OPTIONS FOR FINANCING ECOLOGICAL INFRASTRUCTURE INTERVENTIONS IN SOUTH AFRICA: LESSONS FROM INTERNATIONAL EXPERIENCE

A report under WP5 of the Socio-Economic Benefits of Investing in Ecological Infrastructure (SEBEI) project

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About Socio-Economic Benefits of Ecological Infrastructure (SEBEI)

The overall objective of the SEBEI project is to develop an evidence-based integrated framework and prototype investment case for strengthening water–related Ecological Infrastructure (EI) whilst, supporting well–functioning livelihood strategies/value chains; creating new livelihood opportunities and value chains; and reducing hydroclimatic risks.

The project started in July 2018, and aims to generate new knowledge by combining livelihoods and value chain analysis with an EI approach to water management and next-generation hydroclimatic modelling at optimal spatial resolution.

With this combined approach, our interdisciplinary project team will focus on developing a more sophisticated conceptualisation of the linkages between EI and livelihoods. Hence, the project investigates how people might benefit from a strengthened and cost-effective water supply system realised through optimised restoration and rehabilitation of EI with income-creating co–benefits. The SEBEI project is funded by the Ministry of Foreign Affairs of Denmark (DANIDA).

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1. INTRODUCTION

South Africa (SA) faces considerable water challenges in terms of both water supply and water quality; around 98% of the country's total reliable surface water supply has already been allocated to users (Oberholster and Ashton, 2008; Blignaut & van Heerden, 2009; Colvin *et al*., 2016) and SA's freshwater resources are becoming increasingly polluted and turbid, and are considered to be moderately to highly eutrophic (Oberholster and Ashton, 2008; van Ginkel, 2011). Owing to the dwindling available surface water resources, declining water quality, and growing urban and commercial demand, water demand is predicted to exceed available water supply within the next decade (du Plessis, 2017; DWS, 2017; TNC, 2018).

These challenges are predicted to be exacerbated by climate change, with projections of progressive drying over much of the country (MacKellar *et al*. 2014, Dieppois *et al*. 2016), more intense and more frequent droughts (Edossa *et al*., 2014; Otto *et al*., 2018; Naik & Abiodun, 2020), and increased water temperature and more evaporation (van Vliet *et al*., 2013). Already, water shortages across the country have resulted in negative economic impacts, which are predicted to worsen in the future (Ngaka, 2012; Pienaar and Boonzaaier, 2018; Schreiner *et al*., 2018). These shocks to the economy come at a time when SA is trying to transition towards a green economy, with the aim of boosting employment growth (UNEP, 2013).

Investments in ecological infrastructure[1] (EI) interventions[2] have been identified as an important measure for addressing SA's water challenges, as well as a key element in SA's transition towards a green economy, as it provides opportunities not only for unskilled-employment growth, but also increases in ecosystem services (Blignaut *et al*., 2010; Blignaut *et al*., 2014; Cumming *et al*., 2017; TNC, 2018). Indeed, investments in EI projects generate far broader socio-economic benefits than the employment created during project implementation (de Groot *et al*., 2013; Bark *et al*., 2016; Cumming *et al*., 2017; Sigwela *et al*., 2017).

To date, clearing of invasive alien plants (IAPs) - woody IAPs are estimated to account for considerable losses in available surface water (Cullis *et al*., 2007; Le Maitre *et al*., 2016; Stafford *et al*., 2017; Preston *et al*., 2018) - accounts for the majority of investments into EI in SA, largely through the government-funded Natural Resource Management programme, Working-for-Water, but also through a number of private sector grant funding channels. More recently, there has been growing investment into wetland rehabilitation and restoration, delivering additional ecosystem services such as flood regulation, water quality amelioration, erosion management and sediment regulation (Dini and Bahadur, 2016).

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[1] EI is defined as *"the underlying framework of natural elements, ecosystems, and functions and processes that are spatially and temporally connected to supply ecosystem services"* (Dominati, 2013)

[2] EI interventions are defined as *"an action to enhance certain ecosystem services in a spectrum of landscapes (from natural to transformed), informed by an understanding of ecology. Actions can be artificial or natural, including artificial wetlands, permeable pavements, alien clearing, wetland revegetation, and gabions and weirs to halt erosion"* (Holden *et al*., subm.)

However, the value and scale of EI investments in SA are small compared to requirements (Giordano *et al*., 2012; Shackleton *et al*., 2017) and implementation is piecemeal (van Wilgen *et al*., 2012a & b), largely owing to the reliance on constrained public sector budgets.

