DUCT), who agreed to assist with the baseline river walk and to carry out the initial Alien Invasive Species (AIS) sweep of the project "strip", and with UKZN who would carry out independent monitoring and evaluation.

With an approach and methodology in place, the next step was to find the site, and mobilise the implementation team. As a pilot, the TBOR Team looked for a site that would be manageable in scope, would include a range of terrain and community types and which was reasonably accessible to the project team, which was clustered around the Upper Highway area of eThekwini. The Aller River which rises in New Germany (middle income residential and industrial) and then meanders through Clermont (low income, mostly formal and some informal) before going through a natural open space area before feeding into the uMngeni River had been identified as one of the most damaged small rivers in the municipality. This river provided exactly what the TBOR were looking for.

With money secured from the eThekwini Environmental Planning & Climate Protection Department (EPCPD), and a partnership commitment from the DUCT, the TBOR Team set about defining the project implementation plan, finding a competent project manager and capacity development service

[6] The approach and methodology drew substantially from initiatives managed by DUCT and others who have pioneered the concept of using trained eco-champs as locally-based initiators, and have logged significant successes.

provider and looking out for the team of Eco-champs that would be selected from communities along the Aller river, with seven from Clermont and three from New Germany.

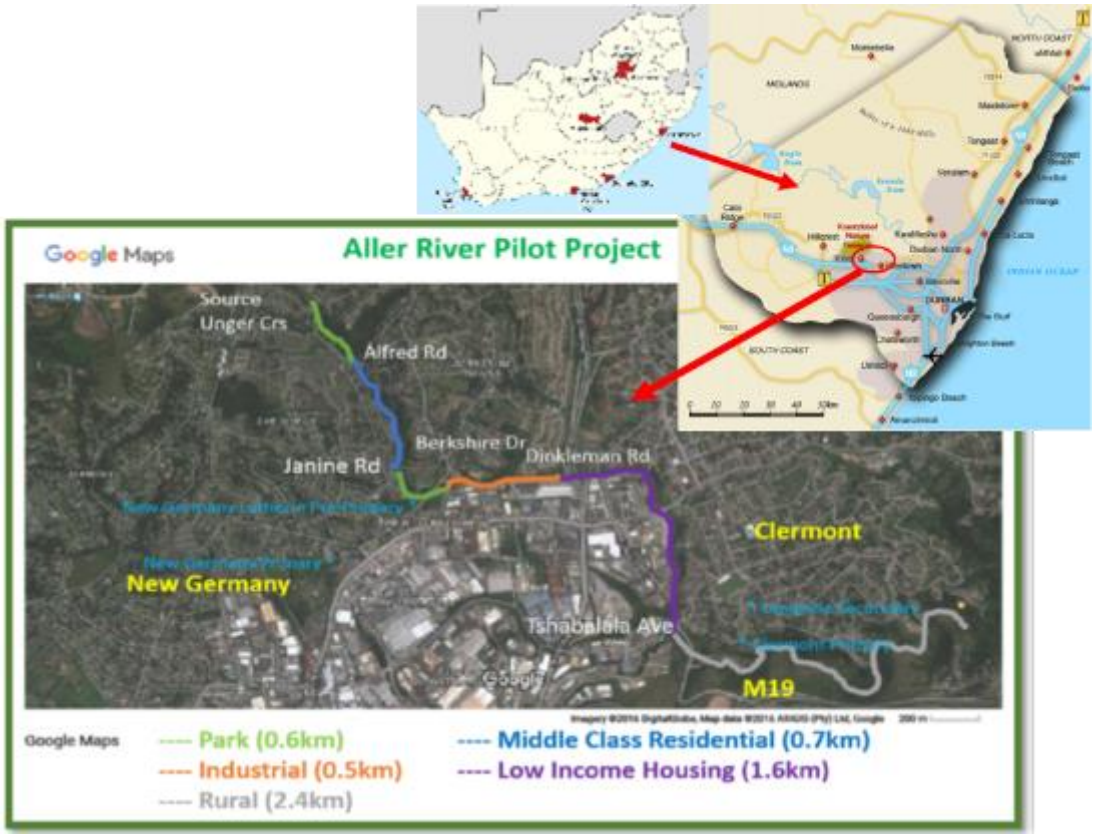


Figure 2. Map of Aller River & surrounds[7]

ARPP Phase 1: February 2016 to July 2017

Phase 1 of the ARPP began with the establishment of the PSC and the appointment of the Project Manager, CLO and training service provider, all three of whom had strong credentials in their favour. This was followed by a careful selection process of the Eco-champs from the Clermont area, where young unemployed matriculants from communities close to the river were invited to apply. Seven were selected and went through a rigorous and intensive training which balanced theoretical conservation, river health and community mobilisation education with practical river monitoring and reporting, AIS management, schools-based eco-club establishment, community event management and team functioning. In the meantime the PM and CLO began a process of building relationships with eThekwini Municipality departments of Water and Sanitation, Durban Solid Waste, Councillors, local ward-based committees, and other key stakeholders that could support the work of the ARPP.

