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Research Report

Title: How can targeted private investment in land-use management maximise returns to capital and ecosystem infrastructure in South Africa?

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MSc – Interdisciplinary Global Change Studies

Department: Global Change and Sustainability Research Institute (GCSRI)

Supervising school: WITS Business School

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Declaration

I, Gray Maguire, declare that this research report was written and compiled by me. It has not been submitted to any other institution or University and is being submitted currently as part of the requirements to obtain a Masters degree in Inter-disciplinary Global Change Studies.

All resources used are acknowledged and referenced where appropriate, including interviews and methodological approaches linked to my professional work.



_____ _____27/10/2016_____

Signed Date

Abstract:

This report examines the potential for private investment in commercial land-use activities to yield a positive return to capital as well as ecosystem infrastructure in South Africa. Intact ecosystem infrastructure in South Africa is concentrated in the Eastern Cape, Kwa-Zulu Natal and Mpumalanga, all of which have a high prevalence of communal land-ownership and small-scale farmers. These areas are under threat of rapid degradation from poor land-use practices including over-grazing, over-harvesting of forestry products, alien encroachment and over-frequent burning resulting in soil erosion and degradation, decreased water retention and quality as well as denudation and biodiversity loss. As such developing effective strategies to respond to the drivers of land degradation is a critical task for ecosystem goods and services preservation.

While the majority of existing state led strategies around sustainable land-use, land-reform and rural development in these areas have proven ineffective there are notable exceptions emanating from the state, NGO's and the private sector. This report analyses these examples in case study format, pointing out the key features of each case with regards to the enabling environment and primary outcomes from both a financial and ecosystem infrastructure returns perspective. Specific attention is also given to the development of effective social processes that have a proven track-record of improving the social base that underlies effective socio-ecological systems. The end goal of the report is to provide a theoretical model designed for real-world application.

This research report is dedicated to Diana Sanchez, Mary Lawhon and Olaf Bliebtreu.

To Diana because of your unfailing support and beautiful heart.

To Mary because of the inspiration and encouragement you've given me.

To Olaf because of all the chats where I tested my theories.

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- WWF
- Conservation South Africa
- SANBI
- TEEB
- GEF
- GIIN
- PLAAS University of the Western Cape
- Department of Environmental Affairs
- UNCTAD
- Department of Rural Development and Land Reform

Contents

Contents 6
Nomenclature 8
Abbreviations: 10
Chapter 1 - Ecosystems and the economy – Background 11
1.1 Methodology 14
1.2 Literature review 15
Chapter 2 – The state of South African ecosystems 20
Chapter 3 – The argument for private investment in ecosystem infrastructure in South Africa 24
Chapter 4 - The small-scale AFOLU approach to ecosystem service investment 27
4.1: Why Agriculture, forestry and other land-use (AFOLU)? 27
4.2: Why small-scale farmers? 32
Chapter 5 – The South African state – policy and enablers 36
5.1 Carbon Offsets 39
5.2 Environmental/Biodiversity offsets 40
5.3 Rural smallholder development model: CRDP and Agriparks 42
5.5 Tax benefits and avoided costs 44
Chapter 6 – Small-scale farmers – the setting and enablers 46
6.1 Ostroms 8 design principles for successful socio-ecological systems 47
6.2 Institutional bricolage 49
6.3 Assets Based Community Development (ABCD) 49
6.4 Murphrees CBNRM laws 49
6.5 Additional factors 49
Chapter 7 – South African private investment – the setting and enablers 50
7.1 Code for Responsible Investing in South Africa (CRISA) 51
7.2 Development Finance Institutions (DFI's) and blended finance 54
Chapter 8 – Opportunities for small-scale farmer value-chain integration 56
8.1 Outgrower schemes 57
8.2 Lessons from agro-industry – the UFF and ZZ2 examples 57
8.2.1 UFF 57
8.2.2 ZZ2 58
8.3 BBBEE and CSI 59
8.4 NGO partnerships 60
8.5 GlobalG.A.P and LocalG.A.P 61

8.6 Timber and non-timber forestry products 61
8.7 The insurance sector and premium reductions for improved risk profile – Santam 62
8.8 Certification premiums 63
Chapter 9 – Application 63
9.1 Communal land-tenure application 64
9.2 Project roll-out methodology 71
Recommendations 73
References 76

List of Figures

Figure 1: Global material extraction (Krausmann et al 2008) 11
Figure 2: Composite resource price index (at constant prices) (Wagner et al 2002) 12
Figure 3: Commodity price indices (UNEP 2011) 12
Figure 4: Degrees of integration and stakeholder involvement in integrative and non-integrative approaches. (Tress et al 2004) 14
Figure 5: The evolution of thought about the relationships between economy, society and the environment (clockwise from top left). 17
Figure 6: relative share value across assets (JP Morgan 2015) 18
Figure 7: BP share price impact of Deep Horizon disaster (Economist 2015) 19
Figure 8: Volkswagen share price impacts of the emissions scandal (Economist 2015) 19
Figure 9: South African ecosystem states relative to boundaries. (Cole et al 2014) 20
Figure 10: Ecological footprints by country. (Living Planet 2012) 21
Figure 11: Status of ecosystem types. (NBA 2011) 22
Figure 12: Average return across asset classes in South Africa. (Futuregrowth 2015) 30
Figure 13: The link between bread prices and revolution. (Mason 2012) 31
Figure 14: Ecosystem service production and poverty at municipal level. (CSA 2012) 33
Figure 15: Population density of South Africa (OpenStax 2016) 34
Figure 16: Agricultural regions of South Africa (Jooste 2013) 34
Figure 17: Locations for the Agri-Parks programme (personal communication with DRDLR) 43

Figure 18: Non-DFI investments by sector in SA (GIIN 2015) 51

Figure 19: The 9 villages of Keiskammahoek..... 66

List of Tables

Table 1: Status of key ecosystem processes (Rockstrom et al 2009).....**13**

Table 2: List of ecosystem services (TEEB 2012).....15

Table 3: Impact of green investments in agriculture (at 0.16% of GDP). (UNEP 2011).....29

Table 4: Economic value of ecosystem services. (TEEB 2012).....38

Table 5: Land preservation priorities identified by Border Rural Committee.....65

Nomenclature

(Mostly derived from: Aronson, J., Milton, S and Blignaut, J. (2007). Restoring natural capital: Science, business and practise. Washington DC.: Island Press.)

Alien species: Fungi, plants or animals that is not native to the country or region in which they are introduced or naturalized.

Agro-industry: Commercial agriculture based on industrial modes of production highly reliant on mechanisation and fossil fuel based inputs.

***Agro-ecology*:** Agro-ecology is a scientific discipline that uses ecological theory to study, design, manage and evaluate agricultural systems.

***Biocapacity*:** the area of land and productive oceans actually available to produce renewable resources and absorb CO2 emissions

Biodiversity: The diversity of life at genetic, species, community, ecosystem and biome levels.

Carbon sequestration: A concept that refers to capturing carbon and keeping it from entering the atmosphere for some period under a greenhouse gas reduction program. Carbon is sequestered in carbon sinks such as forests, soils or oceans.

Degradation: A persistent loss in the capacity of ecosystems to deliver ecosystem goods and services.

Direct -use value: The direct or extractive and consumptive use of natural biota includes wood for construction and timber as well as for energy purposes, medicinal products, edible fruit, herbs and vegetables as well as thatch and the value of livestock and the hunting of game.

Ecology: The study of factors determining the abundance and distribution of plant, animal, fungal and microbial species, including the interaction of all such organisms with one another and with their physical environment.

Ecosystem goods and services: The conditions and processes through which natural ecosystems sustain and fulfil human and other forms of life. Examples include the delivery of fuelwood (goods), the provisioning of clean water, climate maintenance (carbon sequestration), crop pollination, and fulfilment of human cultural, spiritual, and intellectual needs (services). Also known as environmental services.

Ecological footprint: Is a measure of human impact on the Earth's ecosystems. Measured in Global Hectares (gha) per capita it reflects the relative use of the Earth's productive surface in both terrestrial and aquatic environments.

Ecosystem: The complex of living organisms, and their associated non-living environment, interacting as an ecological unit.

Ecosystem Infrastructure: The natural resource base that delivers services such as water and climate regulation, soil formation, pollination and disaster risk reduction.

Gross Domestic Product (GDP): The value of the flow of domestic goods and services produced by an economy over a period of time, e.g., one year. Invasive alien plant: Invasive plants are non-indigenous (introduced) naturalized plant species that produce reproductive offspring in very large numbers and thus have the potential to spread over a large area and to disrupt processes of native ecosystems.

Impact investment: investments intended to return principal or generate profit while also driving a positive impact on social systems and ecosystems.

Natural capital: The stock of physical and biological natural resources that consist of renewable natural capital (living species and ecosystems), non-renewable natural capital (sub-soil assets, e.g., petroleum, coal, diamonds, etc.), replenishable natural capital (e.g., the atmosphere, potable water, fertile soils), and cultivated natural capital (e.g., crops and forest plantations).

Outgrower: a contractual partnership between growers (farmers) and a company that receives the produce of the farmers.

Payment for Ecosystem Services (PES): A system where beneficiaries of an environmental good or service make some sort of payment (either financial or some equivalent) to those who secure the provision of such services.

Abbreviations:

DEA:	Department of Environmental Affairs
DFI:	Development Finance Institutions
DRDLR:	Department of Rural Development and Land Reform
ESG:	Environmental, Social and Governance
GIIN:	Global Impact Investment Network
IFI:	International Financial Institutions
PE:	Private Equity
SANBI:	South African National Biodiversity Institute
SDG:	Sustainable Development Goals
TA:	Technical assistance
UNEP:	United Nations Environment Programme
UNSDSN:	United Nations Sustainable Development Solutions Network
USD:	United States Dollars
VC:	Venture Capital
WWF:	World Wide Fund for Nature

Chapter 1 - Ecosystems and the economy – Background

Mankind has experienced a profound change in the manner that it interacts with planetary resources and systems over the last century. By looking at Figure 1 (Krausmann et al 2008) we can see how we have moved from low, and largely sustainable levels of resource extraction at the start of the 20th century, to rapidly increasing levels of resource consumption towards the end of the century. Along with this increase there has been a dramatic rise in global GDP with concomitant increases in levels of education, life span and well-being for many of the world's people.

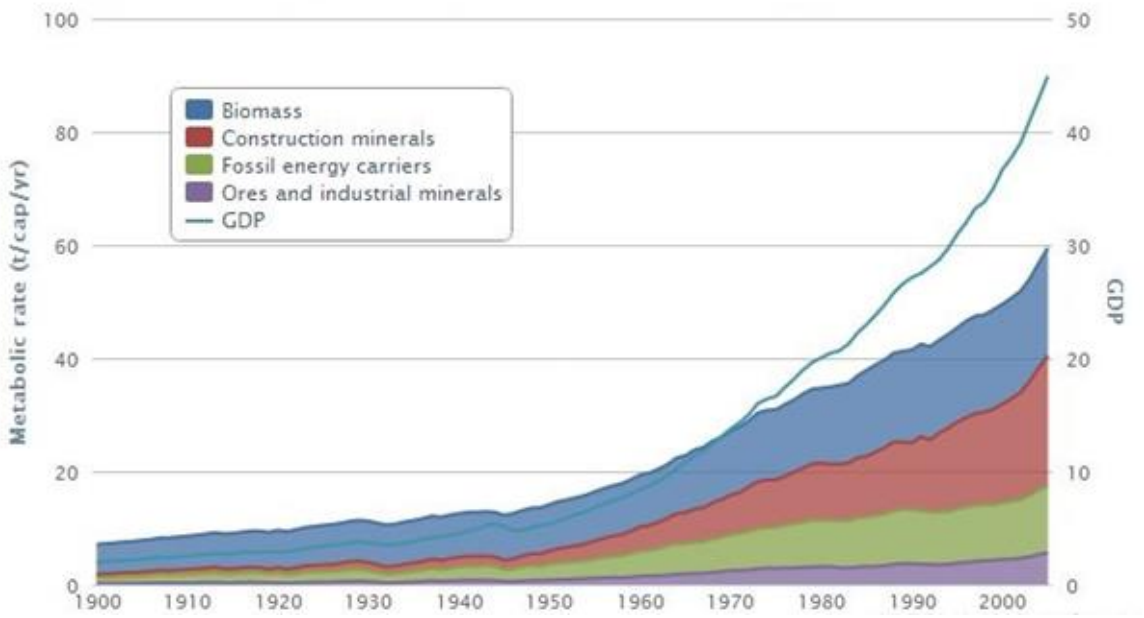


Figure 1: Global material extraction (Krausmann et al 2008)

While many of the trends associated with this massive increase in resource consumption have positive implications for much of society, a fundamental problem emerges when our extraction rates exceed the planets replenishment rates and existing natural capital becomes depleted. At this point we begin to experience diminishing marginal yield to capital in so far that easily accessible resources are depleted and as such to sustain production increased investment is required, which places an upward pressure on price ceteris paribus. The expected outcome of this should be that demand then decreases, but given that we are fundamentally dependent on natural goods and services for our survival, the elasticity of demand is very low resulting in a situation where demand does not decrease with increases in price (Hofstrand 2007).

By looking at figure 2 and 3 from Wagner (2002) and UNEP (2011) we can clearly see that our ability to continue to extract resources ever more efficiently has come to an end which is a clear indication that our extraction rates have indeed exceeded the planets replenishment rates.

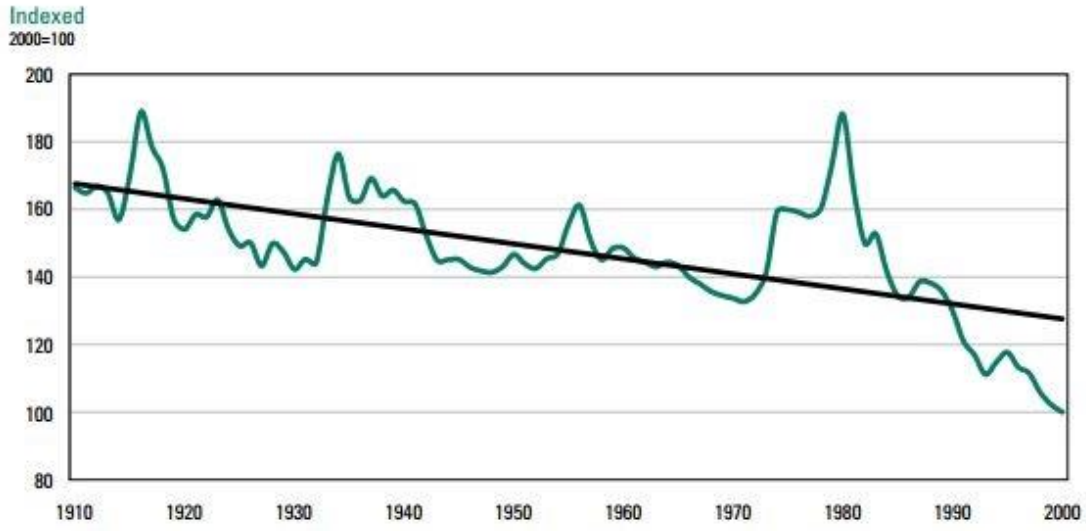


Figure 2: Composite resource price index (at constant prices) (Wagner et al 2002)

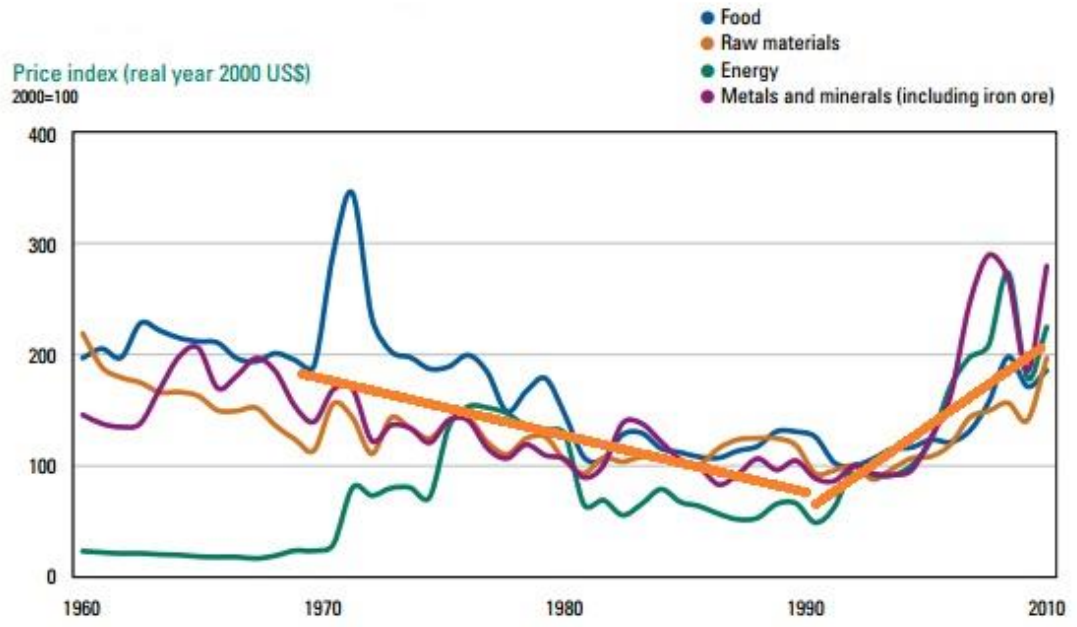


Figure 3: Commodity price indices (UNEP 2011)

At the present moment in history humanity's impact on the earth processes that sustain our continued prosperity on this planet is at an unprecedented level. This has placed us in a position where our most important planetary system processes are experiencing massive threats to their ongoing stability, with three of the ten key life-support processes already having crossed the boundaries of sustainability (table 1: Rockstrom et al 2009).

Earth-system process	Parameters	Proposed boundary	Current status (as of 2009)	Pre-industrial value
Climate change	Atmospheric carbon dioxide concentration (parts per million by volume)	350	387	280
	Change in radiative forcing (watts per metre squared)	1	1.5	0
Rate of biodiversity loss	Extinction rate (number of species per million species per year)	10	>100	0.1–1
Nitrogen cycle	Amount of nitrogen removed from the atmosphere for human use (millions of tonnes per year)	35	121	0
Phosphorus cycle	Quantity of phosphorus flowing into the oceans (millions of tonnes per year)	11	8.5-9.5	-1
Stratospheric ozone depletion	Concentration of ozone (Dobson unit)	276	283	290
Ocean acidification	Global mean saturation state of aragonite in surface sea water	2.75	2.90	3.44
Global freshwater use	Consumption of freshwater by humans (km^3 per year)	4,000	2,600	415
Change in land use	Percentage of global land cover converted to crop land	15	11.7	low
Atmospheric aerosol loading	Overall particulate concentration in the atmosphere, on a regional basis	To be determined		
Chemical pollution	E.g. amount emitted to, or concentration of persistent organic pollutants, plastics, endocrine disrupters, heavy metals and nuclear waste in, the global environment, or the effects on ecosystem and functioning of Earth system thereof	To be determined		

Table 1: Status of key ecosystem processes (Rockstrom et al 2009)

Of the processes listed in Table 1 all of them have detrimental human activities as their root cause such as burning of fossil fuels leading to water degradation and increased atmospheric CO2, which in turn leads to a number of other problems including ocean acidification, deforestation and increasing use of agro-chemicals. But it is not just the damage to the earth systems that we need to be mindful of, it is also our rate of resource consumption as we are consuming at a rate that is imperilling the potential for future replenishment of our renewable resources such as forestry products, fresh water and marine stocks.