Attracting private sector investments for EI interventions is a unique challenge due to the generally 'public good[3]' nature of the water related benefits that accrue from the interventions, as well as the extremely long return periods[4]. However, internationally, organisations are working on ways in which to mobilise private sector capital for EI investments at scale (du Pont *et al*., 2015; O'Connell & Connors, 2019; Pfliegner *et al*., 2019; Trinomics and IUCN, 2019), with a number of innovative mechanisms having been proposed or implemented. Examples of mechanisms include "fit-for-purpose bonds" (du Pont *et al*., 2015; Madeira & Gartner, 2018; O'Connell & Connors, 2019; Pfliegner *et al*., 2019) and environmental impact bonds implemented in the US (EPA, 2017; Pfliegner *et al*., 2019), innovative insurance products (Vaijhala and Rhodes, 2018) and blended finance models (these are explained in detail in the 'Mechanisms for financing EI interventions' section). These mechanisms are able to attract private investors by providing a financial return on investment, generated by the intervention.

To encourage private sector investment in EI interventions in SA, a better understanding of the financial returns that can be generated is required (Cartwright *et al*., 2015). Most of the EI investment literature in SA considers the economic value of EI interventions (the value to society of ecosystem services generated by the intervention), which is useful for attracting public sector and grant funding (e.g. Nkambule *et al*., 2017; Stafford *et al*., 2017; Turpie *et al*., 2017; Crookes & Blignaut, 2019). However, there has been little attention on explicit financial returns that can be generated from EI interventions, which are critical for attracting private capital (Cartwright *et al*., 2015). These could be through avoided costs, such as reduced costs associated with purifying water at water treatment plants or less frequent dredging requirements at dams owing to less siltation, or revenue increases, such as additional water provision from increased water flows.

In SA, the potential for EI interventions to generate financial returns is not the only means for attracting private sector contributions to EI interventions: many companies see the value of investing in EI to reduce water related risks to their businesses and have voluntarily become water stewards, contributing considerable funds to EI intervention projects (Sojamo, 2015); and a few companies direct all or some of their Corporate Social Investment (CSI) budgets to EI intervention projects, from which they receive points on their Broad-Based Black Economic Empowerment (B-BBEE) scorecards (Thwaits, 2012). However, the present "environmental" framing of EI investment benefits, the lack of well-articulated environmental and socio-economic outcomes of EI interventions, and a lack of an integrated view of social

[3] Public goods are defined by the characteristics of 'non-rivalry' in consumption, and 'non-excludability' in provision. Non-rivalry means that one person's consumption of the good does not have a significant impact on somebody else's ability to consume the same good. If a good or service is excludable, it means that, technology or institutions exist that make it possible to prevent others from using the good or service

[4] The period over which the investment return accrues is long which may not suit typical private sector return-on-investment (ROI) timeframes

dimensions of the EI (Aronson *et al.*, 2010), means very little CSI expenditure has gone towards EI projects.

Apart from the difficulty in attracting private sector capital, the efficiency and viability of implementing EI interventions at scale, especially in terms of governance, has also not been properly explored (McConnachie *et al.*, 2013; O'Farrell *et al.*, 2015). Governance aspects are critical for attracting private capital as investors penalise governance-related risks, such as a lack of transparency or inefficiency, by requiring higher rates of return.

This paper aims to identify the existing and potential funding sources for EI investments in SA and explores existing and potential local and global mechanisms for financing these projects, with a special emphasis on financial mechanisms that can elicit private sector capital investments. Section 2 provides the methods used in this review, section 3 explores the current and potential sources of funding for EI investments in SA, section 4 identifies the existing and potential financial mechanisms that can be used to direct funding to EI intervention projects and details four mechanisms that have the potential to elicit private sector capital for EI investments in SA, and section 5 provides a summary of the findings of the study.

2. METHODS

This global review of financial mechanisms for EI interventions was conducted by first searching for peer-reviewed scientific articles on the topic and then by exploring the 'grey' literature. Search terms included "financial mechanisms" or "financing" of "ecological infrastructure" or "nature-based solutions" using Google and Google Scholar. This yielded very few scientific articles on the topic. There were a number of grey literature reports on the topic and these were useful for categorizing the types of financial mechanisms available for EI interventions. For examples and case studies of globally implemented mechanisms, websites of the stakeholders involved in the mechanisms were used to find information on the mechanics of the mechanisms.