In general the ARPP1 was a success in that the project was able to sign off on all of the primary objectives by the end of the 12 month project period, and there was no budget overspend. In general, the approach and methodology were vindicated, although a number of useful learnings for ARPP2 were harvested and integrated into the next phase. However, there was a serious failure to mobilise community interest from the New Germany residential (NGR) community and from the New Germany Industrial (NGI) community. In Clermont, the project was very successful.

The ARPP1 was managed according to the following groupings of activities, with associated learnings.

[7] South Africa map from: https://www.researchgate.net/figure/Map-of-South-Africa-showing-the-8-metropolitan-municipalities_fig1_264901544; eThekwini map from: https://www.roomsforafrica.com/dest/south-africa/kwazulu-natal/regions/ethekwini-durban.jsp;

Table 1. ARPP1 Activity Summary

Component	Primary objective/s	Main lessons at end of Phase 1
Overall programme design	Test the TBOR by designing a set of activities reflecting vision and principles; test the approach and methodology of the TBOR.	Need to establish greater understanding of site-specific complexities. Design a process with realistic budget and time resourcing. Find sufficient funds. Include Key Performance Indicators per activity.
Project Management, Administration & Internal Reporting	Manage the project professionally, on budget, in time. Ensure activities carried out per plan, record keeping efficient and accurate and that reporting was ongoing and disseminated. Convene PSC to guide progress.	Administrative tasks such as financial management and auditing must be resourced. Be more rigorous about implementing adaptive learning reflections.
Stakeholder engagement & networking	Identify and engage relevant stakeholders from government, private sector and civil society, and forge relationships with key stakeholders with the view of adding value to the project.	Diversify strategy for stakeholder mobilisation: different tactics for different community typologies. Re-strategise how to mobilise NGR & NGI. Expecting volunteers from these areas does not work.
Eco-champ Recruitment & Capacity Development Programme	Employ 7 eco-champs from Clermont and mobilise 3 volunteers from New Germany. Identify and secure appropriate service provider to build the capacity of the eco-champ team iro conservation basics, river health knowledge, stakeholder engagement, event management	Volunteer model for the more resourced areas was ill-conceived, and should be scrapped. Refine roles and responsibilities of eco-champs. Identify key skills development to assist eco-champs do their work more effectively. Increase general environmental content. Include NQF trainings wherever possible.
Community Education, Awareness Building & Communications	Hold at least 4 events designed to educate the local communities in Clermont, New Germany Residential and New Germany Industrial. Set up eco-clubs in 4 schools and in each of the local communities from which eco-champs came.	Tailor approach, style, content of community education methods to different areas. Increase door-to-door canvassing. Be more creative in keeping residents informed e.g. whatsapp, noticeboards, displays, etc. Create more targeted information-sharing opportunities and material that link issues of concern – climate change to drought; drought to cholera; choked rivers to drought / disease / lack of security; contaminated rivers and open spaces to disease, danger; nappies/sanitary towels/newspapers to blocked sewers.
River Rehabilitation	Clear access to and IAPs from the river and banks of the Aller River along the 5,8km.	Do detailed baseline at start of project and maintain ongoing documentation. Resource this activity properly. Shift from “slash and burn” approach of clearing to restoration ecology – easier, cheaper, more rational, more sustainable.
River Health Monitoring & Reporting	Walk and report regularly on sewer surcharges, dumping and water quality in and along the Aller River.	Outside Technical expertise is necessary. Broaden toolbox for monitoring including Citizen Science tools (for example Flowrate tool, Wetland assessment tool, , Turbidity test/Clarity tube, Rain gauge, testing for other indicators such as PH, EC, Temp, Oxygen, Ecoli, etc). Monitoring and reporting to be more frequent to generate more consistent evidence and responses. All data gathered must be consistently maintained, shared with relevant roleplayers. Need to find a way to resolve security issues associated with monitoring.
Independent Baseline Study and Project Evaluation	Commission and independent monitoring and evaluation report, to assist with reflection and learning.	Ensure a detailed social baseline is carried out at the start of a project/pre-project phase.