WWF's 2012 Living Planet Report states that our demand on natural resources has doubled since 1966 with us as a species now consuming 1.5 planets worth of resources. Continuing down this path with a "business as usual" mind-set will see us consuming the equivalent of two planets worth of resources by 2030. Obviously given that we only have one planet the notion of consuming two planets worth of resources is absurd, but what it does mean is that we are presently degrading our natural capital and in the process decreasing the ability of the earth to replace the resources we consume.

1.1 Methodology

This report is in partial completion of an inter-disciplinary degree, however the nature of the problem in question, ie: preservation of ecosystem goods and services is complex and requires the analyses of multiple scientific disciplines on the one hand and the activities of various societal actors on the other. According to Tress et al (2004) this scope of study transcends interdisciplinary research and moves into the realm of transdisciplinary research which holds knowledge integration as the central requirement, more specifically the integration of theoretical and practical knowledge.

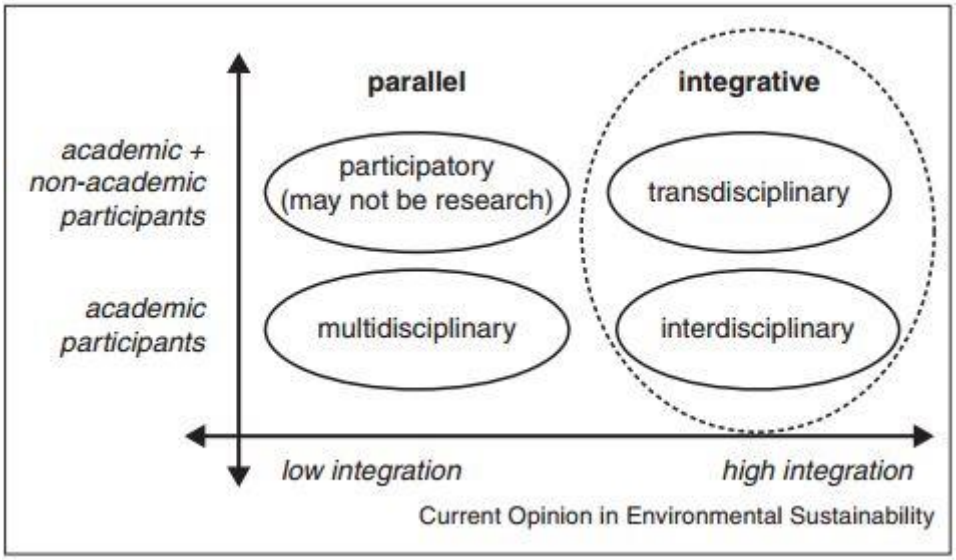


Figure 4: Degrees of integration and stakeholder involvement in integrative and non-integrative approaches. (Tress et al 2004)

The end goal of the report is to provide a theoretical model designed for real-world application which necessitates the development of a theory of change around the base problem. The base problem (Chapter 1) is well articulated by Marais (2012) where he states that the investment requirement for

the preservation of South Africa's existing natural capital "is at least 5 times as much as the Department of Environmental Affairs can afford". Blignaut and Elst (2014) have argued that the commercial private sector plays the leading role in terms of the use and transformation of natural capital in South Africa, and as the primary user it is clear that mechanisms require development which will unlock private flows of investment into natural capital. The core assumption underpinning the development of these mechanisms as advanced in this report is that positive return on investment is the most effective way to unlock investment flows.

As such a narrative is required that begins by establishing the status quo with regards to the nature of South African ecosystem goods and services (Chapter 2). Thereafter a review of the links between business and the environment is required along with a geographical description of the location of natural capital hotspots as well as a description of the primary forms of land-use and tenure in these areas (Chapter 3 & 4). This is followed by a description of the legislative environment (Chapter 5) and key social factors to be considered when acting within this sphere (Chapter 6). The report then continues to provide insight into the investment environment around land-use (Chapter 7) and then reviews a number of successful cases where commercial land-use activity has resulted in net positive gains to capital as well as the environment (Chapter 8). These cases are then combined in a theoretical model which shows how successful case studies can be combined to maximise returns to private and natural capital in a real world setting (Chapter 9) and lastly gives recommendations for broader application.

1.2 Literature review

TYPE	CLASS	GROUP
PROVISIONING	Nutrition	Terrestrial plant and animal foodstuffs
		Freshwater plant and animal foodstuffs
		Marine plant and animal foodstuffs
		Potable water
	Materials	Abiotic materials
		Biotic materials
	Energy	Renewable biofuels
		Renewable abiotic energy sources
REGULATION & MAINTENANCE	Regulation of wastes	Bioremediation
		Dilution and sequestration
	Flow Regulation (Natural Risks)	Air flow regulation
		Water flow regulation
		Mass flow regulation
	Regulation of Physical Environment	Atmospheric regulation
		Water quality regulation
		Pedogenesis and soil quality regulation
	Regulation of Biotic Environment	Lifecycle maintenance and habitat protection
		Pest and disease control
		Gene pool protection
CULTURAL	Intellectual & Experimental	Recreation and community activities
		Information and knowledge

	Symbolic	Aesthetic, heritage
		Religious and spiritual

Table 2: List of ecosystem services (TEEB 2012)

According to Sahu and Choudhury (2005) natural capital is the stock that yields the flow of natural resources and consists of both goods and services which may be further classified into renewable and non-renewable resources. An important distinction (as defined by Sahu and Choudhury) that must be made under the concept of natural capital is the distinction between "cultivated" natural capital and natural capital proper. The key distinguishing trait being that cultivated natural capital is pure natural capital augmented by human capital.

According to the Millennium Ecosystem Assessment (2005) there are four broad types of ecosystem services which are categorised as follows:

Supporting services – ecosystem services that support the continuation of other ecosystem services such as soil formation and nutrient recycling.

Provisioning services – which are products obtained from ecosystems such as raw materials and food.

Regulating services – services that ensure the stability of existing ecosystem services such as carbon sequestration or waste decomposition.

Cultural services – These are non-material benefits that people derive from the existence of the ecosystems themselves such as leisure in parks and culturally significant elements of ecosystems.

Amongst these are a good many that are of significant commercial value including crop pest control, water and waste treatment, nursery value, carbon sequestration, marine produce, pollination, grazing and naturally re-occurring resources to name a few. These services at global level have been estimated by Costanza et al. (2014) to be worth some 125 trillion per year (in 2007 USD) – almost twice global GDP. This evolution in our understanding of the inter-related nature of society, economy and the environment is reflected in Figure 4 which shows the changes in the models we have used to depict it.

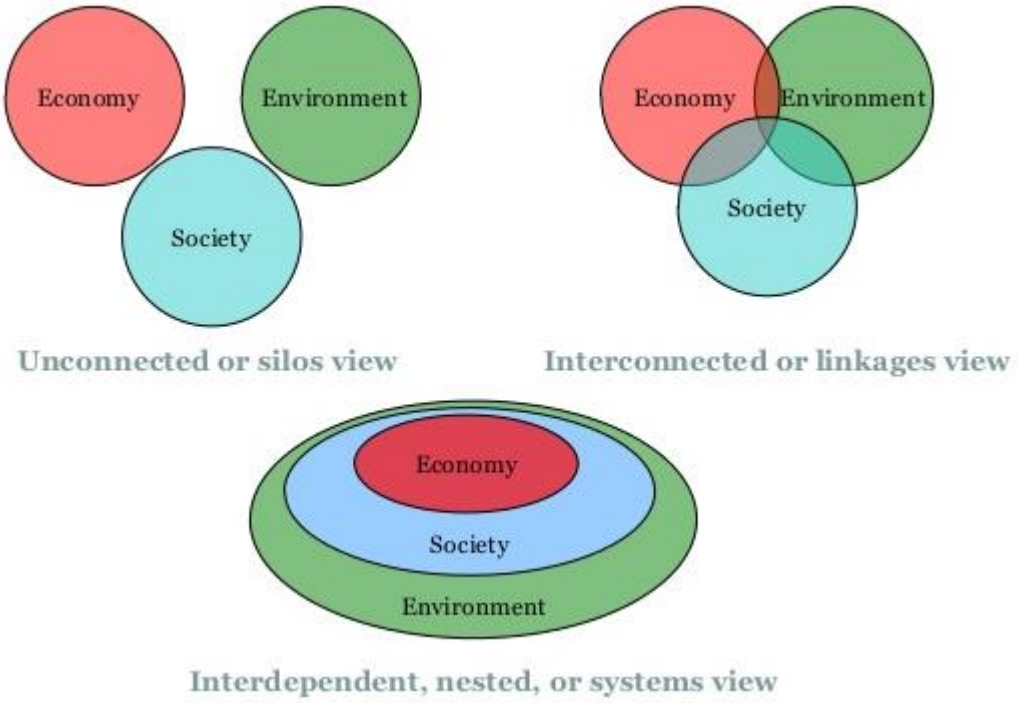


Figure 5: The evolution of thought about the relationships between economy, society and the environment (clockwise from top left*).*

Despite the fact that the Unites Nations Sustainable Development Solutions Network (UNSDSN 2014) estimates that businesses are responsible for two thirds of global resource use and the fact that the loss of these services would have severe financial impacts on private business (not to mention severe impacts for our survival), it remains very difficult to secure private investment in ecosystem infrastructure. This is evidenced by the difficulties in getting a market mechanism to work for greenhouse gas mitigation, or by the USD750 billion annual shortfall in private finance required in order to meet the ecosystem elements of the Sustainable Development Goals (SDG's) in developing countries alone (UNSDSN 2014). In addition to this, many people within the developing world, including in South Africa, are heavily and directly dependent on rapidly degrading ecosystem services as a part of the socio-economic well-being.

Certainly both cultivated and pure natural capital will require substantial investment if they are to continue to meet our societal needs, and as such addressing this challenge must be viewed as one of the great tasks of our time.

Consumers have become more and more aware of both positive and negative environmental impacts resulting from business activities and as a result are placing ever increasing pressure on businesses of all sizes, especially multi-nationals and large corporates, to be responsible with regards to their environmental, social and governance impacts. This has given rise to a number of international monitoring and evaluation and reporting standards such as the Carbon Disclosure Project (CDP), the Global Reporting Initiative (GRI) and Impact Reporting and Investment Standards (IRIS) as well as a number of South Africa specific evaluation and reporting tools such as King III, Benchmark and the JSE SRI/FTSE Russel ESG rating. A key reflection of this is shift in the composition of business market value. As can be seen from Figure 5 the share of market value of the Standard and Poor top 500 listed companies has comprehensively shifted away from tangle assets, such as fixed capital, towards intangible assets like environmental and social impact, governance concerns relating to both staff management and engagement with the state, intellectual property and brand recognition.

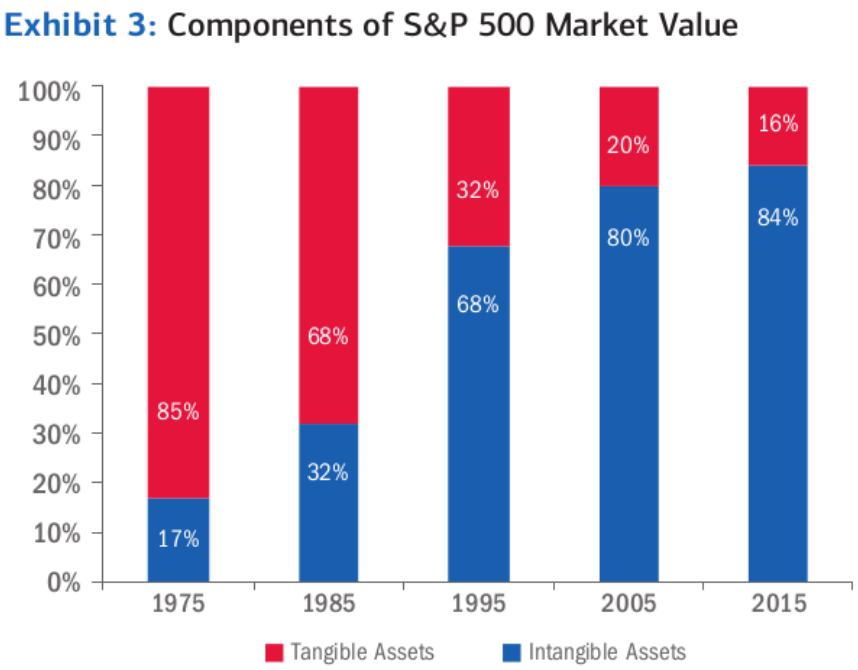


Figure 6: relative share value across assets (JP Morgan 2015)

Companies that have failed to respond appropriately to the shift in focus from consumer and share-holders have very often learned the hard way what happens when these issues are ignored as can be seen by Figure 6 which shows the share price impacts of BP's Deep Horizon disaster on their share price as well as Figure 7 which shows the share price impacts of Volkswagens emissions scandal.

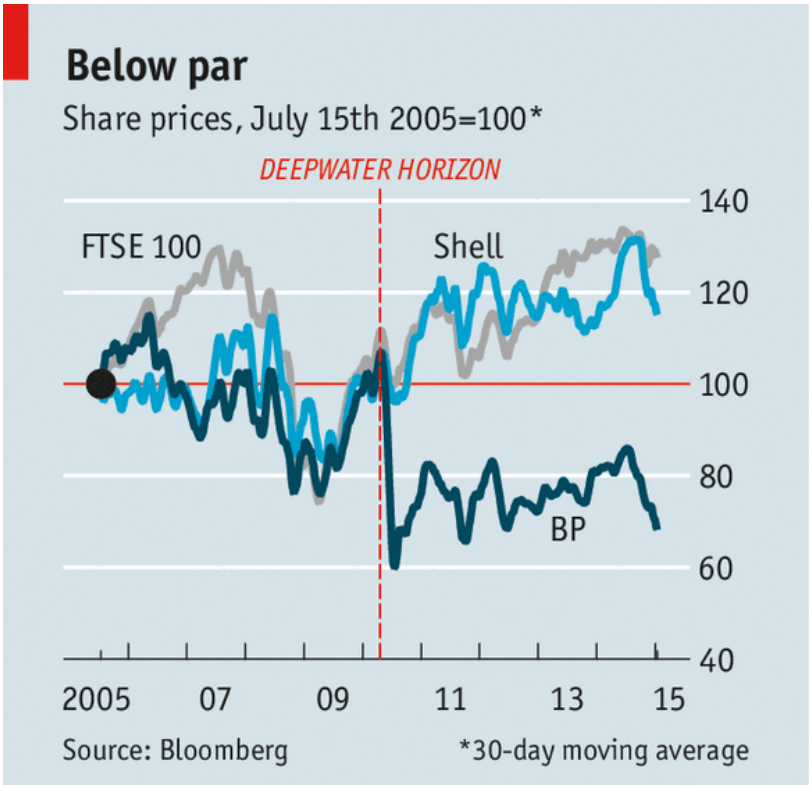


Figure 7: BP share price impact of Deep Horizon disaster (Economist 2015)

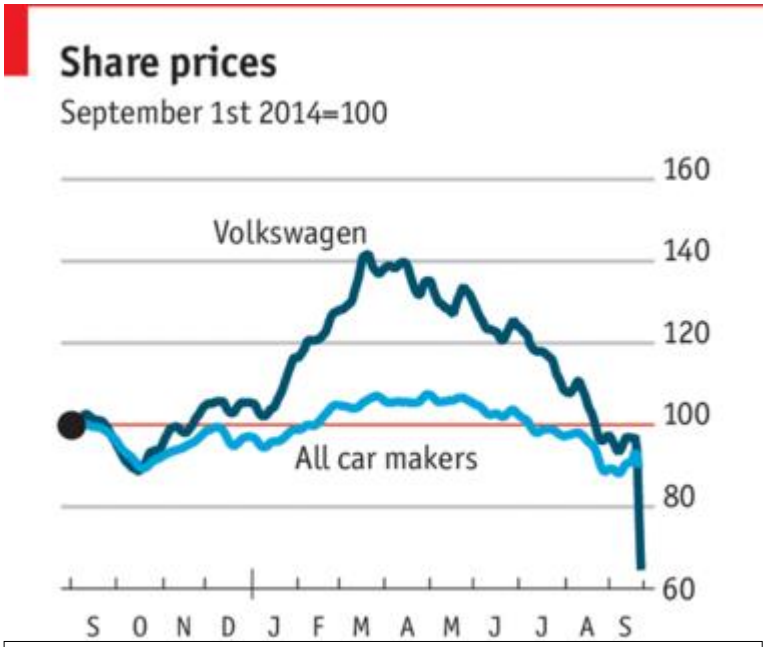


Figure 8: Volkswagen share price impacts of the emissions scandal (Economist 2015)

The pressure to incorporate these changes has also spread across to the financial sector as well, largely due to fossil fuel divestment campaigns targeted at major players in the finance sector both within South Africa and abroad by organisations such as 350.org and Greenpeace. All of these pressures combined have resulted in an incredibly favourable environment for new profit generating enterprises that require new ways of thinking from both investors and investees.

Chapter 2 – The state of South African ecosystems

In 2014 the "safe and just operating space for humanity" methodology developed by the Stockholm Research Centre was applied to the South African environment, the outcomes of this are graphically depicted in Figure 8 (Cole *et al* 2014).



Figure 9: South African ecosystem states relative to boundaries. *(Cole et al 2014)*

The results of the application of this methodology shows that in four of our key environmental areas we have already exceeded the boundaries for sustainable use; ie: we are consuming our natural capital. In particular freshwater use (exceeded by 34%) and biodiversity loss (exceeded by 37%) have dire implications for sustained agricultural and forestry practices. Other areas of environmental stress include arable land-use and phosphorous loading which are both within 10% of their boundaries.

According to Scotcher (2009) the largest driver of ecosystem and biodiversity loss globally is land transformation. Conversion to urban usage, forestry and agriculture has taken place on almost 30% of the earth's landmass. In the South African situation around 35% of the country's ecosystems and their associated processes and services are already threatened. Of the threatened ecosystems 21 are critically endangered, comprising roughly 5% of the threatened total.

These findings are borne out by the WWF's data on South Africa reflected in the "Living Planet Report" which shows that the country's total ecological footprint is just under the global average of 2,7 global hectares (GHA) per capita (the horizontal line in Figure 9. This is not a metric that the country can be proud of. With arguably the world's highest inequality rate, a rural population of 40% and long term youth unemployment standing at an official rate of 67,3% (Stats SA 2015) it is truly appalling that our per capita consumption should be so high. More disturbingly, according to the Living Planet Index (WWF 2012) in 2008 our total global average biocapacity was only 1,78 GHA per capita which means we are using around 30% more than we should be, while still leaving so many South Africans in abject poverty.