3. CURRENT AND POTENTIAL SOURCES OF FUNDING FOR EI INVESTMENTS

There are a number of existing and potential funding sources for EI interventions (Table 1). The two dominant sources of funding for EI interventions in SA are the public sector (largely through the Department of Environmental Affairs' Natural Resource Management programmes - Mbopha, 2019 - which spend about R2 billion annually on EI interventions - CBD, 2019) and corporates who voluntarily invest in EI interventions as they derive some form of benefit from well-functioning EI (e.g. South African Breweries or Coca Cola South Africa who are significant direct water users, or Woolworths who invest in EI interventions

to de-risk their supply chain; Nel *et al*., 2009; Besseling, 2014). Private landowners are also a source of EI funding in SA, either investing directly in EI interventions on their own land (often with the assistance from government through the Land User Incentive – LUI – programme) or contributing to special levies that are earmarked for EI investments (van Wilgen *et al*., 2012). Developers, through environmental offsets, have also contributed to investments in EI, with a small portion of almost every offset being directed towards EI rehabilitation or restoration (e.g. R160 million of the total offset value of the N2 Wild Coast Highway project is being directed towards EI investments. pers. comm. Mark Botha. MD, Conservation Strategy Tactics & Insight).

These sources of funding, although significant, are not enough to meet the water related EI intervention requirements in SA (Giordano *et al*., 2012; Shackleton *et al*., 2017) and are either limited by a financially constrained treasury or subject to changing sentiments by philanthropic and donor funders. Furthermore, implementation has been piecemeal (van Wilgen *et al*., 2012a & b) and ineffective, which often results in more complex problems such as increased density or secondary invasions. To meet the water related EI funding requirements in SA, large upfront capital is required: it was estimated that R270 million is needed for the uMngeni River catchment (Pringle *et al*., 2016) and R370 million is needed for important catchments in the greater Cape Town region (TNC, 2018). One potential funding source that meets this requirement, and which dwarfs the others in terms of market size, is the institutional investor. Institutional investors, such as asset managers, banks and insurance companies, pool capital and invest it in several different asset classes, such as equities or bonds, with the intention of generating a financial return on investment. The financial returns required by institutional investors in SA for EI investments is likely to be higher than the estimated financial returns that can be generated from EI interventions (Cartwright *et al*., 2015). However, institutional investors would generally receive additional risk reduction-related benefits by investing in EI. For instance, insurance companies could benefit from EI investments that reduce the risk of events that would trigger payouts, asset managers generally have some portion of their investments in companies that depend on well-functioning EI, and banks generally lend capital to landowners and companies that depend on well-functioning EI. Furthermore, certain investors, such as impact investors, are willing to receive a lower financial rate of return in return for a positive social or environmental impact generated from the investment (Lalu *et al*., 2019). Indeed, SA has established a new National Task Force for Impact Investing, administered by the Bertha Centre for Social Innovation and Entrepreneurship at the UCT Graduate School of Business, which aims to accelerate the deployment of capital that optimises financial, social and environmental returns[5]. Furthermore, institutional investors are increasingly coerced to invest responsibly through global initiatives like the Principles for Responsible Investment (PRI) and Environmental, Social and Governance (ESG) investing (O'Connell & Connors, 2019; Trinomics and IUCN, 2019). These initiatives, as well as a general sentiment amongst the industry to reduce systemic risk through strategic investments, are paving the way for

[5] http://impactinvestingsouthafrica.co.za/

institutional investors to trade a lower financial return on investment for less tangible, but not less important, non-financial returns.

In some instances, having these funding sources act in isolation may lead to inefficient and ineffective EI intervention investments. This led to The Nature Conservancy (TNC) developing a Water Fund model that serves two main purposes: to pool funding from a number of different sources in order to meet critical levels required to be effective and benefit from economies of scale, as well as to prioritise and administer the water related EI interventions to secure efficiencies across both spatial and temporal dimensions (Arias *et al.*, 2010). While contributions to the Water Funds do not generate financial returns to investors, the benefits of more effective catchment management can attract non-repayable capital contributions from large commercial water users such as water supply companies, hydropower plants, agricultural associations and other private sector investors such as breweries and soft drink companies (Benítez *et al.*, 2010). Water Funds also reduce governance-related risks by operating outside of the public sector, often considered to be inefficient and non-transparent in the developing world.

*Table 1. Existing and potential funding sources for EI interventions and whether the actor/s benefit from the interventions themselves. Funding sources (column 1) marked with an * indicate those that are currently contributing to water related EI interventions in SA*

Funding source	**Do the funders benefit from the ecosystem services generated by the EI interventions**
Public sector *	Yes. Increases to social welfare through ecosystem service gains and improved social and ecological resilience.
Corporates *	Maybe. Those that rely on functioning EI will benefit.
Landowners and individuals *	Maybe. It is likely that in the long-term land value increases through ecosystem service gains would outweigh short-term losses in productivity (from moving agriculture out of wetlands and buffer zones for example).
Developers *	No. But they are obligated to invest in EI.
Development Finance Institutions (DFI)	No. Their mandate is to invest in private sector projects to promote job creation and sustainable economic growth.
Institutional investors (e.g. asset managers, commercial banks, insurance companies)	Maybe. If they invest in companies that rely on functioning EI then it reduces systemic risk that affects investment portfolios.