ARPP Phase 2: August 2017 to January 2018

The original TBOR concept note acknowledged that to make any real impact upon the river catchments was a long-term exercise. The challenge of sustainability-planning therefore was obvious to the Team

from the outset. Donors are not generally available to commit long term. Through a series of fortuitous events, Cambridge University agreed to fund ARPP Phase 2 as part of a collaboration with the AHRC Healthy Waterways project, a project with aims that overlapped in important ways with the TBOR programme. In this phase, there was a more clearly articulated interest in aligning the work with the UN SDGs, particularly Goal 3 (Good Health and Wellbeing), Goal 6 (Clean Water and Sanitation), Goal 10 (Reduced Inequality), Goal 11 (Sustainable Cities and Communities) and Goal 17 (Partnerships for the Goals). Essentially, however, the second phase of the ARPP was automatically an extension of the first phase. In respect of the "donor requirements", the primary objective of ARPP Phase 2 was to: Develop global links, perspectives and a focus on Global Sustainable Development Goals, in particular through the use of ethnographic research methodologies and north-south partner interchanges, while also beginning the process of consolidating the work begun in Phase 1.

To the original activities (revised somewhat to include the learnings from Phase 1), the following deliverables were included:

Component	**Primary objective/s**
Exploration of sense of place with regard to waterways in deprived and affluent urban areas (done also with Young Rangers in the Norfolk Broads in UK) using a Community-walk based ethnographic research methodology.	Gather data from local communities to explore relationships with waterways, water and associated issues such as waste management. Aligns to ARHC Pathways Project; aims to relate relationships with waterways, water and associated issues with a global context of climate change.
Hold "north-south" interchanges.	Set up an interchange link via 3 separate web conferences between Eco Champs in South Africa and young people (Young Rangers) working on a similar project in the Norfolk Broads in the UK.
Small-scale infrastructure interventions	Identify through walks and a stakeholder consultation event with other local community members and businesses small scale infrastructure changes that could enhance river health, and install these.

In general, the ARPP Phase 2 achieved a lot, especially in respect of consolidating relationships with strategic stakeholders inside and outside the area. However, by the end of Phase 2, the Aller River was still periodically contaminated by incidents of sewers surcharging raw sludge into the river at various points. People were still dumping trash along the waterway. AIS plants were re-infesting at a rate from areas previously cleared, and not everyone in the neighbourhood knew about and supported the tireless efforts of the ARPP operational team. The Industrial Sector in New Germany was not brought on board as a whole, and the New Germany Residential area did not quite rise to the occasion.

In summary, at the end of Phase 2 there was in place a team of six committed Eco-champs now able to organise a large community meeting and talk with confidence and knowledge to the public about the threat to global water resources, the importance of protecting local waterways, what causes sewers to blow their lids, who to contact to solve the problem, and how to grow vegetables in a waterwise keyhole garden using harvested rain water. They are also conversant with how to carry out ethnographic research and interpret results. This corps of Eco-champs are recognised as they walk through the streets of Clermont and stopped by concerned citizens reporting leaks, surcharges and illegal dumpings. Ward councillors, ward and area committees are aware of the work being done, and have expressed support. The operational team understands what needs to be done to limit the contamination of the river in respect of local waste management and are have established a Task Team with DWS and DSW to address some of the issues.

New strategies were incorporated into Phase 2 to effectively mobilise the New Germany residential and industrial communities to deal with these areas, which also failed to yield a positive result. The volunteer Eco-champ model was scrapped and two university students were employed from the New Germany residential community to assist. This did not bear fruit and the model once again was up for review for a later phase. Likewise, greater attempts were instituted during Phase 2 in an effort to mobilise the business community of the area, through one-on-one engagements, industry association engagements and through pollution compliance efforts. The biggest learning from this unsuccessful process was that this activity with this kind of stakeholder grouping is a project activity in and of itself,

and must be suitably resourced in order to succeed. The capacity and resources of both phases 1 and 2 were insufficient to extend to do this properly.

The TBOR Team struggled to secure proper funding for Phase 3, but was determined not to lose the ground gained. A limited grant was awarded to the ARPP for Phase 3 from the National Lotteries Commission (NLC).

Aller Phase 3: February 2018 to December

Given the limitation on funding for ARPP Phase 3, a "maintenance" approach was adopted, continuing the core activities of Phases 1 and 2. This means that the work of the ARPP is focussed on continuing with the capacity development of the Eco-champ team; maintaining the fieldwork on catchment health through three main activities, namely, river monitoring and management, pollution control and river bank health management; sustaining community-wide stakeholder engagement and awareness building by continuing to strengthen ties with municipal departments, community leadership structures, local residents and schools. Two important and exciting new focal areas have emerged that will be the hallmarks of this phase. The ARPP Phase 3 programme has built a sub-project around the appropriate disposal of nappies and a project focussing on a different approach to river back rehabilitation through the practice of restoration ecology.