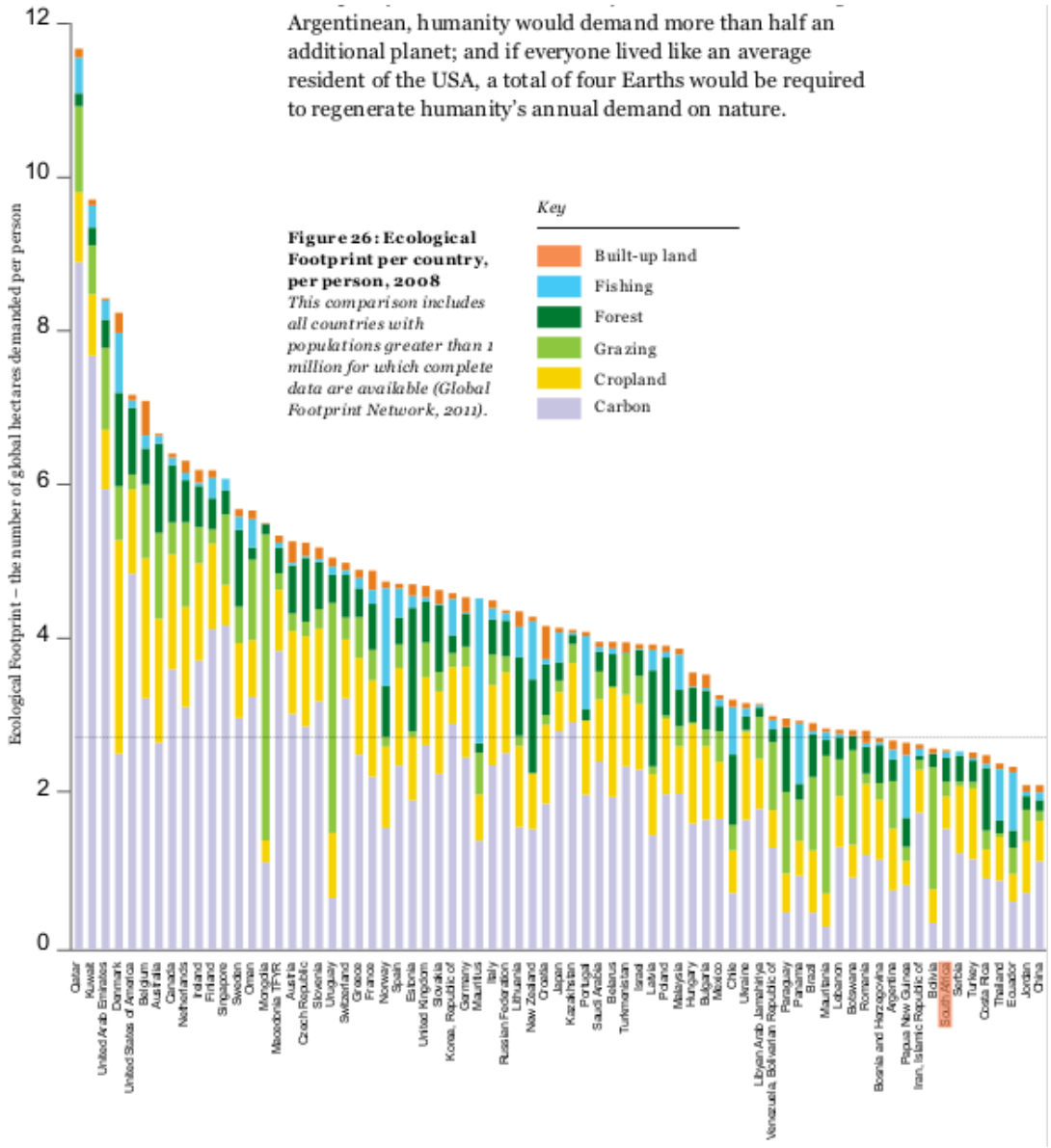


Figure 10: Ecological footprints by country. (Living Planet 2012)

In addition to this broad overview of South Africa's environmental standing the South African National Biodiversity Institute conducted the National Biodiversity Assessment in 2011 (SANBI 2011). This in-depth analyses of all of the country's available data on our various ecosystem types shows that 40% of South Africa's terrestrial ecosystems are classified as vulnerable and 20% as endangered (Figure 10). The NBA also suggests that at the present rate of loss large sections of the country are at risk of becoming critically endangered if drastic action is not taken to address biodiversity loss and ecosystem degradation. The report also maps protected areas and results from this analyses show that around 80% of all inland ecosystem types are poorly protected.

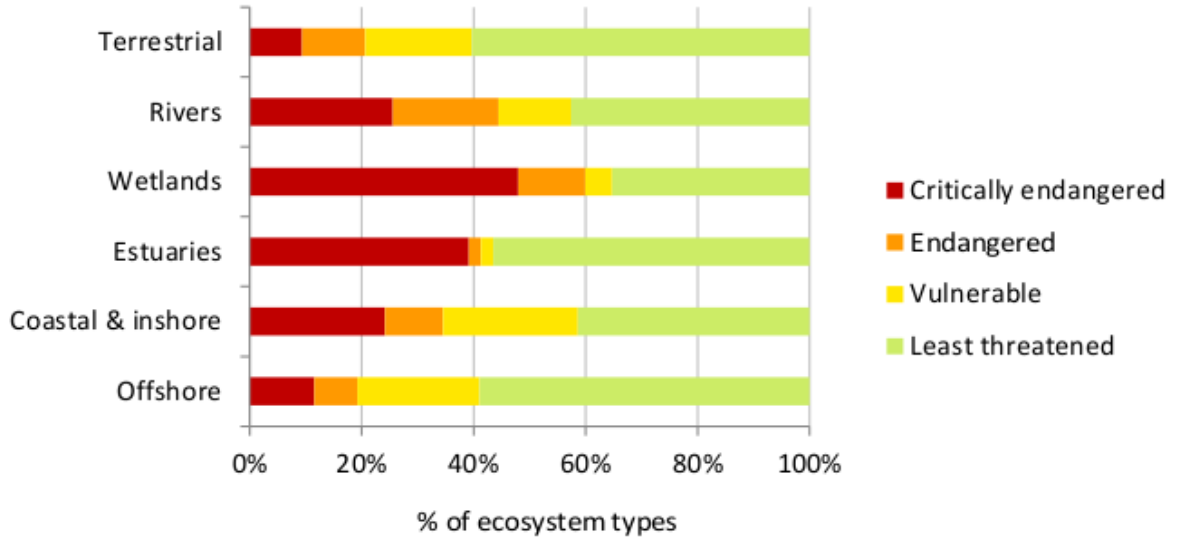


Figure 11: Status of ecosystem types. (NBA 2011)

Areas of priority focus for the sustained productivity of ecosystem services include our high water yield areas which make up less than 4% of our total land mass, but which are critically under-protected with only 18% having any formal protection. This is particularly alarming as 98,4% of the country's available water supplies are presently being consumed (TIPS 2008), with agriculture as the single largest use sector at 60% consumption of the available amount.

Despite a strong history of conservation initiatives in South Africa, including having proclaimed the second oldest nature reserve in the world (Hluhluwe/Imfolozi), the random, patchwork approach to environmental conservation has left many of our ecosystems and biodiversity hotspots at risk. This is particularly so as conservation efforts have usually been focused on areas that yielded the highest potential for immediate financial gain, especially through wildlife related activities, or in areas of particular scenic beauty. This approach however does not make allowance for a whole range of critical biodiversity areas that yield highly valuable services, resulting in a situation where conservation initiatives are not representative of the true value of the range of ecosystems that we derive benefit from. It therefore stands to reason that around half of the country's land based ecosystems either have low or no protection in place.

For the majority of South Africans when reference is made to the economic imperative of preserving the integrity of ecosystems and sustaining biodiversity the immediate thought is how it relates to our tourism industry. Indeed the industry accounts for over 8% of GDP and makes provision for an additional 3 hectares of protected areas for every hectare of state protected land (DEA 2004) but there are however other economic sectors where our biodiversity assets play a very important role that often get overlooked. As Shackleton (2004) points out the role of non-timber forestry products in rural livelihood security is an often overlooked component of coping mechanisms employed by up to 40% of South African households. From edible insects and plants, to honey, grasses, building materials, bushmeat, firewood and much more the direct use financial value to rural households in particular of non-timber forest products is considerable. Shackleton's review of villages in the Eastern Cape, Limpopo and Kwa-Zulu Natal showed that direct-use values could be as high as R12 000 per household per annum with an average of R3 854.

While definitive numbers are lacking, the National Biodiversity Assessment estimates that there are between 9 and 12 million people in South Africa accessing forest, savanna, wetland and river ecosystems for forestry products. They estimate that the financial value attributable to the extraction of these resources is at least R8 billion per year, a value that is comparable to competing land uses.

The role of medicinal plants is a related sector that cuts across both rural and urban areas. With over 27 million consumers within the traditional medicine market in South Africa (and many more interconnected markets in other parts of the SADC region) making use of some 771 species to the tune of R2,9 Billion per annum (Mander et al 2007) present extraction rates are simply not sustainable, particularly as harvesting is fatal to the plant in around 90% of the cases. At present the plants are harvested from the wild, with the most sought-after species reaching local extinction quickly and subsequently being exchanged at very high prices. According to Mander: "*Much of the current research and development effort focuses on novel drugs research, with little effort being directed at improving the current harvesting, production, processing, storage and treatment technology.*".

Other concerning trends include the incremental spread of alien invasive species around the country. The total area infested by invasive alien plants in South Africa doubled between the mid-1990s and 2007, from 10 million hectares to 20 million hectares in 2007 and at least R6.5 billion of ecosystem services are lost every year as a result (NBA 2011). This provides a significant motivation to scale up natural resource management programmes dealing with the clearing of alien vegetation such as Working for Water, especially given the associated job creation and ecosystem service benefits. In some parts of the country, rates of natural habitat and biodiversity loss are so high that by 2050 it is expected that there will be no natural habitat whatsoever outside of protected areas in Gauteng, North West and Kwa-Zulu Natal.

This status quo is clearly in need of urgent remedy and initiatives launched by the South African Biodiversity Institute (SANBI) and the Department of Environmental Affairs (DEA) are helping to pave the way for improved protection of our ecosystems. Since 2004 SANBI has made enormous progress in identifying, analysing and mapping our ecosystems while DEA has developed Biodiversity stewardship programmes where private land is brought under protection by partnering with the title

holder to conserve the land in exchange for support services and tax benefits (NBA 2011). There have also been various innovations with regards to other tax regulations while offset programmes are clearly reflecting awareness by the state that this field is one that warrants serious attention. Now is the time for the private sector to begin to share the urgency of this field of action and develop initiatives that make both environmental and business sense.

Chapter 3 – The argument for private investment in ecosystem infrastructure in South Africa

There are many actors within the socio-environmental justice and conservation sectors that are deeply suspicious of the growing market that revolves around payment for ecosystem services (PES). It is crucial to note before conducting an analyses of investment in ecosystem services that many of their concerns are very justified and as such it would be irresponsible to avoid making mention of them right at the start. While a number of issues can surface in the implementation of an ecosystem investment project, authors such as Richards (2007) and Kronenberg (2013) point out issues related to exclusion, equity and the right to develop as central concerns related to this field. In the development of viable business models investors should be wary of some of the potential negative impacts that can occur as a result of incautious project development, which may lead to long-term social instability around a project, or reputational damage to the firm.

Issues of exclusion are relevant in two very important ways. The first one relates to the "free-rider" problem. This problem revolves around the difficulty in ensuring that all of the beneficiaries of investment in ecosystem infrastructure contribute their fair share towards its conservation. On the one hand the free-rider problem plays a considerable role in limiting private investment as one firm that seeks to invest in infrastructure that another firm may benefit from without any form of outlay, takes on an automatic competitive disadvantage. On the other hand, it is clearly unjust to exclude poor, rural community members from access to natural resources simply because they do not contribute towards the upkeep of the system. Certainly determining who gets excluded from benefiting from the project, and on what basis, is a key factor that must be well considered and planned for in the conceptual stages of project development.

A related issue is that of equity, which is also a critical feature in the project design. When resources start to flow into any location, specifically rural ones, there is an almost inevitable outcome of creating winners and losers. While issues around excludability relate to who benefits from the outputs of the project, equity issues are more specific to how project resources are allocated. In rural project areas, particularly ones working with small-scale farmers, the creation of what is often referred to as the "tall daisy syndrome" can be deeply problematic.

Lastly, the right to develop refers to the issue raised when outside stakeholders (investors) interfere in the developmental ambitions of states and or local populations. Most developed countries (where the vast majority of impact investors are located) have achieved their developed status by massive exploitation of natural resources, very often decimating ecosystem infrastructure in the process. This has led to the present core- periphery model of both the global economy and national economies,

where at the international level the most developed countries extract resources they no longer have from the least developed countries and at a national level, where urban centres extract resources from rural areas. Investment projects, however well intentioned, that conserve natural capital, may make intrinsic sense to external parties but may run contrary to local developmental ambitions that prioritise natural resource exploitation.

In essence, all of these problems speak to the need for effective consultation with affected parties, which is to say that overlooking the social components of project development can easily lead to fatal flaws. Addressing these problems forms a key part of Chapter 6.

Given the critical nature of sustaining ecosystem services in South Africa, and indeed around the globe, it would seem logical that states should be investing considerable resources in pursuit of their conservation and restoration. Indeed this paper has numerous examples of where the state is actively engaged in ecosystem preservation, however in South Africa 80% of land is under one form of agricultural production or another (Scotcher 2009), the vast majority of which not being state land. As a result 80% of the responsibility for managing the inland ecosystems in the country must accrue to private individuals and firms conducting agricultural activities. While we all derive benefit from the ecosystems on their land, only 40% of the South African population is rurally based. This means that the 60% of us that live in the urban areas derive benefit from the ecosystem services that the farmers are the custodians of, without meaningfully contributing to the conservation of these resources.

This leads to a net transfer of public value in the form of unpaid for ecosystem services into private hands via business supply chains, with this transfer working in the direction from rural to urban. Recognising this situation however does nothing to remedy it and as such the shortfall in the levels of private investment directed towards sustaining ecosystem services persists, in part because of business concerns around the "free-rider" problem already mentioned and in part because it is a "free" value addition.

There are other reasons advanced for why attracting private investment in public goods has been under-resourced in the past. Wiles (2014) states that the primary reason that the investment shortfall persists is that private investors do not operate with a social or environmental mandate, but rather are fundamentally profit driven. Similarly Mead and Mcvittie (2008) point out that businesses are very often forced to choose between two often mutually opposing forces, financial returns and morality. The biggest determinants in making that choice being whether competitive advantage can be conferred by choosing a moral line, particularly with regards to environmental or social impacts and how easily that advantage can be communicated to stakeholders.

New business models that sustain the profitability of the private sector while investing in the natural capital that provides such a significant financial base for private activities are clearly required. Indeed this requirement for sustained profits in the face of a crisis is leading to a new kind of thinking that carries the seeds of a workable solution. Traditional investor logic suggests that investment should be directed towards the factor that limits growth. In the past this factor has normally been physical capital or labour. That is to say, if a firm wished to increase profitability it would invest in more workers to cut trees, or more tractors to plough the land. This situation has reversed with the limiting

factor now being the resources that capital and labour were previously directed to exploit. Simply put, if private businesses wish to sustain their profitability they need to develop mechanisms to invest in the limiting factor, ie; ecosystem services.

In 2013 the Network for Business Sustainability South Africa released a report that listed eight questions that define the sustainability challenges faced by leading South African companies (NBS 2013). Of these questions 3 in particular stand out as critical areas of business innovation that investors should be looking at to spot companies that will perform well in environmental metrics over time.

1. How can business engage in medium and long-term strategic planning that is linked to a shared vision for a sustainable future (in South Africa)?
2. How can companies integrate sustainability into strategies and business models?
3. How can companies create sustainable supply chains in the South African context?

Much of this perception around the challenges stems from two sources. Given the highly business and financial management nature of senior management there is most often a distinct lack of understanding with regards to a business's environmental impact, or it's dependencies upon the environment. A review of existing ESG evaluation strategies from JSE listed companies reflects a highly limited understanding of the risks posed to companies by environmental concerns. There is clear potential for corporate value chain analyses to identify keystone value chain components with a vulnerability assessment of the ecosystems that support these keystone components, linked to an evaluation of the elasticity of demand of the products derivable from those keystone components. As of yet, none of the firm involved in monitoring and evaluation of ESG metric for FTSE Russel offer this service.

The purpose of this paper is to suggest solutions to these questions and to identify key areas of opportunity for private investment in ecosystem infrastructure in South Africa that have the potential to yield market competitive returns. To achieve this end this paper analyses the status quo with regards to the national ecosystem infrastructure base (natural capital) and offers business case arguments for private investment in these assets. The product of investments in ecosystem infrastructure include value streams attainable from sources such as soil carbon capture, forestry products, crop production, livestock, biodiversity offsets and water provision. All of these products are direct outputs of our ecosystem services and all of which not only have considerable financial value, but are in fact imperative for the continued existence of society. To support this business case argument a number of different models have been identified that have been employed by the state, Development Finance Institutions (DFI's) or private actors which can be reworked for broader application (either individually or in combination) by businesses keen to invest in this field.

While the cultural service value of South African ecosystems is recognised, especially with regards to the contribution of eco-tourism towards ecosystem services preservation, this paper has elected to apply a focus that limits its analyses to provisioning and maintenance and regulating services. This has been done as a result of the well-established and understood relationship between tourism and conservation and in recognition of the fact that further analyses of the sector here is unlikely to yield

many new insights. Additionally, given that over 70% of the financial value of total ecosystem services in South Africa resides with provisioning and maintenance and regulating services (Turpie 2008) there is ample reason to focus on these two areas.

This level of focus provides a key departure point for what is referred to as biodiversity business, which is defined as: “Commercial enterprise that generates profits through production processes which conserve biodiversity, use biological resources sustainably and share the benefits arising out of this use equitably.” (Bishop 2008). This definition is in-line with the three broad goals of the United Nations Convention on Biological Diversity (CBD), which calls for increased involvement of the private sector in biodiversity conservation, sustainable use and equitable benefit sharing.

In 2014 JP Morgan Chase supported the Nature Conservancy to produce a report under a new initiative called Naturevest (2014) which focused on conservation finance, a major enabler of biodiversity business. Titled “Investing in conservation: a landscape assessment of an emerging market” the report interviewed 56 investors active in conservation finance. Cumulatively these investors were responsible for around 1300 transaction between 2004 and 2013.

The report tracked some USD 23.4 billion in conservation finance over the four year period between 2009 and 2013 and found evidence of rapid growth in the sector from increased interest in the market. While it is important to note that DFI investments totalled USD 21.5 billion of this amount it is equally important to note that private investment grew at a rate of 26% per annum over the period. The conclusions of the report project the disbursement of USD 1.5 billion worth of already raised capital, with a further USD 4.1 billion expected in new investments by 2018. Thus far, sustainable food and fibre production projects, including forestry and agriculture, have accounted for two-thirds of all private conservation investment, but the market is far from saturated.