4. MECHANISMS FOR FINANCING EI INTERVENTIONS

For each funding source identified in section 3, there are a number of different financial mechanisms that can be used to direct funding to EI intervention projects (Table 2). For example, the corporate sector could direct funding towards EI interventions through CSI expenditure, through water stewardship programmes or through buyouts (Table 2). In SA, a number of these financial mechanisms are being used but, apart from substantial public sector budgets directed to EI interventions, the mechanisms used largely aim to either recoup costs gradually over time (such as through water tariffs or levies) or incentivise actors to change behaviour (such as through certification schemes or the LUI programme; Table 2). These existing mechanisms, although valuable, cannot generate the large upfront capital required to meet the water related EI intervention needs in SA.

The following section focuses on four mechanisms that can provide private sector investors with a return on their EI intervention investments and which are currently under-utilised in the South African landscape, and/or direct large amounts of upfront capital to the problem: CSI, bonds, parametric insurance products, and blended finance.

4.1 Corporate Social Investment (CSI)

Corporate Social Investment (CSI), or Corporate Social Responsibility (CSR) as it is termed in the UK and US, has been around since the industrial revolution but saw more widespread uptake since the 1950's and 60's (Thwaits, 2012). CSI in SA translates into contributions by corporates to projects or initiatives which do not form part of normal business activities and are not undertaken to increase profitability (King IV, 2016; Mersham and Skinner, 2016). Before the promulgation of the Broad-Based Black Economic Empowerment (B-BBEE) Act, CSI was comprised of voluntary donations to projects or initiatives that provided corporates with an opportunity to report on the social and environmental components of the triple-bottom-line accounting framework[6] and provided them with sustainable branding and marketing opportunities. Since the B-BBEE Act, CSI contributions to projects or initiatives that facilitate sustainable access to the economy can be used to earn Socio-Economic Development (SED) points on a corporate's B-BBEE scorecard. Not all CSI expenditure earns SED points, however. To redeem the full SED points, corporates must contribute a minimum of 1% of net profit after tax to eligible projects and initiatives. Eligibility of projects or initiatives is up to the discretion of B-BBEE ratings agencies but for full SED points to be awarded to corporates more than 75% of the beneficiary base must be 'black' South Africans and the projects or initiatives must aim to provide the beneficiary base with access to the economy, not merely a donation. Apart from generating a sustainable corporate image and earning B-BBEE points, CSI contributions are tax deductible up to the level of 10% of the corporate's taxable income, according to the Income Tax Act (Thwaits, 2012).

[6] The triple bottom line is an accounting framework with three parts: social, environmental and financial

The total estimated CSI expenditure in SA in 2019 was R10.2 billion but the proportion of this expenditure earning SED points is not known (pers. comm. Nick Rockey, MD at Trialogue). Education-related projects and initiatives received the greatest share of contributions in 2019 (50%), while environmental projects and initiatives received 5% of contributions (Trialogue, 2019). In terms of CSI contributions towards water related EI projects and initiatives, only a handful of corporates were identified as making contributions, including AECI, Rand Water and SAPPI (pers. comm. Nick Rockey).

4.2 Bonds

Bonds, including green and/or water bonds, have received considerable global attention as a means of attracting private capital for EI interventions (du Pont *et al.*, 2015; EPA, 2017; O'Connell & Connors, 2019; Pfliegner *et al.*, 2019; Trinomics and IUCN, 2019). Bonds can be issued by governments, banks, municipalities or corporations and are perceived to be lower risk for investors due to their fixed period, fixed investment mandate, agreed-upon rate of return and, in some instances, government underwriting. Bonds can be financed (paying back investors) in a number of different ways: (1) some projects generate a sufficient return to finance the repayments (for example, an entity issuing a bond to raise capital to invest in a new water treatment plant – WTP – may generate sufficient returns from the WTP once operational that repayments to investors stem from the proceeds generated), or (2) some projects do not generate a sufficient return to cover the full repayment but are subsidised by the general operations of the entity issuing the bond (for example, an entity issuing a bond to raise capital to invest in alien clearing may not generate sufficient financial returns from the investment to pay back investors but they supplement the returns that can be generated from the investment with income generated from their normal business activities, such as water supply), or (3) an entity can earmark certain income streams for repayment of the bond (for example, an entity that receives an infrastructure grant from national treasury can earmark a proportion of the annual grant to repaying the bond), or (4) an entity contracts with other entities that payments will be made to them once certain investment criteria are met and these payments are used to cover the bond repayment (for example, an entity raises a bond based on the contracts with other entities that benefit from the investment and volunteer to help pay for the investment should certain criteria be met). Under (3), if national treasury recognized EI as an official asset class that could be recognized on entities' balance sheets then a portion of that entities' infrastructure grant could be diverted towards maintaining the EI on its balance sheet so as not to erode the value of that infrastructure. Already work is underway in SA to develop a natural capital accounting framework that is a first step to making this a reality (SANBI & Statistics SA, 2018).