The impacts of blocked sewers are fundamental to the problems experienced in river catchments for various reasons through the constant but episodic contamination of rivers with raw sewerage from surcharging and leaking sewers. These spills also have myriad other unacceptable impacts including health impacts, reducing community recreational and use access to river water, odour nuisance factors impacting quality of life and others. A significant cause of sewer blockages is the disposal of used nappies into toilets. This fact (and the extent of used disposable nappies dumped along with household trash into rivers) prompted the ARPP Team to develop a sub-project to address this problem.

In February, the project engaged with the national Department of Environmental Affairs (DEA), National Steering Committee of the Absorbent Health Products (AHPs) Task Team, including the EDANA international nappies producers' body based in Belgium. This national Task Team accepted the ARPP as its first pilot project. EDANA agreed to fund focus group research, and subsequently to fund education and awareness raising by the ARPP team. Initial education and awareness activities were carried out in July with people at various public locations. Education and awareness raising on the safe disposal of nappies continued at the "Amanzi Ayimpilo" ('Water is Life') event at Christianenburg Stadium in Clermont in July, where the nappies pilot was officially 'launched'.

The ARPP operational team engaged in extensive consultations and joint planning with Durban Solid Waste (DSW) and eThekwini Water and Sanitation (EWS) officials in the project area to assess and plan potential piloting of solutions, including those proposed by the focus groups. The result is a multi-stakeholder 3-month pilot sub-project to explore and test proposed solutions, running from 1 August to 31 October 2018. The agreed slogan for the campaign is: "Life just got easier. Used nappies are dropped in the bin." The solution being piloted involves 19 'wheelie' bins, contributed by DSW. These were delivered in August to 16 Community Ablution Blocks and 2 crèches in Clermont and 1 crèche in New Germany. Users of disposable nappies are encouraged to deposit the used nappies in these bins. Verigreen in Pinetown contributed 1,000 plastic bags for transport of the used nappies from the collection points to landfill through the regular DSW waste collection services. Posters in the Zulu language with instructions for the safe disposal of nappies were affixed to the CABs. **In the first 2 weeks of the nappies safe disposal pilot sub-project in August, 3465 used nappies (64 large plastic bags, weighing approximately 768 kilograms) were effectively redirected from disposal in rivers and open spaces within the Clermont residential area to safe disposal in landfill sites.**

The project has requested EDANA to engage with its industry partners to get clearer directions, using icons, for the safe disposal of nappies on their packaging. The pilot will be closely monitored and the results shared with all stakeholders, for possible adaptation and roll out in other areas. The nappy sub-project is an example of responsiveness and flexibility so important to the TBOR approach. Similar to

this is the revision of the approach to river bank rehabilitation and biodiversity building for clean and functional waterways.

To address challenges posed by IAPs, river bank erosion and support the re-establishment of natural biodiversity, the project has explored and embraced a restoration ecology approach to river rehabilitation. On a walk along the Aller River in April 2018, Eco-champs were introduced by mentor Richard Winn to basic restoration ecology principles and practical methods in the Aller River context. Key principles of this approach are minimizing destruction of wildlife habitat, while optimizing supportive ecosystem rehabilitation services, and optimizing the restorative impact achievable with limited human and financial resources.

Key activities are clearing IAPs, and rehabilitating riparian areas and stabilising eroded areas using appropriately selected and planted indigenous trees, shrubs, grasses and other plant types. This will in turn contribute to restored biodiversity and restoration of the ecosystem's water cleansing function, in turn ultimately creating the potential for productive use of the water, including for food production. The approach balances planting of appropriate indigenous plant materials as the clearing of AIS is carried out, contrasting fundamentally to the "slash and burn" approach used in Phase 1. The approach is rational, less costly with greater long term viability, although slower and less visible.

Conclusion

The ARPP has been a powerful site of learning – about the importance of river protection to building climate change resilience; about how to localise this important activity; about the validity along with the challenges and successes of the TBOR-type approach; and about the doability of such interventions, if the commitment is there. Possibly the most critical learning from the three phases of the ARPP is that securing reasonable funds to action a community-based river catchment rehabilitation intervention aligned to behaviour change for long term gains and sustainability is extremely difficult, disproportionate to its value. As a complex and patient process working with people, often in under-resourced areas, the solution requires expertise, mobility, responsiveness and skilled project management. This comes at a hefty price. It appears to be difficult for fund managers to understand the long-term value of this kind of approach, despite the obvious benefits both in the short term and for long term sustainability of a deeply threatened resource. Water is life. Best we put our money where our thirst is.

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