While private investments in sustainable agriculture are experiencing especially rapid growth, increasing from USD 67 million in 2004-2008 to USD472 million in 2009-2013, surveyed investors reported challenges commensurate with an immature market including issues such as shortages of investment prospects with suitable risk-return profiles and experienced management teams and a lack of standardised impact metrics.

Chapter 4 - The small-scale AFOLU approach to ecosystem service investment

4.1: Why Agriculture, forestry and other land-use (AFOLU)?

The field of study with regards to ecosystem infrastructure is a broad one and includes terrestrial, river, wetland, estuarine, coastal and inshore, and offshore environments. Unfortunately this field is too broad for this paper and as such the focus of the study will prioritise ecosystem services affected by the Agriculture, Forestry and other Land-use (AfoLU) sector. The term AFOLU was coined in 2006 by the intergovernmental Panel on Climate Change (IPCC 2006) guidelines designating the various categories of activities which produce anthropogenic greenhouse gas emissions GHG's. AFOLU is a combination of two previously separate sectors LULUCF (Land Use, Land Use Change and Forestry) and Agriculture. The motivation for choosing this particular field of study (as opposed to one focused

on marine based ecosystems) is well summed-up by the World Business Council for Sustainable Development: *"WBCSD and its members have identified a number of business solutions that can contribute to achieving these targets* (the Action2020 Platform for Action)*. Their common feature is that they all require a landscape approach, i.e. to consider the multi-functionality of landscapes. The global demand for food, feed, fibre, biofuel and biochemicals is rapidly growing, which increases competition between these different sectors for one of the most precious resources: land."* Similarly, WWF has listed food as having the largest ecological footprint in its One Planet Business report (WWF 2007) as a result of the impacts at the production level as well as at the level of consumption, including issues related to fossil fuel inputs, carbon emissions, pesticide use, soil degradation, packaging, food miles and unnecessary waste.

The agricultural sector in South Africa is not only a key earner of foreign exchange, but it is also a key employment sector and source of livelihoods with over 1 million employees in the commercial sector and over 240 000 small scale farmers who further support over a million people, according to the National Strategic Plan for Agriculture (DAFF 2012). While the sector clearly plays a key role in employment and livelihood generation it is already struggling to ensure the food security of our nation, with Oxfam South Africa reporting that 1 in 4 South Africans is in fact food insecure (Oxfam 2015). At a global level agriculture as a sector must contend with a significant increase in demand over the next 35 years as the global population is expected to swell from 7 Billion at present to 9,7 Billion by 2050 (Scotcher 2009) with much of this taking place in Africa and as such urgent development of this sector is required.

The United Nations Environment Programme (UNEP 2011) has calculated the return on investment for affecting the transition to sustainable agricultural systems at a global level over the next 35 years as seen in Table 4. As can be seen, the benefits of investment in this sector extend far beyond increased return to financial capital. Production, employment, calorie intake are all increased, soil quality is improved and water consumption and deforestation are decreased. Not listed in the table are additional benefits resulting from ecosystem conservation, carbon emission reductions and local economic multipliers resulting from increased local production and consumption.

Year	2011	2030		2050	
Scenario	Base year	Green	BAU[a]	Green	BAU[a]
Agricultural production ($ billion/yr)	1,921	2,421	2,268	2,852	2,559
Crops ($ billion/yr)	629	836	795	996	913
Livestock ($ billion/yr)	439	590	588	726	715
Fisheries ($ billion/yr)	106	76	83	91	61
Employment (millions)	1,075	1,393	1,371	1,703	1,656
Soil quality (Dmnl)	0.92	0.97	0.8	1.03	0.73
Agriculture water use (KM3/yr)	3,389	3,526	4,276	3,207	4,878
Harvested land (billions of ha)	1.2	1.25	1.27	1.26	1.31
Deforestation (millions of ha/yr)	16	7	15	7	15
Calories per capita/day (kcal) available for supply	2,787	3,093	3,050	3,382	3,273
Calories per capita/day (kcal) available for household consumption	2,081	2,305	2,315	2,524	2,476

Source: UNEP, 2011.
Note: [a] BAU= business as usual (scenario).

Table 3: Impact of green investments in agriculture (at 0.16% of GDP). (UNEP 2011)

According to JP Morgan (2015), impact investments in agriculture can assume a number of different approaches that assist poor communities to access food. They identify provision of logistical support (such as storage and distribution), aggregation of small farmer produce for increased market share as two highly promising areas for benefit and return.

Sustaining profitability within the sector however is dependent on not only targeted investment in direct production and marketing support, but also in maintaining the ecosystem services that the sector is dependent upon. TIPS (2008) provides examples for the Western Cape deciduous fruit industry where it is estimated that wild pollinators contribute between R331 and R2096 million worth of value. Similarly, the financial value of grazing land in grassland biomes in South Africa is estimated to be worth around R8712/km2. Natural landscapes contribute between R376/km2 and R2943/km2.

Projections by investment analysts such as the Mckinsey Global Institute (GIIN 2015) for growth sectors in the African economy as a whole place agriculture as the 3rd largest industry on the continent by 2020, with revenue expected to be in the region of USD 500 billion. This is hardly surprising as Africa holds 20% of the global land mass, along with 60% of the world's uncultivated arable land. In the South African situation there is essentially a dual agricultural economy in place. There is both a well -developed commercial, agro-industrial farming sector which is constituted by approximately 40 000 commercial farmers and an underdeveloped small-scale or subsistence sector that is constituted by around 240 000 farmers (NDA 2012).

While agriculture presently occupies a small and shrinking percentage of GDP at around 3% of the total, it is important to note that this is largely because the sector has not grown as fast as the rest of the economy. In fact, Scotcher (2009) points out that primary agriculture has continued to grow at around 13.9% per annum ever since the 1970's, but given that the total economy has grown at an average of 14.5% over the same period agriculture appears to be a shrinking sector by comparison. It remains a key employer and in a country with a massive shortage of skills provides significant opportunities for labour absorption. Despite the shrinking share of GDP, farmland based investments have an impressive record of providing above market average returns on investment as Figure 11 reflects.

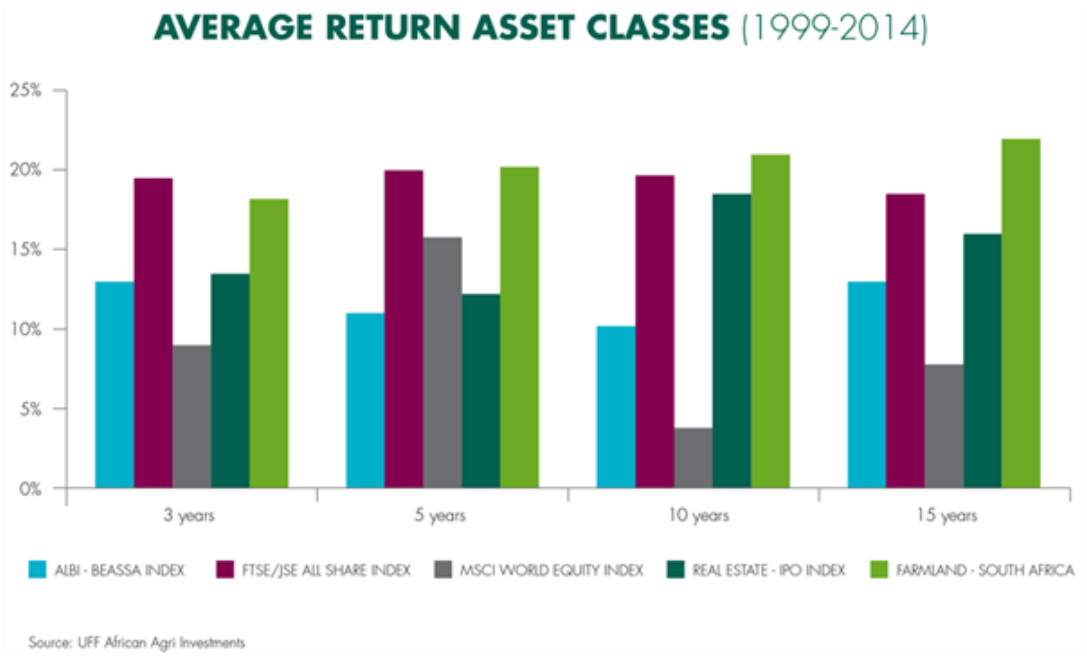


Figure 12: Average return across asset classes in South Africa. (Futuregrowth 2015)

However, it must be noted that this impressive ROI track-record pertains to large-scale commercial agriculture and forestry, and not to the small-scale landholder sector. This paper has already argued why it is necessary to focus on small-scale landholders if we are to preserve our ecosystem goods and services in South Africa. Doing so with private capital however necessitates integrating small-scale producers of crops, livestock, timber, fibre and other AFOLU products into commercial value chains, and by doing so profitably.

While a vital source of livelihoods the AFOLU sector is also a major driving force behind the degradation of the ecosystem services that it is dependent upon. Existing areas of production are already being negatively impacted by a number of disrupting forces such as climate change, input

scarcity and soil degradation. Add to this the fact that rapidly increasing species extinction rates are resulting in increasing pressures on states and the private sector to declare ever more land (and marine areas) as protected areas. The implications are inescapable. Presently un-utilised pieces of arable land must be brought into productive use and existing farmed land needs to have its productive potential maximised. This must all take place in an environment of relative food price stability if the stability of nation states is to be preserved as Figure 12 shows.

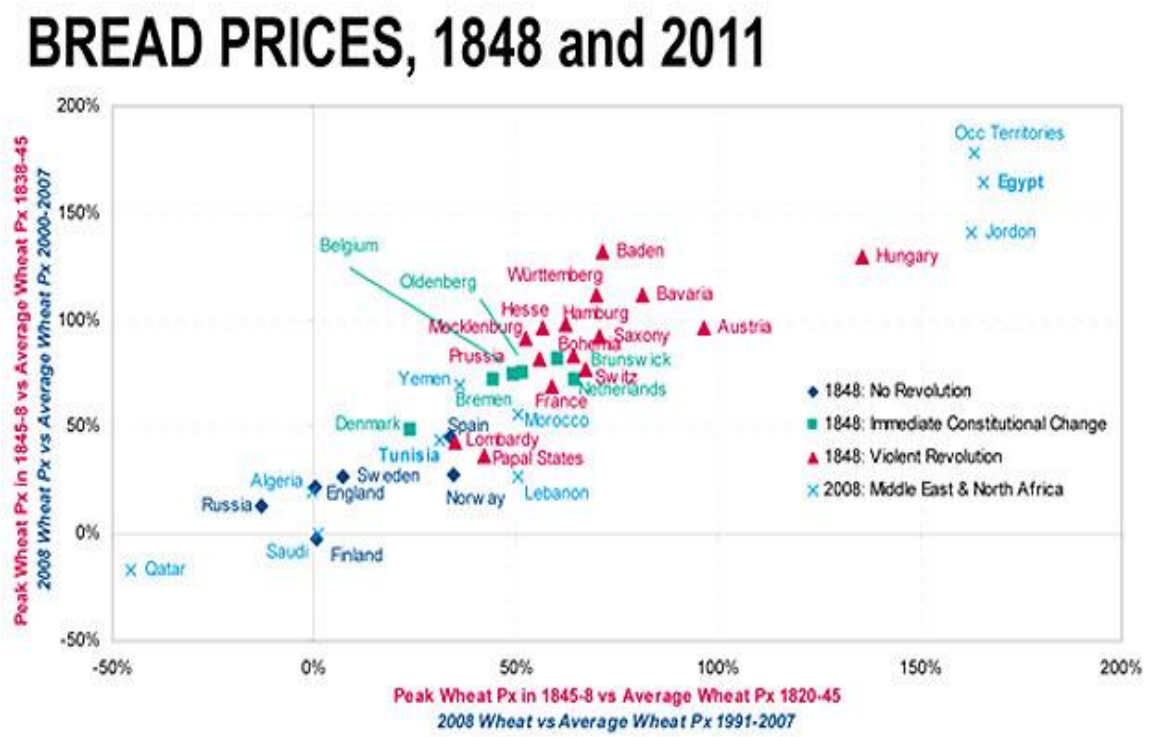


Figure 13: The link between bread prices and revolution. (Mason 2012)

As it stands however South Africa is not off to a good start. Since 1994 the state has purchased some 6 million hectares of land on productive farms as part of its land reform process, 90% of which has now become unproductive, with 50% of this having now degraded to the point where commercial rehabilitation is no longer viable (Futuregrowth 2011).

The 2014 study by Naturevest (2014) of the 5 year period leading up to 2013 showed that of the top 10 investors surveyed in a study of USD1,9 Billion worth of conservation impact-investment assets (accounting for 80% of the total investment amount), all except the third largest investor were for profit institutions investing in real assets, and with a fair amount of experience in the sector. Conservation impact investment is still relatively unknown, yet 8 of the top 10 had begun investing in the sector before 2008 when the study started. The primary focus of the investment was in land for forestry and agriculture projects, and tended to be large scale. This form of investment is paralleled

by a similar strategy followed by the likes of Old Mutual in South Africa whose UFF investment fund. The essence of the fund is to focus on large agricultural projects (in the region of R100 Million each) which will appoint a large scale agricultural industry player to operate the farm on a profitable and sustainable basis. These operators are specifically selected as a result of their ability to control the whole value chain from the land to the end buyer including all processing. The term of the fund is 10 to 12 years and appreciates along with the increasing value of prime agricultural land. The operators are also required to pay a lease fee which further helps to ensure adequate returns to the investor while protecting against some of the inherent risk associated with primary agriculture. Needless to say this model is not compatible with small-scale land ownership, but principles derivable from this example are examined in Chapter 8.

Global agriculture and forestry is the single largest contributor of total Greenhouse Gas (GHG) emissions according to the IPCC (2006), even larger than the energy sector. In the South African setting while agricultural emissions are small in comparison to the energy sector, the White paper on Climate Change (DEA 2011) estimates that Agriculture contributes over 21 000 tons of CO2 emissions per annum. With the exception of Angola this figure means that South Africa's agricultural emissions alone are larger than any of the other SADC countries total emissions from all sectors.

At COP 17 President Zuma launched the concept of "Climate Smart Agriculture" which has the broad aims of increasing productivity of the sector, while increasing climate resilience and stimulating an inclusive economy. There is much value in pursuing these goals, but it must be stated that that lack of implementation and capacitation at small scale farmer level is undermining the achievement of this goal. South Africa's position with regards to agriculture is based on the National Development Plan that states that Rural development will be "driven by an expansion of irrigated agriculture", which while desirable in some respects is highly questionable as South Africa has already allocated 98.4% of its available fresh water (TIPS 2008).

To make matters worse Scotcher (2009) states that agriculture is the largest single non-point source of water pollutants in South Africa. Poorly managed farms allow pesticides, herbicides, poisons, nutrients (from fertilisers and manure) and sediments to drain into groundwater, rivers, lakes and coastal zones. Pesticides from every chemical class have been detected in groundwater and are widespread in the nation's surface waters. In many areas water is not only un-potable but is so polluted that it cannot be used for irrigation.

4.2: Why small-scale farmers?

A further refinement for this paper has been added in the form of a small-scale farmer focus. A major issue with this refinement however is the difficulty in defining what a small-scale farmer is. Developing a clear picture of what is meant by "small-scale" farmers is crucial to an understanding of just who investment in this sector needs to address. There is very often a perception that small-scale farmers are mostly subsistence producers on small pieces of very often marginal land in the former homeland areas, who employ manual, family labour to meet their basic nutritional needs. This narrow definition needs to be done away with. While it is true that at the lowest level of production

there are pure subsistence farmers who produce entirely for household consumption, on the higher end of the small-scale production spectrum there are farmers who produce almost entirely for commercial markets. Assuming that small-scale farmers are defined by the size of their land-holdings does not provide much clarity either. As Kirsten and Van Zyl (1998) argue almost 25% of white commercial farms cover land areas of less than 200 hectares, with around 5% being even smaller than 10 hectares. They point out one hectare of irrigated peri-urban land used for mixed crop purposes has a higher possible profit yield potential than 500 hectares of low-productive potential land in the Karoo.

It is also often assumed that small-scale farmers are intrinsically less capable of meeting productive yields attained by commercial farmers. In fact studies dating back to the early 90's show either no correlation or indeed a negative correlation between productive yield, farm scale and level of capital intensity (Lipton et al. 1996). This is primarily due to the fact that small-scale farmers are better positioned to take advantage of a number of yield maximising techniques such as inter-cropping, improving soil quality and utilising sections of marginal land. In addition to this small-scale farmers ability to maximise Energy Return on Energy Investment (EROI) in terms of calorific return on joules invested particularly with regards to fossil fuel inputs, is incomparable.

For the purposes of this paper Kirsten and Van Zyl's (1998) definition of small-scale farmers has been adopted and modified "A farmer whose scale of operation is too small to attract the provision of the services he/she needs to be able to significantly increase his/her productivity *under prevailing market prices*". This paper will focus on the country's small-scale farmers as these are the stakeholders that are most able to impact ecosystem services as the custodians of the land which holds the highest ecosystem service values as can be seen from inspection of Figure 13, Figure 14 and Figure 15.