With green bonds, proceeds are exclusively used for the financing of eligible green projects that have a positive environmental and/or climate benefit (du Pont *et al.*, 2015). The total global green bond market is worth $389 billion, with proceeds used to finance green energy projects (34%), buildings (21%), transport (17%) and water (11%; CBI, 2019). Green bonds used to finance water investments are typically used to upgrade existing WTPs with energy saving technology or climate-proofing existing water infrastructure (CBI, 2019).

However, the number of bonds specifically allocating a portion of proceeds towards water related EI projects is low at 14, with an estimated value of $10.1 billion (CBI, 2019). However, the proportion of this value that is used to finance water related EI projects is likely to be much lower (CBI, 2019). Examples of bonds used for financing water related EI interventions include the Anglian Water Bond which has invested in the construction of artificial wetlands, the DC Water Environmental Impact Bond which has invested in EI to absorb and slow surges of stormwater during periods of heavy rainfall, and the California Forest Resilience Bond which has invested in thinning forests to reduce fire risk and improve water supply (EPA, 2017; Madeira & Gartner, 2018; O'Connell & Connors, 2019; Pfliegner *et al*., 2019; Trinomics and IUCN, 2019). Although all of these are considered to be under the green bond umbrella, they are all structured very differently. These bonds are typically implemented in developed nations where interest rates are low, meaning that the financial returns that investments into EI need to generate are low. However, in SA, interest rates are much higher, meaning that EI interventions need to generate significant financial returns in order to compete with other investment products. A study by Cartwright *et al*. (2015) indicated that the additional water yield required by EI investments in the uMngeni catchment in SA to be able to repay investors in a water bond is much higher than what could feasibly be generated from investments in EI. This is largely owing to the very high return on investment required by institutional investors in SA, in the region of between 10 and 12% per year. This is in stark contrast to the returns being paid to investors in EI bonds globally of between 1.6 and 3.5% per year. Part of the reason for the higher-required return on investment for EI projects is the uncertainty around the financial benefits to be generated. One way to alleviate the uncertainty is to set up the bond as an impact bond with financial payments linked to ecological performance. For example, investors are rewarded for above-expected returns while they share in the costs of below-expected returns. For example, DC Water's Environmental Impact Bond has runoff reduction thresholds which trigger different payout scenarios (EPA, 2017).

The California Forest Resilience Bond (FRB) has been structured in such a way that it makes it appealing within the South African context. The major beneficiaries of forest thinning have been identified, with the aim of sharing the cost of the activity among all the beneficiaries rather than purely the forestry department (as has been the situation historically; Madeira & Gartner, 2018). The mechanism works whereby a project in need of funding is identified by the beneficiaries and metrics (or parameters) of success are determined. The beneficiaries sign contracts stating that they will pay a certain amount should the project meet its predetermined metrics of success. An entity, the FRB in this instance, goes to the market to raise capital from the private sector on the back of these contracts. The proceeds are used to implement the project and, should it result in the metrics of success being met, the beneficiaries make their obligated payments to the entity who then structures the payments as cashflows to investors. This is appealing in SA as there are a number of beneficiaries linked to different EI interventions that are not contributing to the cost of implementing those interventions. For example, alien clearing benefits water utilities, fire risk departments, insurance companies (who insure abstractors), banks (who make loans to abstractors), tourism operators, private abstractors, municipalities, dam operators, etc. If

the benefits to these actors can be quantified, an investment case for each actor can be made.

4.3 Parametric insurance products

Catastrophe bonds, a parametric insurance[7] product, have been designed to transfer catastrophe risks to the capital market. When natural disasters occur, governments are often considered as "insurers of last resort" and are expected to help with losses not covered by traditional insurance and to coordinate and fund reconstruction efforts. This is often financially unsustainable for budget-constrained governments. Catastrophe bonds work as an insurance policy in which the holder of the policy receives a pay-out when a disaster reaches a predetermined threshold (Vaijhala and Rhodes, 2018). Investors in catastrophe bonds 'bet' against natural disasters reaching the payout threshold and earn interest on their investments when catastrophes do not occur (from the insurance premiums paid by the insured and from the returns generated from investing a portion of the proceeds in the capital market), but when they do, investors lose part or all of their principal invested. The global catastrophe bond market is now worth more than $37 billion (Bloomberg, 2019).

The City of Cape Town had considered purchasing a drought-related catastrophe bond following the latest drought event that nearly led to the City running out of water but decided to rather invest in proactive activities such as reducing the demand for water by implementing demand management interventions and increasing water supply through options such as desalination (pers. comm. James Cullis, Technical Director, Aurecon). This kind of thinking led to the development of resilience bonds, which are designed to fund both proactive risk reduction projects and reactive disaster recovery actions. Resilience bonds are a form of catastrophe bond that link insurance premiums to resilience projects in order to monetise avoided losses through a rebate structure (Vaijhala and Rhodes, 2018). The resilience rebate is a source of funding for measurable risk reduction projects. The difference between a resilience bond and a catastrophe bond is that, although they both use the same financial modeling, resilience bonds model two scenarios: business-as-usual and a world with protective infrastructure projects that increase resilience against the catastrophe taking place, resulting in reduced risk. The difference in the expected losses when the catastrophe happens with and without the risk-reduction project is estimated and the difference is captured as a resilience rebate, which can be used to finance the resilience project itself. For example, if the City of Cape Town were to take out a resilience bond, where the catastrophe payout would be initiated when the City ran out of water, and at the same time were to invest in alien clearing in its important catchment areas and the models indicated that this activity would reduce the risk of running out of water, the City would receive a resilience rebate proportional to the risk reduction factor of the alien clearing investment. This resilience rebate could be used to help finance the investment in alien clearing.

[7] Parametric insurance is a type of insurance that agrees to make a payment upon the occurrence of a triggering event.

4.4 Blended finance

Blended finance is the strategic use of public sector, development finance, grants, and philanthropic funds to mobilise or leverage private capital flows that require a specified rate of return on investment. With funding from these sources, which are provided under less favourable conditions (lower return, higher risk, longer tenure), institutional investors are freed up to tap the strong potential returns from water related projects while benefiting from valuable downside risk protection. For landscape-based approaches, blended finance can potentially operate as a fit-for-purpose financing instrument as it brings together different stakeholders responding to their individual investment preferences. For example, if an institutional investor invests R100 million in EI and expects a 10% return per year, while government's NRM programme matches this funding but requires no return then the NRM funding can subsidise the institutional investor. Let's assume that an investment of R100 million can generate 5% financial return through enhanced ecosystem services provision and an investment of R200 million can generate a 10% return, then the R200 million can be invested and the full 10% financial return can be allocated to the institutional investor. This has been coined a 'returns booster' by WWF in SA who have allocated funds to an institutional investor to invest with other money into green outcomes projects, where WWF are not expecting a return on the money they have invested, allowing the institutional investor to invest in lower-yielding projects where all the returns go to their other clients (pers. comm. Anton Cartwright, economist and researcher at African Centre for Cities, University of Cape Town). Guarantees are also a very effective tool in blended finance as they can be used to de-risk an investment.

Internationally, there are a number of facilities and initiatives that have been established to play a catalysing role in mobilising private sector capital, such as WWF's Bankable Projects initiative. This initiative aims to transform the investment landscape, redirecting substantial financial flows into sustainable water projects by helping to bridge the investment gap by catalysing a stream of bankable projects, which will improve freshwater ecosystems, while providing investors with an acceptable return on their investment. WWF's role is to direct funding that is not looking for a return to fund the 'un-fundable' aspects of EI interventions and help raise the seed capital to bring bankable projects from a concept or idea to a prefeasibility phase, after which private sector capital is sought which will generate a return on investment.

In SA, blended finance is still in its infancy but the Development Bank of Southern Africa (DBSA) has established two facilities aimed at providing catalytic finance: The Climate Finance Facility (CFF) and the Green Fund. The CFF is a R2 billion debt facility that aims to address market constraints in the private sector and play a catalytic role with a blended finance approach in increasing climate related investments in Southern Africa. The CFF will co-fund projects and businesses that mitigate or adapt to climate change. The CFF will break existing market barriers to climate financing by de-risking climate projects in order to crowd-in significant investments from the private sector. Similarly, the Green Fund aims to provide catalytic finance to enable innovative investment in projects and programmes that will assist in SA's transition towards a green economy. The fund aims to provide seed funding to

enable projects to seek further investment from private and public sources. A key role of the Green Fund is to support projects at the early stages, when the risks are too high for private sector investment. The estimated investment flowing to EI through the Green Fund for the 2013/14 financial year was R45 million (Colvin *et al.*, 2015).