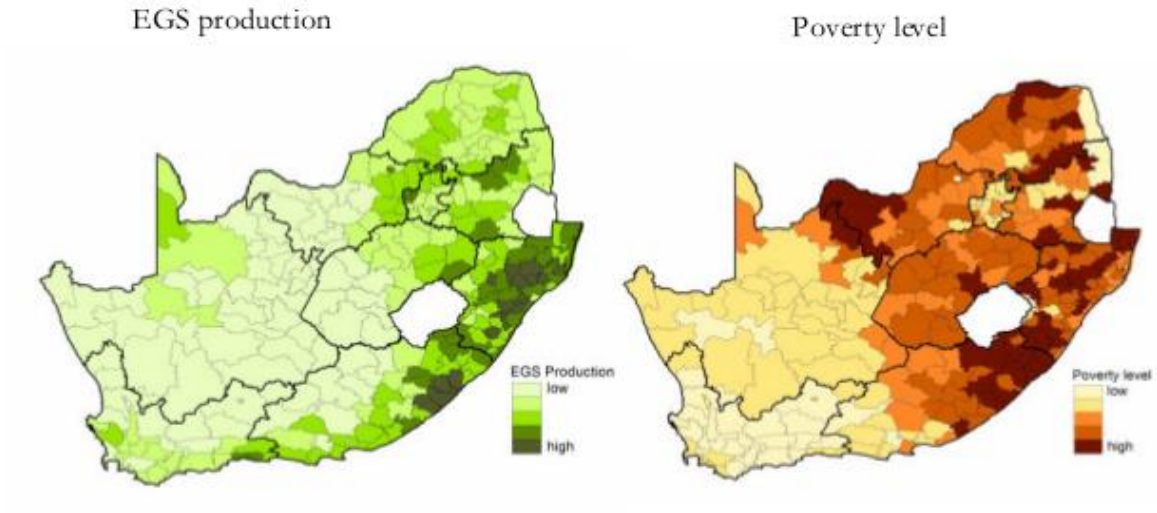


Figure 14: Ecosystem service production and poverty at municipal level. (CSA 2012)

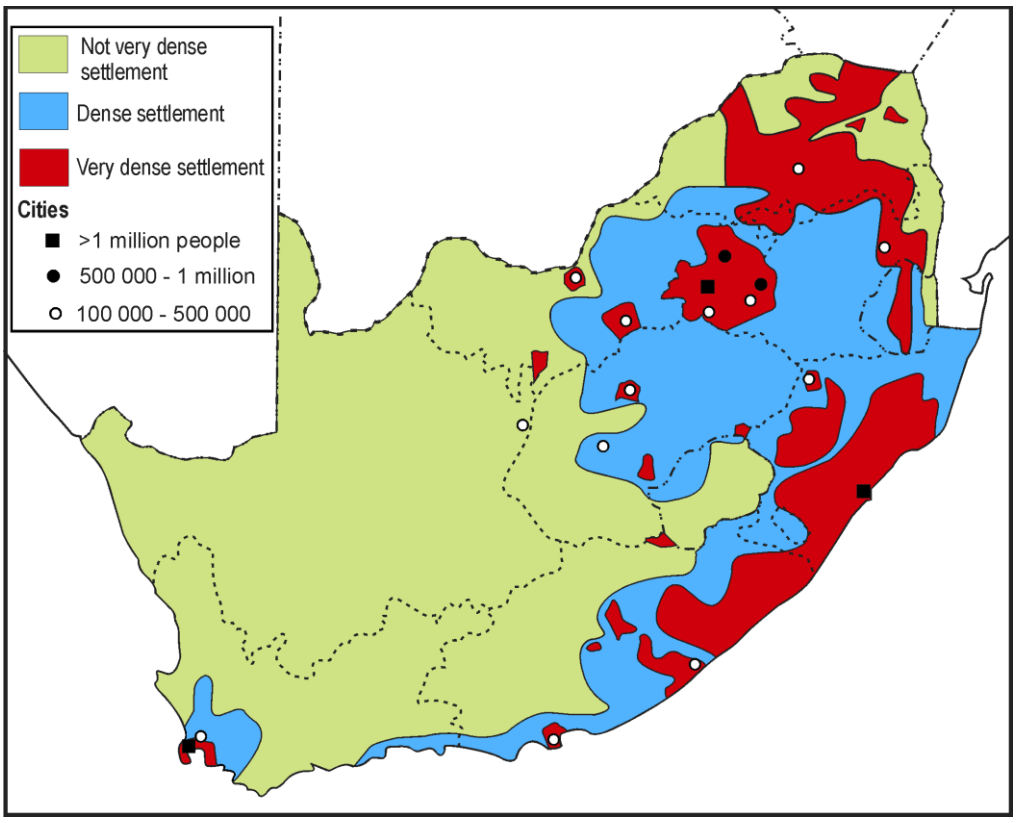


Figure 15: Population density of South Africa (OpenStax 2016)

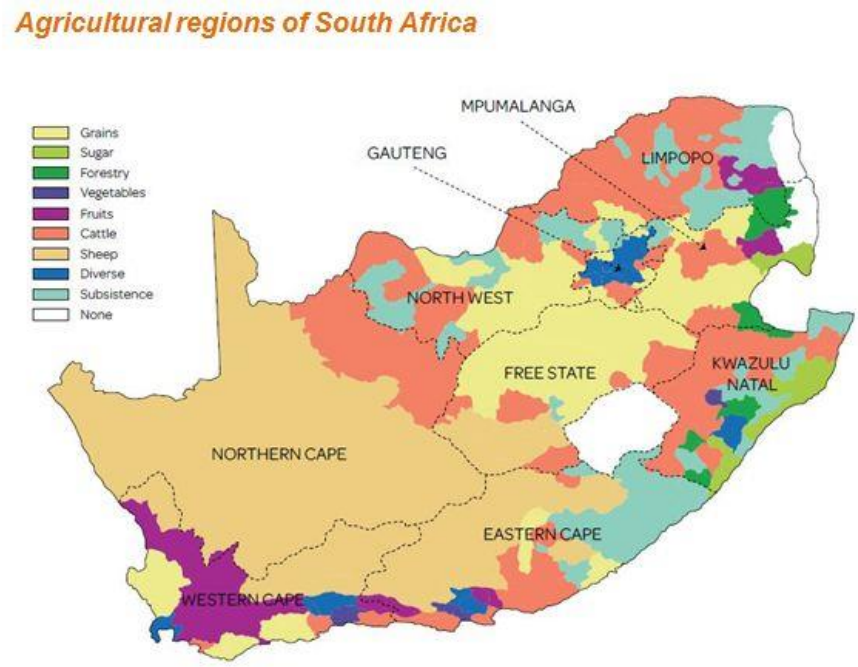


Figure 16: Agricultural regions of South Africa (Jooste 2013)

Even the most cursory observation of Figures 14 and 15 leads one to the inescapable fact that the critical areas for the provision of environmental goods and services correlate almost exactly with the area's most populous with subsistence farmers (the Jooste does not distinguish between subsistence farmers and small-scale farmers).

The second reason for selecting small-scale farmers is for the critical role they play in developing sustainable agricultural systems. The UNCTAD Trade and Environment Review (2013) states that: "The world needs a paradigm shift in agricultural development: from a "green revolution" to an "ecological intensification" approach. This implies a rapid and significant shift from conventional, monoculture- based and high external-input-dependent industrial production towards mosaics of sustainable, regenerative production systems that also considerably improve the productivity of small-scale farmers. We need to see a move from a linear to a holistic approach in agricultural management, which recognizes that a farmer is not only a producer of agricultural goods, but also a manager of an agro-ecological system that provides a number of public goods and services.

Further to this, the National Climate Change Response white paper (DEA 2011) points out that we are already committed to a future that holds even more water insecurity than we presently have, which suggests that urgent steps are required to address water management of the agricultural sector at both small-scale and commercial levels. Small-scale farmers are particularly vulnerable as they are almost entirely dependent on rain-fed agriculture and as a result are incredibly vulnerable to environmental changes.

Changes within the agricultural sector need to be much more far reaching than just this though. In the FAO's 2011 report "Global Action on Climate Change in Agriculture: Linkages to Food Security, Markets and Trade Policies in Developing Countries" they argue that "*a fundamental rethink of the way agriculture is practised needs to be initiated. Mitigation practices include conservation agriculture, organic agriculture and greater reliance on renewable energy for domestic use in rural households in developing countries. Finding ways to reduce reliance on chemicals and synthetic fertilizers and creating incentives to promote the use of renewable energy throughout the modern agricultural systems is of the utmost urgency and requires concerted policy action*." Small-scale farmers are uniquely well placed to achieve this transition as they are not committed to an agro-industrial development path as of yet firstly, and secondly many of these interventions are simply impractical at an agro-industrial scale.

The fact that this directive comes from organisations such as the FAO and UNCTAD is a clear signal to the South African state that the issue of agricultural transformation needs to be taken seriously and with urgent effect, something that is not happening at present.

At COP 20 The Global Alliance for Climate-Smart Agriculture was launched with the aim of enabling 500 million farmers worldwide to practice climate-smart agriculture by 2030. Despite the creation of African subsidiary bodies, The Africa Climate-Smart Agriculture Alliance and The Africa Union-NEPAD Agriculture Climate Change Programme, and our countries prominent position in the G77, state led

action on this subject aimed at small scale producers is still insufficient. In addition to this, the position of the state with regards to the development of the Global Alliance remains very unclear.

While the Global Alliance makes reference to positive initiatives such as the promotion of various sustainability principles (mulching, intercropping, conservation agriculture, crop rotation, integrated crop-livestock management, improved grazing and improved water management etc.), there are a number of areas that are points of concern if achieving the goal of transitioning towards agro-ecology is concerned. The language that the Global Alliance is adopting focuses on agricultural intensification, Certified Emission Reduction (CER) based carbon offsets, agro-forestry and various other concepts that are oriented towards agro-industry and not small scale agro-ecology.

This is worrying as it suggests that the state believes that only farmers able to operate at scale on large land-holdings are able to succeed in today's agricultural markets. While this topic is worthy of extensive study in itself, this paper takes the position held by such institutions as the FAO, the Poverty Land and Agrarian Institute, UNCTAD and the Africa Research Institute that lack of market access, low levels of production and business support, poor infrastructure, lack of finance, irrigation and price stability are the primary reasons for the failure of this sector to capture market share.

Chapter 5 – The South African state – policy and enablers

The National Development Plan (NDP 2013) has been developed with a high degree of awareness of the environmental challenges faced by the global community*: "Market and policy failures have resulted in the global economy entering a period of "ecological deficit", as natural capital (ground water, marine life, terrestrial biodiversity, crop land and grazing) is being degraded, destroyed, or depleted faster than it can be replenished."*

In addition to this there is recognition of the specific context that we face at home: *"South Africa faces urgent developmental challenges in terms of poverty, unemployment and inequality, and will need to find ways to "decouple" the economy from the environment, to break the links between economic activity, environmental degradation and carbon- intensive energy consumption. In the past, resources were exploited in a way that was deeply unjust and left many communities excluded from economic opportunities and benefits while the natural environment was degraded. The country must now find a way to use its environmental resources to support an economy that enables it to remain competitive, while also meeting the needs of society. Thus, sustainable development is not only economically and socially sustainable, but environmentally sustainable as well."*

In the development of a new, democratic constitution the human right to have the environment protected was affirmed in Section 24 (Act 108 of 1996) of the constitution. Following on from this the white Paper on the Conservation and Sustainable Use of South Africa's Biological Diversity was published in 1997. This was in turn followed by the National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004). The purpose of this act was *"To provide for the management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act, 1998; the protection of species and ecosystems that warrant national protection;*

the sustainable use of indigenous biological resources; the fair and equitable sharing of benefits arising from bio-prospecting involving indigenous biological resources; the establishment and functions of a South African National Biodiversity Institute; and for matters connected therewith".

Having passed the act the National Botanical Institute was mandated with the implementation of the act and SANBI was created later that same year. The National Biodiversity Strategy and Action Plan (NBSAP) was published in 2005 and the framework for its implementation, titled the National Biodiversity Framework (NBF 2009), was published in 2009.

In order to pass the NBF into law Section 35 of the Public Finance Management Act (PFMA), Act 1 of 1999 as amended by 17Act 29 of 1999 requires that, "*new national legislation that assigns an additional function or power to, or imposes any other obligation on, an implementing agency, must, in a memorandum that must be introduced in the Parliament with that legislation, give a projection of the financial implications of that function, power or obligation to the implementing agency."*

The figure provided as a result of this stipulation evaluated the costs over the five year implementation plan at R7,6 Billion (EnAct 2008) and the total value of the assets in question were valued at R73 Billion (Table 3) or 7% of GDP (Turpie et al 2008).

An example provided by Turpie (2008) relates to the wastewater purification services provided by wetlands in the Western Cape. In her case study she shows how both industrial and domestic water born waste passes through wetlands across the region where it is effectively buffered and much of the nutrient load mitigated. An estimate of the cost to replace these services with artificial solutions was conducted by evaluating the quantities of pollutants removed and then determining the cost of the same service as it would be done by a waste water treatment facility. The conclusion was that wetlands provide the equivalent of US$ 12,385/ha in waste water treatment services annually across the region.

TYPE	CLASS	Valuation (Amt in R Millions)
PROVISIONING	Grazing	18094
	Natural Resources	4895
	Bioprospecting	178
REGULATION & MAINTENANCE	Carbon Sequestration	8649
	Pollination)	5684
	Erosion Control	8319
	Flow Regulation	440
	Water Treatment	202
	Black Fly Control	77
	Crop Pest Control	4380
	Nursery Value	976
CULTURAL	Tourism	21 000
	Scientific	15
Overall Value	Biodiversity	**73 Billion**
		Approximately 7% of GDP

Table 4: Economic value of ecosystem services. (TEEB 2012**)**

The financial evaluation went on to point out that the implementing departments had a net shortfall of R3,4 Billion (EnAct 2008) over the 5 year period. This is a sizeable sum of money, which must be covered (and consistently over time as well) if the ecological systems that sustain us are to remain intact. The shortfall could be met by increased taxation, by implementing user-pay principles, appealing to foreign development assistance, increasing the national debt and various other mechanisms, but new mechanisms for raising finance have emerged over the last decade which offers alternative and attractive options.

As Blignaut and Elst (2014) point out the commercial private sector plays the leading role in terms of the use and transformation of natural capital in South Africa. Unfortunately, the private sector has not matched this consumption/transformation of natural capital with an equivalent amount of reinvestment. From a capital theory approach to economic development (Hicks 1946), this makes very bad business sense as the core underlying principle of the theory is that it is essential to keep capital intact. Indeed it is quite contradictory that it has become standard practise for companies to reinvest a depreciation allowance to ensure the non-depletion of the capital stock, but that this reinvestment most often does not extend to its natural resource base. This approach is fundamentally unsustainable and in the words of El Serafy (1989:11) to "liquidate your assets and use the proceeds for consumption, you are living beyond your means, and in doing so you are undermining your ability to create future income".

While the private sector transforms natural capital a great deal it is also subject to the risks and opportunities that come about as a result of changes in ecosystem services. An example of this is the siltation of the water infrastructure on the upper Umzimvubu which has reached 70% of dam capacity in some cases (Marais 2012). According to van Luijk et al (2013) investments in thicket cover in this case will result in the elimination of the loss of the utility of this infrastructure. "Comparing measurements in a grazed area without a thicket canopy to those in an area with intact thicket cover, …it was found that the loss of thicket cover had resulted in an extreme change in soil infiltration rates, a decrease in soil moisture retention, an increase in run-off, and increase in erosion."

Blignaut (2014) makes reference to previous areas of focus with regards to investment in natural capital such as investment in protected areas, offset investments, mitigation or bio-banking investments and payments for ecosystem goods and services (PES). This report follows an inclusive approach where all manner of investments in natural capital are included, with the one defining feature being that they need to have demonstrated financial returns in previous case studies.

5.1 Carbon Offsets

The South African government has committed to reducing the country's greenhouse gas emissions by 34% by 2020 and 42% by 2025 over a business as usual case (which has still not been entirely defined). As part of meeting these targets the state developed the Carbon Tax Bill of 2015. The bill is due to be enacted in January 2017 and will have an initial marginal carbon tax rate of R120 per tonne of CO2e (carbon dioxide equivalent). This will give a significant boost to a domestic carbon market, where those who emit excess carbon can seek to purchase the right to emit this excess carbon by buying someone else's rights, or by buying the carbon that is either captured or avoided through

mitigation or sequestration. This form of carbon trading has great potential to add value to agro-ecology initiatives, particularly those related to agro-forestry.

At present the larger international carbon market (CDM – Clean Development Mechanism) is in abeyance until the Paris agreement determines a new form for a market based carbon offset scheme. In contrast to this there is a small but vibrant voluntary carbon trading market active in South Africa which is represented by highly reputable organisations such as Credible Carbon. These mechanisms allow for independently verified emission reductions and carbon capture projects to deliver tradeable results at favourable prices (R120 per tonne at the present rate). Linking such a mechanism with small-scale farmer initiatives has proven to be a viable source of income in the Baviaanskloof where spekboom thickets have regrown due to changes in agricultural practise. This strategy could also be highly effective in indigenous forest programmes described in the section on timber and non-timber forestry products.

In addition to this a recent FAO study (FAO 2012) analysed datasets from 74 studies which had made comparisons between the carbon sequestration capacity of organic vs. nonorganic farming systems and found that there were "significant differences and higher values for organically farmed soils". This type of carbon sequestration has also received a large boost at the COP 21 negotiations in Paris where the "4 pour 1000" initiative was launched, which aims to mainstream the value component of soil carbon.

5.2 Environmental/Biodiversity offsets

The Department of Environmental Affairs defines environmental offsets as follows: "*An environmental offset is an intervention, or interventions, specifically implemented to counterbalance an adverse environmental impact of land-use change, resource use, discharge, emission or other activity at one location that is implemented at another location to deliver a net environmental benefit.*" (DEA 2015). While highly controversial due to concerns around the "trade-ability" of nature and the potential for the licensing of environmental destruction, bio-diversity offsets have played a role in preserving South African ecosystems on a number of occasions already with a high degree of success.

While an overall national policy determination is still being finalised, two provinces (the Western Cape and Kwa-Zulu Natal) have already developed environmental offset guidelines. Up until recently the Department of Environmental Affairs has framed environmental offsets through the lens of the "mitigation hierarchy", which situates offsets as the least desirable option of the four mitigation actions listed below.

1. Avoid or Prevent: Develop a strategy to avoid or prevent creating the impact in the first place

2. Minimise: In the event that an impact cannot be avoided it should be minimised as much as possible.

3. Rehabilitate: Where damage still occurs developing an effective plan to rehabilitate the site after the development has taken place is the next pre-requisite.

4. Offset: In the event that impacts cannot be rehabilitated subsequent to the project development, developing an appropriate offset plan is the final option.

One of the main problems with this methodology however is that it does not make allowance for strategic priorities. An example of this would be where a development is set to take place in an ecosystem that is not threatened, and where rehabilitation is easily achievable. In a case such as this it is clear that the mitigation hierarchy would require the project developer to rehabilitate the impact in situ, when it may in fact be more desirable from both the project developers perspective as well as from an environmental strategic perspective to allow the developer to offset his impact in another ecosystem altogether which may be critically endangered and far more in need of conservation.

This is especially true as a result of the specifications around scale applied in both the Western Cape and Kwa-Zulu Natal draft provincial guidelines in so far that a ratio of 30:1 is required in order for the offset to be accepted when the impact is in areas that are critically endangered. The implication of this is that for every 1 hectare of land disturbed in the development process 30 hectares of land needs to be conserved elsewhere. The potential net environmental benefits of this approach are obvious, but if they are to be achieved the creation of some sort of offset market would prove invaluable in facilitating this process. Enter the DEA's Effective Environmental Improvement Intervention (2E2I) programme which is a proposed programme that will allow for the registration of ecosystem re-mediation projects under a specific set of standards. In essence the programme will allow those conducting re-mediation work to connect with those seeking opportunities to offset their impacts. While still in the development phase this programme has a great deal of potential to facilitate effective environmental improvement project development and could well prove itself to be an area of value add for environmental improvements on small-scale farms, especially in areas under communal land tenure.

A useful tool in facilitating biodiversity offsets is the Conservation of Agricultural Resources Act (CARA, Ac t no. 43 of 1983). This act has established a legal framework for the conservation of agricultural resources and has the potential to play a significant role in directing funds towards ecosystem goods and services markets (TIPS 2008). The act aims to support the sustained productivity of the land by prevention soil erosion and rehabilitating soil degradation as well as conserving water sources and eradicating alien invasive species.

A similar initiative that has been developed since 2000 has been the introduction of biodiversity stewardship programmes which have already been rolled out in several provinces. The stewardship programmes work by developing a partnership between conservation authorities and landowners which allows for the landowner to retain title of the land as the management authority of a newly proclaimed protected area. The cost of establishing the protected area is hugely reduced for the

conservation authority as they do not have to purchase the land and their role in management of the area becomes a supportive one where the private landowner is the principle actor. Asides from additional income generation opportunities such as through tourism and game meats the landowner also benefits by avoiding property taxes as well as certain areas of income tax.

Since the inclusion of biodiversity stewardship projects under the Protected Areas Act in 2000 over 400 000 hectares of private land have either been brought into the programme or are in the process of being included (NBA 2011), with interest in the programme growing exponentially. The Khayalethu river trial in the Khayalethu township in Knysna is one such area and provides an excellent example of how communal land in areas as densely populated as an urban township can be brought under protection for communal benefit which suggests that small-scale farmers can adopt the system for financial gain on their own land.

5.3 Rural smallholder development model: CRDP and Agriparks

Despite a number of well-intentioned programmes, investment in supporting small-scale commercial farmers in South Africa by the state has been sorely lacking for some years. The Comprehensive African Agriculture Development Plan (CAADP) requires member states to spend some 10% of their national budgets on agriculture, but in reality the South African state has been spending about 2% on average since the early 2000's (Greenberg 2010). When this under-investment is coupled with the demise of the marketing boards which helped to ensure purchase prices and provide technical assistance (TA) functions it becomes unsurprising that small-scale producers have occupied a constantly shrinking share of market value.

To help address this rural stagnation the Department of Rural Development and Land Reform developed the Comprehensive Rural Development Programme which initially aimed to affect 160 sites by 2014. While this project has encountered a number of setbacks from a time perspective it has given birth to a crucial initiative in the form of the Agri-Parks programme.

Many actors within the South Africa agricultural policy space, including prominent actors such as Greenberg (2010) and Cousins (2009) argue that the failure of the small-scale sector is primarily due to a lack of market access and support services such as technical assistance and physical capital. The Agri-Parks programme's role is to help reduce some of these barriers by providing networks of contacts between producers, markets and processors as well as the physical infrastructure required for agro-processing. By developing linkages between the parks, farmers on surrounding agricultural land involved in the production of crops and livestock, processing facilities and the market, the programme aims to develop 300 000 new small-scale producers, as well as create 145 000 new jobs in agro-processing by 2020. The Agri-park approach will include the selection and training of smallholder farmers, as well as selecting farms in each province for the placement, incubation and training of unemployed agricultural graduates and other agro-entrepreneurs. In total 44 sites have been planned for the country (Figure 16), and much of this development will take place within the

area defined in this paper as having the bulk of South Africa's ecosystem infrastructure. Not only do these support services provide a substitution effect for a great deal of capital required by emerging farmers thus reducing the scale of private investment requirements, but this programme also has tremendous potential to link the initiatives identified in this paper to small-scale farmers.

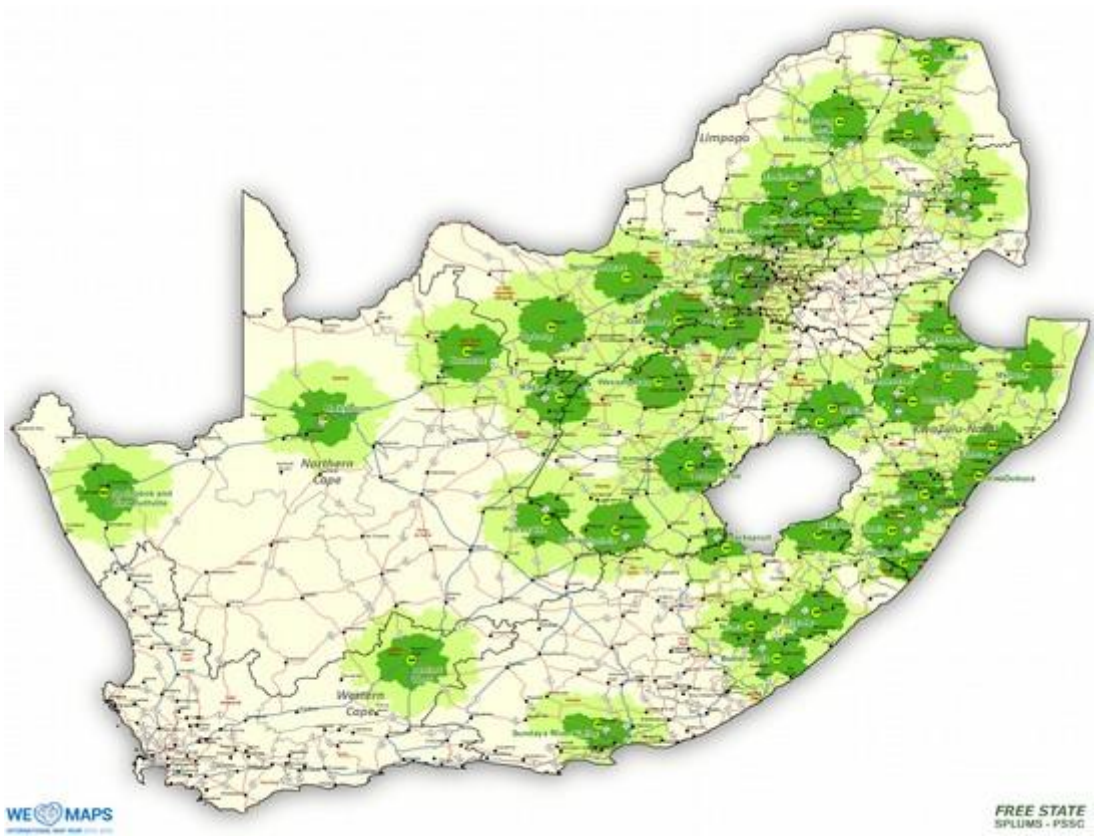


Figure 17: Locations for the Agri-Parks programme (personal communication with DRDLR)

5.4 Working for Water/Land/Wetlands

These three linked programmes are all state led initiatives aimed at reducing alien vegetation, reducing fire risk, improving water quality and conserving wetlands and landscapes. The original programme that they stemmed from was the Working for Water (WfW) programme which was launched in 1995 to tackle the issue of the 198 invasive alien species that cover around 10% of South Africa. While falling short of the state's objective of "*reducing the density of established, terrestrial, invasive alien plants, through labour intensive, mechanical and chemical control, by 22% per annum*"

(DEA 2016) it has nevertheless been able to clear over one million hectares of alien invasives since 1995 and is recognised as an exemplary conservation project globally.

Based on the success of the WfW programme the Working for Wetlands (WfW) is aimed at improving livelihoods through job creation that protects agricultural resources, enhances biodiversity, yields cleaner water, reduces impacts from flooding and sustains base-flows in rivers (DEA 2016). Since its inception in 2004, the programme has directed over R800 million towards the rehabilitation of over 1,000 wetlands on state owned land, private farms and communal lands. A similar initiative that is presently under development in the Taung region in North West is the Working for Land programme which seeks to address degradation of land due to desertification, overgrazing, soil erosion, poor storm water management and unsustainable farming practices. Working for Land intends to make more land productive for the communities to sustain their livelihoods.

Tapping into these programmes in order to roll-out components of the environmental improvements required in order to sustain functioning ecosystem infrastructure has the potential to act as a significant in-kind co-investment by the state.

5.5 Tax benefits and avoided costs

A significant area of value addition for investment in the small-scale farmer environment in South Africa are the tax benefits accruing to those who invest in environmental outcomes. Asides from the property tax benefits already mentioned related to biodiversity stewardship projects, section 37B of the income tax act (Treasury 2011) makes provision for deductions in respect of environmental expenditure, while section 37C makes provision for environmental maintenance and conservation. A similar amendment to the act under section 12J has now been instituted which has raised the investee asset threshold from R20 million to R50 million thus allowing for a significant increase in venture capital investment. This amendment exempts venture capital (VC) from taxation on amounts of up to R50 million as long as the investment is held for a minimum of 5 years.

For longer term investments Section 18a of the income tax act is yet another tax mechanism that can be employed to reduce/eliminate tax related costs in so far as an amount equal to the expenditure incurred by the taxpayer to conserve or maintain land may be deducted as long as the investment has a duration of at least 30 years. The government notice with respect to these amendments is included below:

The Income Tax Act, 1962, is hereby amended by the insertion of the following section: ‘‘Deductions in respect of environmental conservation and maintenance 37C. (1) Expenditure actually incurred by a taxpayer to conserve or maintain land is deemed to be expenditure incurred in the production of income and for purposes of a trade carried on by that taxpayer, if (a) the conservation or maintenance is carried out in terms of a biodiversity management agreement that has a duration of at least five years entered into by the taxpayer in terms of section 44 of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004); and (b) land utilised by the taxpayer for the production of income and for purposes of a trade consists of, includes or is in the immediate proximity

of the land that is the subject of the agreement contemplated in paragraph (a). (2) (a) Any deduction of expenditure contemplated in subsection (1) must not be allowed to the extent that the expenditure exceeds the income of the taxpayer derived from trade carried on by the taxpayer on land utilised as contemplated in subsection (1)(b) in any year of assessment. (b) The amount by which the deduction exceeds the income of the taxpayer so derived must be deemed to be expenditure incurred by the taxpayer in the following year of assessment. (3) An amount equal to the expenditure actually incurred by a taxpayer to conserve or maintain land owned by the taxpayer is for purposes of section 18A deemed to be a donation by the taxpayer actually paid or transferred during the year to the Government for which a receipt has been issued in terms of section 18A(2), if the conservation or maintenance is carried out in terms of a declaration that has a duration of at least 30 years in terms of section 20, 23 or 28 of the National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003). (4) If during the current or any previous year of assessment a deduction is or was allowed to the taxpayer in terms of subsection (1) or (3) in respect of expenditure incurred to conserve or maintain land in terms of an agreement or declaration contemplated in those subsections, and the taxpayer subsequently is in breach of that agreement or violates that declaration, an amount equal to the deductions allowed in respect of expenditure incurred within the period of five years preceding the breach or violation must be included in the income of the taxpayer for the current year of assessment. (5) If— (a) land is declared a national park or nature reserve in terms of an agreement under section 20(3) or 23(3) of the National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003); and (b) the declaration is endorsed on the title deed of the land and has a duration of at least 99 years, an amount equal to 10 per cent of the lesser of the cost or market value of the land without regard to any right of use retained by any taxpayer is for purposes of section 18A and paragraph 62 of the Eighth Schedule deemed to be a donation paid or transferred to the Government for which a receipt has been issued in terms of section 18A(2), in the year of assessment in which the land is so declared and each of the succeeding nine years of assessment. (6) If the taxpayer retains a right of use of land contemplated in subsection (5), the amount deemed to be a donation in terms of that subsection is an amount that bears to the amount determined in terms of that subsection the same ratio as the market value of the land subject to the right of use bears to the market value of the land had that land not been subject to the right of use. (7) If during the current or any previous year of assessment a deduction is or was allowed to the taxpayer in terms of subsection (5) in respect of a deemed donation in terms of a declaration contemplated in that subsection, and the taxpayer subsequently violates that declaration, an amount equal to the deduction allowed in respect of the deemed donation within the period of five years preceding the violation must be included in the income of the taxpayer for the current year of assessment.''.

Additional areas that should be considered with respect to tax deductions include Section 11D, which enables deductions for research and development costs, Section 12 K, which allows for tax deductions based around carbon sequestration and mitigation (but unfortunately only if the carbon emission reduction has been approved as a CER). While not directly attributable to taxation it should also be noted that environmental improvements may also help avoid charges related to waste water discharge under the Water Act as well as landfill taxes at municipal level from agricultural waste.

While not enacted yet, changes stemming from National Treasury's environmental fiscal reform initiative also warrant attention. A key focus of the initiative is to develop "mechanisms that allow for payment for ecosystem services, and reinvestment of the revenues generated in securing the health of ecosystems." (NEMBA 2004).

Chapter 6 – Small-scale farmers – the setting and enablers

Despite the fact that agriculture has sustained a high growth rate since the 1970's and the fact that there are over a 280 000 farmers engaged in agricultural production in this country, the share of value within this agricultural value chain has shifted in two important ways since the early 90's. The first is that there has been an overall contraction in the participation of small-scale commercial producers in agricultural markets in South Africa over the last 30 years (Greenberg 2010). A key indication of this has been the reduction in the share of turn-over value at the National Fresh Produce Markets (NFPM) around the country since the mid-90's. The once central status of these markets that were based in 17 regional hubs around the country has now shrunk to a point where 75% percent of their total throughput is centred around Tshwane, Cape Town and Durban alone. A range of factors have precipitated this including increased market share captured by retailers, shifts in the relative share of value from producers to retailers in the value to chain, the growth of centralised distribution centres for the major retailers and increased requirements on quality control necessitated by both retailers and legislation such as the consumer protection act.

In recent years, retail procurement from NFPMs has declined to as little as 10% of total procurement, relating to lack of cold chain maintenance, inadequate traceability to the farm level and food safety issues.

Prior to 1996 small-scale farmers benefited from a number support services provided by the state. However The Marketing of Agricultural Products Act of 1996 eliminated agricultural marketing boards and a number of their key market control mechanisms, including ending export and import controls, subsidies and tariffs, as well as price controls. The only sector that survived this intense deregulation has been the sugar industry which has maintained a price pooling mechanism. Needless to say this deregulation did not only affect small farmers, but large commercial farmers as well and in response specialised institutions stepped in to fill the void, most notably in the form of the South African Futures Exchange (Safex) and the Agricultural Futures Market of the JSE whose price stabilisation functions have been enormously useful to large-scale commercial farmers, but out of the reach of small farmers.

Further to this a number of technical assistance services such as grading, storage, processing and delivery were also eliminated, and in a similar vein large scale producers were able to fill the void through private investment while small farmers could not. Under the weight of these changes it is hardly surprising that the NFPM's now occupy only 10% of the retail market.

It is important to note that significant financial resources have been dedicated to land reform in South Africa, and as has been previously shown, this has not yielded the level of results desirable.

Under the land reform programme rural black farmers were granted funds to acquire land or invest in existing land-holdings, but it took until 2005 before assistance was provided to link these mostly small-scale farmers with market readiness support, and even these support programmes were mostly financial in nature and didn't address other skills and infrastructure shortages (Scotcher 2009).

Stakeholder engagements with small-scale emerging farmers conducted by WWF in February 2016 showed that most of the farmers in this group felt that they need crop and livestock prices to be between 2 and 4 times higher than at present for them to be able to achieve long term financial sustainability. Certainly shifting the weight of the financial value in the food value chain more towards producers and less so towards retailers would help achieve this effect, but this may prove very difficult to legislate, and will on all likelihood see end prices rising for consumers, something that we can ill-afford. As such finding additional areas for adding value to small farmers businesses fills an important gap in securing their livelihoods.

In Chapter 3 some of the social issues that relate to ecosystem infrastructure investment are mentioned. What follows is a methodology developed by the author which combines four key conceptual approaches to mitigate social problems within the rural agricultural development and Community Based Natural Resource Management environment and reflects his professional experience as the Community Engagement Facilitator for Cape Town based NGO, Project 90by2030.

The methodology forms part of an unpublished body of work operating under the title of the Participatory Community Engagement" (PCE) methodology and the four development theories included are:

- Eleanor Ostrom's (1990) "8 design principles for successful socio-ecological systems (SES)".
- Francis Cleaver's (2002) concept of "Institutional bricolage"
- John McKnight's (2005) Asset Based Community Development (ABCD) theory
- Murphree's community based natural resource management (CBNRM) (Mukamuri and Manjengwa 2009)

6.1 Ostroms 8 design principles for successful socio-ecological systems

Ostrom has identified 8 design principles for successful socio-ecological systems (SES) which are highly instructive for the development of an effective community resource management structures. While deeply valuable deeper potential for the success of her design principles is achievable if used within the context of Frances Cleaver's concept of institutional bricolage (to be discussed further on in this section).

Ostrom's 8 principles support the creation of sustainable SES's by determining who has rights to the resource and who does not, what the responsibilities are of those who hold those rights and what the cost is of benefitting from the possession of those rights. The principles aim to eliminate the incentive to over-use, those who would seek to benefit without contributing, and the grounds for contestation of access rights. While no formula attempts to present itself as perfect, as external

shocks are often beyond system designer's control, all of these principles are subject to one over-riding principle which is that without buy-in from those employing the systems the system is destined to fail.

These 8 design principles are as follows:

1. Clearly Defined Boundaries

Defining clear boundaries of the resource system so that those with both rights and responsibilities are clearly defined, as well as those who do not. Examples from the field included allocation of land-use rights for farming purposes.

Proportional Equivalence between Benefits and Costs

Access to resources should be allotted according to local dynamics regarding potential benefits as well as the costs involved in accessing those resources such as labour and capital. While still to be tested, our latest iteration of the methodology employs a subsidy model rather than a pure sweat equity based system to achieve this end.

8. Collective-Choice Arrangements

Making sure that the people dependent upon the resource are at least in part responsible for defining the rules that govern the resource. As we are not there to ensure sustained adherence to agreements we recognise it is essential that this arrangements are arrived at through collective action.

8. Locally accountable monitoring

Making sure that those responsible for auditing the resource base and resource user's behaviour are at least somewhat accountable to the resource users or are in fact the resource users themselves.

8. Graduated Sanctions

Ensuring that sanctions are put in place by either the users themselves or by people who are accountable to the users for varying degrees of infraction upon the terms of use of the resource. As outsiders, we are not in a position to determine what is just when it comes to settling disputes and infractions and rather adopt a mediation role only when absolutely necessary.

8. Conflict-Resolution Mechanisms

Making sure that accessible and speedy conciliation, mediation and/or arbitration mechanisms are in place to manage contestation between users, and between users and officials. We have learned that the application of graduated sanctions is not feasible over the long term if conflict resolution mechanism are not robust.

7. Recognition of Rights of tenure

The right and responsibility of the resource users to ensure that the institutions governing the resource adequately reflect their needs, and enjoys such recognition from external authorities. The governing institutions that have arisen through our community work derive their legitimacy from being instituted by the community. Gaining recognition from external authorities such as the state however, is not in our control.

8. Nested Enterprises
When resources are part of larger systems, it must be ensured that governance activities relating to resource usage rights and responsibilities, regulation – through monitoring and/or enforcement – as well as conflict resolution are vertically and horizontally integrated.

6.2 Institutional bricolage

Institutional bricolage is a method of system development through organic community led organisational processes. In this view, similar arrangements are adapted for multiple purposes, are embedded in networks of social relations, norms and practises and maintaining social consensus and solidarity may be equally as important as optimum resource management outcomes (Cleaver 2002). Essentially wherever possible we have sought to make use of existing entities to achieve the project goals and only develop new ones when existing ones are not suitable for the work at hand.

6.3 Assets Based Community Development (ABCD)

ABCD seeks to empower communities to lead in their own development and Community Based Resource Management (CBRM) initiatives. In the development of the PCE methodology the ABCD approach was distilled into 7 key exercises (highlighted in the block titled: Important questions in community workshops from ABCD) that help communities to better understand their own role and potential and to help regulators gain clarity on community priorities.

6.4 Murphrees CBNRM laws

Murphrees approach to resource management is to develop strategies that anchor people at the centre of the development model based on incentive driven approaches that allow for differential benefits to accrue to differently performing members of a project. The approach recognises land and local government engagement as central themes and strives to deal with issues of ownership by increasing village level governance capacity.