*Table 2. Mechanisms for financing EI interventions with examples of practice from SA and globally. The mechanisms (column 2) marked with a * indicate those which are being implemented in SA to direct funding to water related EI interventions.*

Funding source	Mechanism	Description	SA examples	Global examples
Public sector	National, provincial or local budgets *	Public budgets made available for specific applications	DEA NRM programmes	
	Infrastructure grants *	Public budgets made available for infrastructure-related applications	City of Cape Town infrastructure grant	Cities of Munich and New York
	Buyouts	Purchasing or leasing land from landowners with the intention of preventing harmful activities taking place on the land		Cities of Haringvliet and New York
	Debt-for-nature-swap	Financial transactions in which a portion of a developing nation's foreign debt is forgiven in exchange for local investments in environmental conservation measures		Seychelles; el Salvador[8]
	Self-insurance	Paying insurance premium to oneself and investing it in an endowment-type model with proceeds to be used to fund projects	eThekwini and Tshwane Municipalities but avoided costs not used to fund EI[9]	
Corporates	Stewardship *	Contributions by corporates to projects or initiatives that reduce their risk	Woolworths, Coca Cola, SAB Miller	
	Corporate Social Investments (CSI) *	Contributions by corporates to projects or initiatives which do not form part of normal business activities and are not undertaken to increase profitability	AECI Wise Wayz Water Care (WWWC) programme, Rand Water	
	Buyouts *	Purchasing or leasing land from landowners with the intention of	Olifants River mining company leasing land from	

[8] Cumming *et al*. 2017
[9] Pringle *et al*. 2018

		preventing harmful activities taking place on the land	rural community to protect riparian zone	
Landowners and individuals	Water pricing/ tariffs/ levies *	An increase in the price of water, a tariff or the issuing of a levy to cover expenditure on a project	Water User Associations (WUA); DWS water strategy allows for proceeds to be invested in clearing IAPs, through Water Resource Management (WRM) charge[10]. Revised strategy expands to include "maintenance and restoration of ecosystems". Umgeni Water exploring catchment management levy.	New York City[11];
	Crowdfunding	The practice of funding a project or venture by raising small amounts of money from a large number of people, typically via the internet		Crowdfunding for green projects in Europe[12]; other info[13]
	Insurance premiums – subsidy or tax	The use of insurance as an environmental control mechanism whereby premiums are reduced or increased based on environmental management practices		Insurance as an environmental control mechanism[14]
	Biodiversity stewardship *	Voluntary commitments from landowners to support conservation and sustainable	Landowners not obligated legally to invest in EI but get	

[10] Cumming *et al*. 2017
[11] Postel and Thompson 2005
[12] Adhami *et al*. 2017
[13] https://www.weforum.org/agenda/2018/05/crowdfunded-campaigns-are-conserving-the-earth-s-environment
[14] Pearce 2000

		resource use on their land. In some instances, tax breaks are provided to the landowners as an incentive	financial support from provincial conservation agencies to engage in EI activities	
	LUI programme *	An incentive mechanism to entice landowners to invest in controlling invasive plants on their land		
	New market creation *	The creation of a market to unlock additional benefits that aims to alter behaviour with regards to environmental management practices	Umzimvubu rangeland programme (CSA) – the Meat Naturally model – improves condition of cattle for market	
	Water credits	A financial mechanism that supports upstream landowners to invest in improved water management practices for which credits are generated that can be traded on a market		District Stormwater (a wholly owned subsidiary of TNC) provides Stormwater Retention Credits (SRCs) in DC[15]
	Carbon credits	A financial mechanism that supports upstream landowners to invest in improved forest management practices for which credits are generated that can be traded on a market		
	Tradeable grazing rights	Rights to graze a certain number of livestock are issued to farmers which can be traded		Tradable permit systems have been proclaimed as the panacea for an ineffective command-