6.5 Additional factors

There are practical considerations that extend beyond creating the correct enabling environment that both investors and small-scale farmers need to be made aware of when pursuing commercial agro-ecological value chain integration. An interview in 2016 with Silandela Mkhululi who runs the small-scale farmer development programme at WWF revealed that his own stakeholder engagements reflected a positive response from small farmers to the Local GAP accreditation system in particular. As both Spar and Pick ‘n Pay support the integration of the system it enables the farmers to use a single system to integrate into two value chains. In addition to this there is a great deal of cross-over with the “Farming-for-the-future” system advocated by Woolworths which means that farmers might start off with applicability to only LocalGAP, but could in time be able to service all the major players in the retail market.

Pick ‘n Pay has a strong track record of supporting the GAP (Good Agricultural Practice) system with 63% of Pick n Pay fresh produce suppliers being GlobalGAP certified (the step up from LocalGAP). Communication with Leonora Sauls from Pick ‘n Pay resulted in the following feedback with regards to integrating small-scale farmers into their value chain:

- Technical assistance from the outset can make a significant difference in terms of identifying what kinds of produce best suits the environmental context of the small farmers in question, and advantage should be taken of existing state agricultural extension services which can go a long way toward facilitating this.

- It takes between 3-7 years for a community farming project to ramp up to any kind of scale. The first few years are about getting going, learning what grows and what doesn't grow well in the area and developing the organisational structure and business operations. In this time there is usually only enough produce for those involved, and perhaps for selling to immediate neighbours.

- Organic certification is very expensive and time consuming, particularly with regards to the certification process and requires much administration – Rather they recommend natural farming methods that can align with the LocalGAP system in the start phase.

- Of the farming groups that Pick 'n Pay's development initiatives have assisted, some have reached sufficient volume to need a bigger market. The Ackerman foundation has in some cases successfully linked them to Pick 'n Pay distribution, but of course there are strict requirements which relate to refrigerated transport, packaging, quality and the like. In cases where this is too costly, and impractical the Ackerman foundation may assist them to become a supplier to Boxer who have a higher market for non-premium produce.

Chapter 7 – South African private investment – the setting and enablers

According to the Global Impact Investment Network (GIIN 2015), Impact investments are investments made into companies, organizations, and funds with the intention to generate social and environmental impact alongside a financial return. The Impact Barometer from the Graduate School of Business at the University of Cape Town lists priority business sectors benefiting from impact investment including agriculture, water, housing, education, health, energy and financial services (Bertha 2013).

The impact objectives (asides from profit) include climate change adaptation and mitigation, improvements in income and asset base for indigent people, mitigating climate change, increasing incomes and assets for poor and conservation. The investments themselves can take the form of innovative structures such as green revenue bonds, or social impact bonds or stick to traditional debt or equity vehicles. In 2014 the GIIN reported that there had been almost USD 11 Billion worth of impact investments made globally in 2013, and anticipated an increase of 19% to USD 12.7 Billion in 2014. JP Morgan, Monitor Deloitte and the Calvert Foundation anticipate market growth to expand to between USD400bn and USD1-trillion worldwide by 2020. Presently 22% of global-impact investments are in Sub-Saharan Africa, which is good news for South Africa as the most developed financial hub on the continent, and South Africa is the largest market for impact investment in this region by far. International Development Finance Institutions (DFI's) have closed more than 650

deals and disbursed USD 16.7 billion across the region, with almost USD 10 billion of that taking place across 187 deals in South Africa, predominantly in the energy and housing sectors. Non-DFI impact investors in turn were responsible for the disbursement of USD 5.6 billion throughout the region. Overall, South Africa was the recipient of over 60% of non-DFI deals and 30 percent of international DFI deals within the region

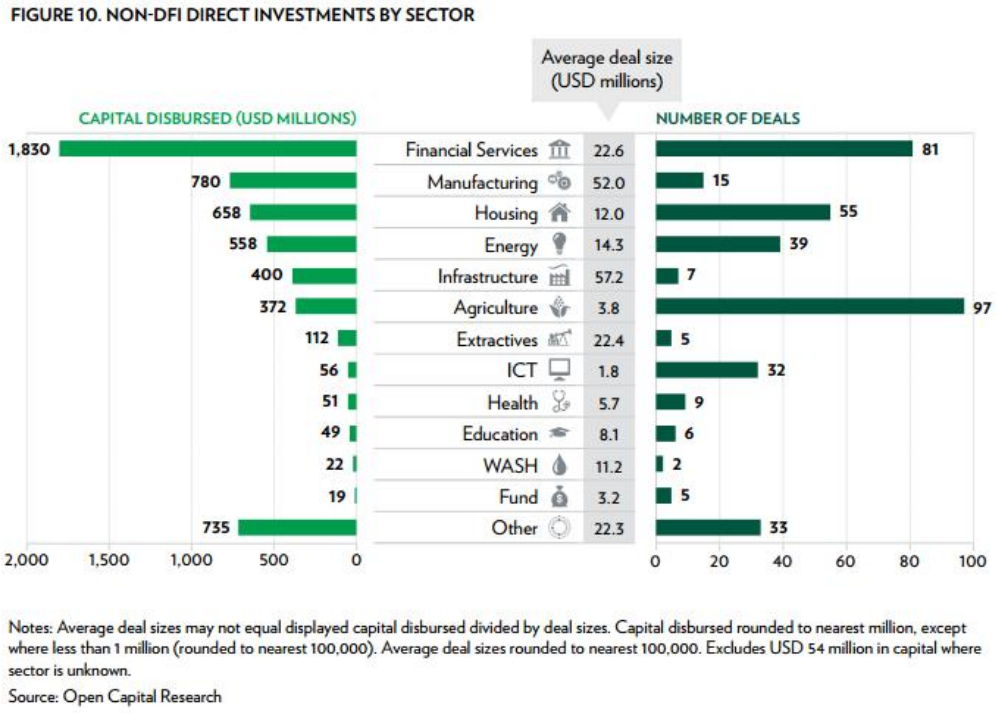


Figure 18: Non-DFI investments by sector in SA (GIIN 2015)

To help guide investment firms in best practise to address this new and growing field the United Nations developed the UN Principles for Responsible Investment (UNPRI). Under this set of principles there is a specific section that pertains to farmland which sets out 5 core principles that those investing in the sector must follow if they are to meet the minimum requirements for responsible investment. They are:

1. Promoting environmental sustainability
2. Respecting labour and human rights
3. Respecting existing land and resource rights
4. Upholding high business and ethical standards
5. Reporting on activities and progress towards implementing and promoting the Principles

7.1 Code for Responsible Investing in South Africa (CRISA)

Since its launch in 2011 CRISA has been endorsed by the Institute of Directors in Southern Africa (IoDSA), the Principal Officers Association (POA), and the Association for Savings and Investment South Africa (ASISA) and has been supported by the Financial Services Board (FSB) and the Johannesburg Stock Exchange (JSE). The code guides institutional investors as to how they should conduct investment analysis and investment activities as well as how to integrated sound governance mechanisms.

The five principles of CRISA are:

1. An institutional investor should incorporate sustainability considerations, including environmental, social and governance, into its investment analysis and investment activities as part of the delivery of superior risk-adjusted returns to the ultimate beneficiaries.
2. An institutional investor should demonstrate its acceptance of ownership responsibilities in its investment arrangements and investment activities.
3. Where appropriate, institutional investors should consider a collaborative approach to promote acceptance and implementation of the principles of CRISA and other codes and standards applicable to institutional investors.
4. An institutional investor should recognise the circumstances and relationships that hold a potential for conflicts of interest and should proactively manage these when they occur.
5. Institutional investors should be transparent about the content of their policies, how the policies are implemented and how CRISA is applied to enable stakeholders to make informed assessments.

Working in conjunction with CRISA is the King III code on corporate governance which is a voluntary reporting mechanism that tracks the governance, social and environmental impacts of subscribing businesses. Pre-dating CRISA by 5 years the need to supplement the reporting component of the financial sector under King III has been widely called for as financial institutions enjoy the least reporting requirements under the code, despite the obvious fact that these institutions make all manner of unsustainable investments possible.

In line with CRISA at the international level the International Finance Corporation (IFC) has established a set of standards aimed at managing environmental risks and worker welfare. These standards are based on the Equator Principles, and incorporate all relevant International Labour Organisation, United Nations World Health Organisation and Food and Agriculture Organisation (FAO) standards and conventions.

The eight IFC performance standards are:

1. Assessment and Management of Environmental and Social risks and impacts
2. Labour and Working Conditions
3. Resource Efficiency and Pollution Prevention
4. Community Health, Safety and Security

5. Land Acquisition and Involuntary Resettlement
6. Biodiversity
7. Conservation and Sustainable Management of Living Natural Resources
8. Indigenous Peoples

The South African impact investment environment is still only a small part of the global market, but the formation of the South African Impact Investment Network (SAIIN) in 2009 is a clear indication that the domestic market is starting to respond to global signals. According to the Bertha centre (2015) the total amount of investment assets in the country is around USD 678 billion, with 70% of funds reporting to at least have one impact investment strategy. ESG action and reporting is the most common means of engagement, with corporate governance being the strongest element under ESG compliance. They believe this is largely due to the wide spread nature of subscription to the UNPRI by asset management, private equity and venture capital firms.

In 2015 the JSE adapted its existing approach under the Socially Responsible Investing (SRI) index to comply with the requirements under FTSE Russel, which has a broader ESG approach. This has aligned South African corporates with a globally recognised set of standards and offers opportunities for investors to integrate ESG considerations into their investments. Currently FTSE Russell's research covers 85 JSE-listed companies (making up 93% of the market cap of the FTSE/JSE All Share Index).

There are a number of financial tools that exchanges such as the JSE, as well as over-the-counter markets, make available to investors looking to achieve environmental impacts through their investments. One such mechanism is the "green bond" market. Green bonds are bonds are fixed income instruments issued with the aim of employing the finance raised specifically in projects with an environmental outcome. They are common tools widely used internationally by states and DFI's to raise funds, and there are indications that the state has plans to introduce them in South Africa.

A similar vehicle available to private investors is that of derivatives which are widely used to manage or hedge risk in financial and commodity markets. According to Little et al (2014) risks related to environmental conditions have been employed in the past (especially with regards to agriculture) in ways akin to that of options. In the case of private investment in ecological infrastructure one possible formulation of the derivative would see the owner pay the writer of the derivative to incur the risk of remediation in the event of under-performing environmental indicators (the underlying) assessed prior to a pre-agreed date. In the event that environmental indicators hold to the pre-agreed threshold no pay-out would ensue and the investor would keep their payment.

Another potential financial tool is that of revenue bonds. These bonds may also have an environmental focus and would most commonly be issued by state agencies, but not necessarily so. A pre-requisite for this type of bond is an income generation model that allows the agency to recoup their financial output. These bonds can be used to finance private investment in ecological infrastructure, particularly with respect to water availability where for example an entity such as

Rand Water could finance ecological infrastructure investments through municipal revenue from water charges.

An additional financial facilitator is that of futures contracts. Futures contracts work by establishing a set purchase price for commodities at a pre-arranged point in time. This would be of high use value to the development of small-scale farmers in that an investor could offer a fixed purchase price to small-scale producers without incurring commodity price fluctuation risk.

A final and unconventional financial tool that has potential to create economic incentives for community members to engage in ecosystem rehabilitation/preservation work is that of complementary currencies. Often referred to as local or community currencies, and most famously represented by the British Bristol pound, they centre on the creation of an alternative medium of exchange to the national currency (Ruddick 2012). They can be used as a physical or digital medium of exchange for a variety of purposes, but are most often limited in their geographic application and with regards to what they may be spent on. According to Ruddick (2012) the term complementary refers to the currency's "ability to complement a national currency as opposed to replacing it" and there are over 2500 working examples around the globe. In South Africa there are two notable examples that have been used for environmental ends namely the Buffelsdraai Landfill reforestation treepreneur project in eThekwini municipality (Durban 2008) and the Fostering Local Wellbeing K-Mali (FLOW 2015) project in Kokstad and the Bergriver.

While detailed outcomes from these projects are still being assessed a similar example hailing from East Africa has been well documented. The Eco-Pesa is a complementary currency that was created for use in three informal settlements in the Kongowea area of Kenya. It was backed by the national currency and began with the registration of 75 small local businesses, price discounting on selected items, community service work, and community events. Studies of the project estimated that 4,176 USD worth of trading took place from the circulation of 352 USD worth of the currency. Key outcomes included an average 22% observed increase in the incomes of the participating businesses, collection of around 20 tonnes of waste, and the creation of three community tree nurseries led by youth groups.

7.2 Development Finance Institutions (DFI's) and blended finance

While the financial tools already listed all have potential to expedite a successful and profitable transaction they pale in comparison to the enabling potential inherent with co-funding from Development Finance Institutions (DFI's). There are a number of major domestic DFIs in South Africa including the Industrial Development Corporation (IDC), the Development Bank of Southern Africa (DBSA), and the National Empowerment Fund (NEF). Ironically, despite its developmental mandate the Land and Agricultural Development Bank of Southern Africa (the Land Bank) does not strictly qualify as a DFI due to commercial banking approach, but it is included here none-the-less. Of these the DBSA, the NEF and the Land Bank are all prime targets for co-financing on small-scale agro-ecological development projects.

The Global Environment Facility (GEF 2015) defines blended finance as "structured transactions in which development finance and private capital achieve climate impact—or other environmental impacts—while at the same time delivering adequate risk-adjusted financial returns for the private investor." They state that the most commonly used blended finance instruments are:

1. guarantees, protection from risks of capital loss.
2. debt, normally in the form of subordinated or concessional debt (or both)
3. equity, usually junior equity which takes on higher risks for lower financial returns.

As one of the South African DFI's listed above that provide blended finance opportunities the DBSA's mandate is to "*accelerate sustainable economic development, with a focus on social and economic infrastructure*" (GIIN 2015). Through this mandate the DBSA has funded or co-funded a number of major projects in energy, healthcare, water, and education which suggests that catchment wide projects may well be well received.

The Land Bank's mandate is to finance agri-businesses and farmers. Its approach to agricultural and rural development encompasses both large commercial-farming projects as well as new entrants to the sector from disadvantaged backgrounds.

Through its Rural and Community Development Fund (RCDF), the NEF supports sustainable change in the social and economic environments. The RCDF's goal is to promote the development of the rural economy through financial provision for sustainable enterprises. It funds a number of relevant fields including agro-processing and manufacturing, forestry and fisheries and eco-tourism.

In addition to these domestic DFI's there are a number of international DFI's active in South Africa. A few of these institutions have programmes that specifically target environmental outcomes including the Global Environment Facility, the African Development Bank (AfDB)

To target the stimulation of private investment into ecosystem infrastructure the Global Environment Facility (GEF 2015) developed the "Frontier" Blended Finance Operations Guarantees and Subordinated debt for Land Restoration programme. The programme is targeted at the private sector with the aim in mind of leveraging finance for restoration of degraded land. These investments typically have longer payback periods and quite often have high risk ratings, thus making it quite a challenge to source funds. To overcome these challenges the programme provides guarantees and subordinated loans, helping catalyse additional public and private sector investments by reducing perceived risk.

Some of the land restoration and natural resource management activities include management activities targeting ecosystem services, landscape regeneration, intercropping, shade growing systems and high value forest products. The GEF anticipates carbon sequestration through the programme to be in the region of 4,5 million tons CO2e.

Specifically aimed at developing countries in Africa the Junior Equity for Agro-Forestry and the Moringa Agro-forestry Fund are managed by the AfDB with the intention of promoting sustainable land management in production landscapes. The fund aims to focus on 5 – 6 scalable projects that

will combine plantation based agro-forestry with agriculture to maximise value streams. While still pursuing its developmental mandate the GEF anticipates a return of 6 percent through it junior equity position in the fund. The project will target some 79 000 hectares for biodiversity and ecosystem restoration and a further 200 000 hectares for sustainable production systems. The GEF anticipates that the project will sequester some 9.5 million tons CO2e..

The experience gained by the GEF should provide an example to local and regional DFI's for two major reasons. Firstly, the GEF has dedicated some 68% of its total funding towards climate related investments in 2013-2014 (some USD 1.4 billion), and as such are setting the example for taking climate impacts seriously. The second reason is their success in using their funds to leverage private sector finance. During the same 2013-2014 period they were able to leverage 60 cents for every dollar of their own funds, yielding some USD 800 million dollars for climate finance from the private sector. In other sectors with lower risk and faster payback periods they were even more successful and increased their public/private funding ration to 1/6.3, meaning that for the USD 175 million they invested they were able to leverage USD 1098 million from the private sector. Clearly there is much opportunity to create blended finance projects that direct a combination of private and public funds towards environmental outcomes.

A key hurdle that will need to be overcome in the developing world to ensure that these opportunities can be realised is that of the currencies that returns to project investment will raise. A foreign investor investing in dollars is highly unlikely to want South African Rand in return for her investment. According to GIIN 2015 "*This is especially challenging for investments using long-term debt instruments which require repayment in hard currencies, as these can appreciate five to 10 percent per year relative to local currency*". One option here is that of hedging, but the present costs are often prohibitive, but in the case of large institutional funds like GEF the barriers are lower. This does have the potential to leave investments in SMME's out of the investment target zone though, as they are too small to absorb sufficiently large sums from these big institutions which is something our domestic and regional DFI's should be mindful of and plan around.

Chapter 8 – Opportunities for small-scale farmer value-chain integration

There are a number of methodologies that have been applied both within South Africa and elsewhere on the globe that have successfully resulted in profitable investment in agriculture at the small-scale level. While many of the approaches listed in this section have a mix of outcomes, the initial point of departure is that securing an effective business case necessitates either reducing costs, or increasing revenue. This section of the paper gives a description of some of the most promising methodologies that have delivered successful returns to projects within South Africa and elsewhere.

8.1 Outgrower schemes

As with many of the methodologies listed in this paper, out-grower schemes have not been without their controversies, but there have been a number of successful examples of such schemes particularly in the sugar and timber industries that offer opportunities for further expansion. Both the sugar and timber industries are particularly dependent on high rainfall for their viability which coincides with the high rainfall areas in Kwa-Zulu Natal and Mpumalanga very neatly. As has been stated previously much of the land in these provinces is communal land and as such it follows that land intensive industries should develop models that can integrate communal areas into their value chains.

The model works by incentivising both buyers (ie: the timber or sugar mills) and the producers (ie: small-scale farmers) to be actively engaged in making the market work by ensuring a stable supply of materials. This is achieved by ensuring a guaranteed purchase price for the small-scale farmer which is secured through the purchase of a food future on either the Johannesburg Stock Exchange (JSE) or some other exchange.

The returns on these sorts of projects have a track record of being attractive for both parties (TIPS 2008), which incentivises cooperation in the input, planting, maintenance harvesting and distribution phases of the value chain. The farmer support is both financial as well as technical and results in greatly reduced risk for both the farmer and the firm. For the farmer her risk of crop-failure is greatly reduced and her financial exposure to market failures and variances is hedged. For the firm having external grower's aids in BBEEE ratings, supports land-reform which is good for reputational value, reduces labour relations risks such as strikes and most importantly effectively eliminates the likelihood of intentionally started fires in plantations.

These models have shown that small-scale farmer can in fact produce on time at competitive prices when the correct support is in place. In TIPS (2008) the authors argue that in a similar vein "with the right investment from ecosystem services buyers, rural land owners could meet the supply requirements, thereby providing opportunity for a vibrant ecosystem services market in rural South Africa.".