[15] www.districtstormwater.com

				and-control system governing federal rangelands in the US[16].
	Grazing fees *	A tax issued to farmers per head of livestock owned	Namaqualand[17].	
	Legislation *	Legislation, in the form of a tax or subsidy, with the clear intention of bringing about a desired outcome	Eden municipality; Alien and Invasive Species Regulations of the National Environmental Management: Biodiversity Act (Act 10 of 2004, or NEMBA).	
	Certification schemes *	A mechanism to verify that an organisation has achieved a certain standard (usually environmental or social)	Biodiversity & Wine Initiative (BWI) and Integrated Production of Wine (IPW) schemes have some metrics with regards to alien clearing but focused on whether landowner has a management plan rather than actual clearing.	
Developers	Offsets *	A mechanism that seeks to minimise the environmental impacts of a development project by ensuring that any damage in	Spring Grove Dam[18]; uMkhomazi planned dam[19]; Newcastle Dam[20]; Berg	Business and Biodiversity Offsets

[16] Hess 1995; Nelson 1997; Regan 2016
[17] Rohde *et al*. 2006
[18] Cox and Brownlie, 2015
[19] van Staden *et al*., 2018
[20] Nieuwoudt 2008

		one place is compensated for somewhere else	River Dam offset during construction	Program[21]; Popular in USA
Development Finance Institutions (DFIs)	Development and green funds/ grants	Financing mechanism established to support development and/or a transition to a green economy	DBSA Green Fund	Global Environment Facility (GEF)
	Climate change funds	Financing mechanism established to assist developing countries in adaptation and mitigation practices to counter climate change	DBSA Climate Finance Facility	Green Climate Fund; Adaptation Fund
Institutional investors (e.g. asset managers, banks or insurance companies)	Bonds (water/ green/ impact/ collaborative revenue/ revenue)	The bond is a debt instrument, under which the issuer owes the holders a debt and is obliged to pay them interest or to repay the principal at a later date, termed the maturity date	City of Cape Town Green Bond (but no proceeds go towards EI interventions)	DC Water; Anglian Water; Collaborative revenue bonds are the California FRB model; Revenue bonds use proceeds from project to service debt;
	Parametric or event-based insurance	An insurance product that pays out an agreed-upon sum based on the expected loss resulting from a trigger event		Catastrophe bond market; Willis Towers Watson's Global Ecosystem Resilience Facility[22]; Coral reef insurance (from storms) in the Yucatan Peninsula, Mexico[23]
All	Blended finance	The strategic use of public sector, development finance, grants, and philanthropic funds to mobilise or	DBSA's Climate Finance Facility and Green Fund; African Development Bank's	WWF Bankable Projects Initiative; Dutch Fund for Climate

[21] Business and Biodiversity Offsets Programme (2013)
[22] Pfliegner *et al*., 2019
[23] TNC www.nature.org/en-us/what-we-do/our-insights/perspectives/insuring-nature-to-ensure-a-resilient-future/

		leverage private capital flows that require a specific return on investment	Adaptation Benefits Mechanism (ABM);	and Development – SANLAM involved; The Natural Capital Financing Facility (NCFF); Tropical Landscape Financing Facility (TLFF);
	Payments for Ecosystem Services (PES)	Incentives offered to landowners in exchange for managing their land to provide some sort of ecosystem service, usually financed by water users (governments, corporates, individuals, etc.)	Maloti-Drakensberg PES study[24];	Around US$25 billion invested in water related EI in 2015[25]. The vast majority was in the form of public subsidies (governments reward landholders for good stewardship), including PES.

[24] Blignaut *et al*., 2010
[25] Bennett and Ruef, 2016

5. SUMMARY

This report aimed firstly to identify the existing sources of funding for water related EI interventions in SA and the financial mechanisms used to direct that funding to projects on the ground, and secondly to identify potential sources of funding and financial mechanisms that could be explored in order to meet the EI intervention requirements in SA. The findings indicate that of the existing funding sources in SA (Table 1), the public sector is the only source contributing significant funds towards EI interventions. Furthermore, the funding source with the largest market size, the institutional investor, is not contributing any funds to EI interventions in SA. The corporate sector, apart from a few water champions (those corporates already investing in water related EI interventions to minimise their own risks), also has the potential to contribute more towards water security in SA. SA has already implemented a number of financial mechanisms for directing funds towards EI interventions (Table 2) but these have the tendency to not generate the large upfront capital required to deal with the issues at scale, nor do they successfully mobilise private sector capital. Although facilities have been established to catalyse and leverage private sector capital, these have not experienced any successful uptake. Globally, there are a number of innovative financial mechanisms designed specifically to catalyse and leverage private sector capital for EI interventions or nature-based solutions, such as bonds, parametric insurance products and blended finance facilities, and these are gaining ground the world over. The feasibility (are there sufficient returns on investment) and viability (are current government structures suitable) of establishing and implementing such mechanisms here in SA is worth exploring.

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