8.2 Lessons from agro-industry – the UFF and ZZ2 examples

8.2.1 UFF

GIIN (2015) argues that developing technical assistance (TA) facilities in the pre-investment phase develops a strong pipeline of investable opportunities. They maintain that funders are increasingly recognising the importance of pre-investment support to get companies investment ready. South Africa in particular is listed as a site of much activity with regards to the development of such intermediaries and service providers. One such investor that has successfully integrated agricultural TA facilities into their portfolio is Old Mutual through UFF African Agri investments.

According to the Futuregrowth Agri-composite fact sheet (2015) The approach adopted has been quite aggressive in terms of pursuing a high rate of return which aims to outperform the consumer price index (CPI) by 10% per annum (before taxes and fees) over three year investment windows for up to 12 years. Asides from financial returns, a number of environmental returns have been targeted during the project cycle process including water conservation, reduction of greenhouse gases (GHG's), pathogens, pesticides and particulate emissions increased use of organic matter, reducing soil erosion, low-impact tillage and promoting biodiversity.

The fund addresses large scale projects to invest a minimum of R30 million per farm and as much as R200 million which has manifested in 4 farms being brought into the project thus far. An important outcome of the fund which has helped to ensure its success is the partnership approach with the South African government as the farms are identified on the basis that the fit into the land reform programme. The delays inherent in the land reform process are avoided as the fund facilitates the purchase of suitable farms, while the state begins the land reform process.

From there the fund appoints a professional farm operator who manages the farm. These operators are identified on the basis that they are large market operators who have control of the value-chain all the way through the processing and distribution phases. The operators are required to either keep existing workers or employ local workers from the community and employ sophisticated monitoring and evaluation information systems to track the farms productive metrics and environmental impacts. The end aim is to then transfer ownership of the farm to the community at the end of the project cycle (10-12 years), who can then choose to run the project themselves or retain the operator.

8.2.2 ZZ2

The Koedoes River Catchment (KRC) area is a large fertile zone in Limpopo province that is home to ZZ2, a large commercial agricultural company that employs around 7000 people and produced around 120 000 tonnes of tomatoes, 2.2 million cases of avocados and considerable quantities of mangoes and onions during 2013/2014 (Haddad 2015). The KRC is also home to a large commercial cattle industry as well.

In the late 1990's, while the company was experiencing declining yields despite increasing costs on pesticides and fertilisers, they started becoming aware of the increase in consumer pressure to deliver produce to market in an environmentally responsible manner. The effect of these shifts was to move the company towards a long-term sustainability vision, which they titled "Natuurboerdery" (natural farming). One of the key developers of this approach, Professor Erik Holm, explained it as such: "*ZZ2 did not turn to organic production but chose to develop an approach that incorporates organic materials with reduced use of inorganic fertiliser and pesticides. This strategy lends itself to cost-effective, large- scale application, leading to sustainable farming and nutritious produce. The concept lies between organic and industrial farming, but is better than either*" (Joubert, 2012)

By focusing on soil health, water use efficiency, integrated pest and disease management, food and environmental health (including biodiversity of plants and animals) ZZ2 has been able to verifiably combat decreasing yields, lower input costs and improve climate resilience (Haddad 2015). Further to this the carbon content of the soil has been increased and conservation areas have been established around many of the farms which further support biodiversity and resilience.

Both of these two cases provides valuable insights into the kinds of outcomes achievable on larger scale projects and suggest that additional income streams can be generated through conservation, utilisation of timber and non-timber forestry products and biodiversity and carbon offsets. These examples also have the potential to lower costs through tax reductions and insurance premium decreases from reduced risk and may prove to be highly effective for larger scale co-operative style farms.

8.3 BBBEE and CSI

Broad Based Black Economic Empowerment (BBBEE) has taken on a sizeable role since its enactment in 2003. The Act was put in place to increase the role of previously disadvantaged groups in the South African economy and applies to all state-owned enterprises (SOEs) and to private businesses with annual revenues over R 10 million and scores them out of a total of 113 points across 5 elements While the specifics of the act are available on the Department of Trade and Industries website a general outline is provided here (Presidency 2003).

The percentage of economic participation and voting rights held by black South Africans (Ownership) counts for 25 points and Management control counts for 14 points. Highly relevant to our small farmers is the enterprise and supplier development component which counts for 44 points and requires businesses to 1% of net profit after tax on contributions to enterprise development with a further 2% towards majority black-owned businesses. Similarly the skills development component which counts for 25 points tracks expenditures on skills development programmes for blacks. Finally, the socio-economic development component requires businesses to allocate at 1% of net profit after tax to socio-economic contributions including grants, guarantees, developmental capital, training and mentoring, and direct assistance provided to beneficiary communities which is most-often earmarked as part of the Corporate Social Investment (CSI) budget (GIIN 2015).

The BBBEE components relating to enterprise development, skills development and socio-economic development, accompanied with additional CSI spending provides an excellent potential source of investment funding and technical assistance, especially for the start-up phase of small farmer projects. Recent estimates by GIIN (2015) reported some R8.2 billion spent by business on CSI overall and a further R51.8 billion on BBBEE as a whole. Impact investors wishing to create positive environmental and social benefits are well placed to take advantage of this large pot of money either in the form of technical assistance for their projects or through seed capital or preferential access to markets.

8.4 NGO partnerships

Initiated by Conservation South Africa (CSA 2012) in the Umzimvubu Catchment area, the Biodiversity and Red meat Initiative (BRI) targets small-scale livestock farmers in the country's most rapidly degrading catchment area along the northern boundary of the Eastern Cape between Lesotho and the coast. The area totals around 2 million hectares of which some 70% is under communal land tenure. Identified as one of the last remaining "near-natural-river" systems the area also comprises grasslands, forest, thicket and dune ecosystems forming a key biodiversity zone in the Maputaland-Pondoland-Albany Hotspot.

As part of a broad landscape based initiative CSA is working with local people from urban and peri-urban areas to reduce environmental impacts stemming from urban development, over-harvesting of selected species, mining, over-grazing and commercial farming. Under the BRI CSA is helping local farmers to develop alternative strategies for managing grazing lands that help cattle retain their market value during the winter months and by linking them to commercial value-chains so that they can directly benefit from improved environmental governance.

A similar intervention that of Holistic Planned Grazing (HPG) which is a high density grazing methodology that requires the presence of a lot of animals in a small space for a short period of time. The presence of the livestock deposits large quantities of manure and urine on the land and leads to healthy, vigorous pasture growth achieved without the application of fertilizer to the land. Originally developed by Allan Savory in the 1980's the approach promotes livestock health and weight while improving soil quality, preserving biodiversity and providing an opportunity for soil carbon sequestration.

The methodology has already been piloted at the Spier wine estate in South Africa and is presently a beneficiary of soil carbon credit income via the Promotion of Access to Carbon Equity (PACE) voluntary emission reduction scheme.

Biowatch is a Kwa-Zulu Natal based NGO that focuses on small-holder female farmers by supporting them to develop better management practices with respect to their agricultural resources including land, water, seeds and infrastructure while securing their rights (Biowatch 2016). Their support work includes agro-ecology training, Genetically Modified Organism (GMO) awareness, Traditional agricultural knowledge, seed bank training and market support. The farming support offered by their rural base in near Mtubatuba in Zululand has had the benefit of promoting sustainable land-use practices while promoting rural livelihoods by forging a link with the local Boxer and Pick 'n Pay to absorb the surplus produce.

In 2008 the World Wide Fund for nature (WWF) funded the initiation of the GreenChoice Alliance, a programme that aimed to produce a master document which could be customised to specific agricultural sector requirements and minimise the negative impacts of food production, processing and consumption. The programme had an initial focus on sustainable food and wine products, but it

also included animal, fibre and wild harvested flowers. Over time it began to incorporate more and more sectors and became the functional environmental management programme for Woolworths' suppliers under the name of Farming for the Future. The Good Business Journey Report (Woolworths 2015) states that currently 98% of our primary suppliers across produce, horticulture, wine and dairy are Farming for the Future accredited while 73% of secondary suppliers are accredited under the programme. In order to achieve certification producers must meet quality standards for soil health, water supply, biodiversity, supporting rural livelihoods and helping communities adapt to climate change.

These are just a few of the initiatives being undertaken by NGO's supporting the sustainable integration of small-scale farmers into commercial value chains and is hardly exhaustive. Developing partnerships with NGO's has a great deal of potential to support small farmers to become commercially viable and investors should be on the lookout for potential partnerships of this sort.

8.5 GlobalG.A.P and LocalG.A.P

Since the late 1980's there has been a growing trend within agricultural value-chains to shift the bulk of the value-added more towards the side of retailers and less towards producers (Greenberg 2010). This is making small-scale financial viability harder and harder to achieve but recent increases in societal pressure to act responsibly and BBBEE requirements has seen retailers (and in fact all large corporates) begin to direct their efforts towards integrating small-scale producers into their value chains. In order to encourage effective environmental management amongst agricultural producers two systems have emerged amongst the major food retailers in the country namely Farming for the Future (already covered above) and GlobalG.A.P/LocalG.A.P.

Originally established as a European standard for food product safety, environmental impact and the health, safety and welfare of workers and animals in 1997 (GlobalG.A.P 2016) the programme has now expanded to over 100 countries. In South Africa it is endorsed by Shoprite/Checkers, Pick 'n Pay/Boxer, Spar and Massmart. Asides from providing certification that is recognised outside of South Africa which opens up foreign markets to domestic producers, it also provides the requisite degree of traceability of foodstuffs required by the Consumer Protection Act (act 68 of 2008). In addition to this the full GlobalG.A.P certification has a range of environmental metrics that require compliance, including biodiversity, but it must be noted that the model is geared to agro-industry and not towards agro-ecology. For small farmers wishing to enter commercial value streams an entry level standard has been introduced called LocalG.A.P which leads up to full accreditation in time. While not providing very much return on environmental investments for small farmers it does provide certification and market entry and can be a supplement towards other income streams such as Fairtrade accreditation.

8.6 Timber and non-timber forestry products

There is a significant amount of marketing effort given by the commercial forestry sector to promoting the idea that plantations comprised of rapidly growing exotic species on short rotations

can be done sustainably and with a wide range of benefits to rural black communities who participate in outgrower schemes. Credit must be given to the likes of the SAPPI and Mondi who have both done much to ensure that their operations are Forestry Stewardship Council approved, setting aside land for conservation and introducing other initiatives such including emerging farmer outgrowers in their value-chains. However the truth of the matter is that monoculture plantations of exotic species like pine and eucalyptus decimate biodiversity, denude the soil and consume vast quantities of scarce water reserves (Versfeld and Warren 2002). Then there are all the other direct-use values listed in Chapter 2 which are removed from the economic equation as a result of industrial forestry.

In the Department of Water Affairs and Forestry position paper titled: "Forests, water and development: seeking effective ways of utilising our resources", Versfeld and Warren (2002) suggest that *"the introduction of alternative forms of slower-growing forest trees (such as indigenous hardwoods for either timber or traditional medicines, but not excluding high-value exotics), using significantly less water than industrial plantations as we know them, might provide an acceptable land use in areas which are stressed or water scarce"*.

They put this forward as a means to deal with water scarcity, an inescapable issue that much of South Africa will have to deal with on a progressively more proactive scale if we are to avoid a sustainability crises of mammoth proportions. They propose that a move to slow-growing, high value trees might offer a way of increasing revenue with lower costs. Some of the commercial benefits derivable from non-timber forestry products include traditional medicines, honey, mushrooms, thatching, curios, marula beer, tourism, carbon sequestration and water supplies.

8.7 The insurance sector and premium reductions for improved risk profile – Santam

An interview with John Lomberg, head of stakeholder relations and corporate social investment at Santam reveals that the insurer is in the process of developing a model that helps build climate resilience through landscape and ecological infrastructure investments. The pilot project which is being trialled in the Koega municipality in the Eastern Cape links a number of stakeholders to help reduce the insurance risk of all parties concerned and extend the level of cover Santam can offer to households and businesses in the 50 and 100 year flood lines. The project links farmers in the Port Elizabeth catchment area, downstream Concerned Corporate Citizens (CCC's), the Koega municipality, impact investment firm Four Returns Capital, landscape based NGO LivingLands and Santam under its Business Adopt a Municipality (BAAM) programme.

The programme has engaged LivingLands to analyse the climate change trends in the area and to help develop alternative options for sustainable productive agricultural use of the land which increases water supply to the catchment area, while reducing the risk of flooding and fires. This has resulted in the transition of land from grazing purposes to the cultivation of lavandin (a variety of lavender) for essential oil extraction which has yielded increased and sustainable profits. This process derives part of it's funding from the CCC's who are downstream stakeholders on the Kouga, Krom and Baviaans rivers who often have their own assets at risk in the event of flooding and fire. By investing

part of their CSI budget into landscape improvements they not only create jobs and improve the environment, but they also reduce their insurance risk and as a result pay lower premiums than would otherwise be the case.

As Santam points out, their aim is to “keep insurance affordable and reward landowners for the implementation of resilient measures to reduce the impact of climate change and thereby reduce claims to Santam” – (from interview with John Lomberg)

8.8 Certification premiums

With 1147 Fairtrade premium product prices on a comprehensive range of fresh and processed agricultural commodities as of March 2016 (Fairtrade 2016) Fairtrade accreditation provides a real financial incentive for the integration of sustainable environmental management practices into small-scale agriculture. With the seventh highest number of workers on Fairtrade certified plantations 2014 receiving some €1,156,700 worth of Fairtrade Premiums, South Africa is an established location for Fairtrade producers.

Fairtrade’s mission is to “connect disadvantaged producers and consumers, promote fairer trading conditions and empower producers to combat poverty, strengthen their position and take more control over their lives.” Fairtrade standards provide a mechanism for small-scale farmers to receive a price that covers the cost of sustainable production while providing additional funds which may be invested in social, environmental or economic projects.

The scheme also has additional investor benefits in that Fairtrade makes pre-financing available for farmers that require it while achieving a number of social impacts in the process, which may in turn be applicable to social impact bonds, thus yielding another potential income stream. The environmental components of the standard include thresholds for energy and greenhouse gas emission reductions, soil and water quality, pest control, biodiversity, genetically modified organisms (GMO’s), chemical use and waste management.

Not only does Fairtrade certification present a significant opportunity for income from environmental investment through its own internationally recognised label, but given that over 50 percent of all Fairtrade certified producers are also certified as organic, there is yet another avenue for value addition.

Chapter 9 – Application

While many of these land-use management tools have been operationalised on their own, it is the contention of this report that it is their combined application that has the largest potential for net positive environmental and commercial return. A key inspirational model to support this contention is that of the LivingLands project in the Port Elizabeth catchment area linking downstream Concerned Corporate Citizens (CCC’s), the Koega municipality, impact investment firm Four Returns Capital,

landscape based NGO LivingLands and Santam under its Business Adopt a Municipality (BAAM) programme.

As outlined previously, the programme has engaged LivingLands to analyse the climate change trends in the area and to help develop alternative options for sustainable productive agricultural use of the land which increases water supply to the catchment area, while reducing the risk of flooding and fires. This has resulted in the transition of land from grazing purposes to the cultivation of lavandin (a variety of lavender) for essential oil extraction which has yielded increased and sustainable profits, as well as rehabilitation of degraded land through replanting of Spekboom which has been able to draw considerable investment as a result of its carbon sequestration properties.

The project has been able to exemplify the strategy of multiple income streams by drawing finance from Santam and CCC's as a result of the need for disaster risk reduction; from carbon sequestration resulting from market demand for carbon offsetting; from commercial sales of essential oils, honeybush tea and game meats as well as eco-tourism related income. In addition to this Working for Water has provided in-kind staffing services and the farmers in question are able to benefit from tax benefits under section 37c of the income tax act as a result of the environmental improvements related to the project. Further opportunities for biodiversity stewardship partnership are also in the pipeline presenting yet more opportunities for value addition to the land-owners.

9.1 Communal land-tenure application

While the example of the Port Elizabeth catchment area is indeed laudable, this report has demonstrated that a considerable amount of our existing eco-system goods and services are located in areas such as the Eastern Cape and Kwa-Zulu Natal that remain under communal land-tenure. Adapting the mechanisms described so that they meets the needs of land-users in these areas is the critical task that this report must elucidate. In order to do this a prominent land-use management NGO based in the Eastern Cape (Border Rural Committee - BRC) was contacted with the aim in mind of demonstrating the potential to maximise returns to capital and ecosystem infrastructure through commercially oriented sustainable land-use management activities. Once an area of operations had been defined, in this case the 9 villages of the Keiskammahoek area, the BRC was asked to define critical biodiversity and ecosystem challenges that were affecting the area. Table 5 below represents that feedback on this question, what follows that is the design of a project in this area using the principles outlined in this report that is presently being fund-raised for as a joint project between BRC and Project 90by2030.

Background to Border Rural Committee

BRC is part of the Tshintsha Amakhaya (TA) initiative which is an alliance of NGOs that work in the land and agrarian reform sector.

The primary aims of the TA initiative are as follows:

1. to encourage active citizenship and
2. deepen understanding of the structural causes of constraints facing rural people,

3. to identify and advocate practical alternatives that promote household food security and national food sovereignty.

BRC has been active in the Keiskammahoek district since 2006 and has been involved in a number of food, water, agriculture and land-use management initiatives in the area.

Result area	Notes
1. Enhancing the **production of good quality water** in Northern Keiskammahoek (Hogsback/ Stutterheim)	· 2000 hectares cleared of wattle and other alien invasive species in the vicinity of the dam. Enrichment planting of 2500 indigenous trees. The identified forest area is fenced. · The Cata Dam is maintained – silt is dredged.
2. Preserving **endangered species** and promoting **biodiversity** in Northern Keiskammahoek (Hogsback/ Stutterheim) through tourism	· Plans for four IUCN Redlist species (ie Cape Parrot, Border Barb, Amatola Toad and Samango Monkey) and other endangered species. · Packaging of eco-tourism guided walks and experiences, and training of guides (including mapping trails and making promotional video)
3. Brokering a **stewardship agreement** between Cata Community Property Association and state	Some progress was made in this regard under our CEPF project – we would like to build on this and see it through.
4. Youth and the environment **education** programme	Intensive education programme in the schools. Educate 100 primary school students and 100 high school students. Focus on: - Climate change, fossil fuels - Importance of conservation for economy
5. Environmentally-conscious **local economic development**	- Traditional medicine harvesting project. - Agro-ecological commercial farming project.
6. Improved **soil quality** and reduced **erosion**	- Sustainable land-use management practises

Table 5: Land preservation priorities identified by Border Rural Committee

The Keiskammahoek community landscape

Keiskammahoek is a small settler village in the foothills of the Amatola Mountains, located some 50km from King William's Town, at the confluence of the Gxulu and Keiskamma rivers. It has long been known to local inhabitants as a sheltered and fertile spot and, despite being located in a drought-stricken region, it has never lacked for water primarily due to the area being surrounded by

the Amathola Mountains on three sides and the Cata River running through the middle of the area to the Cata Dam in the South.

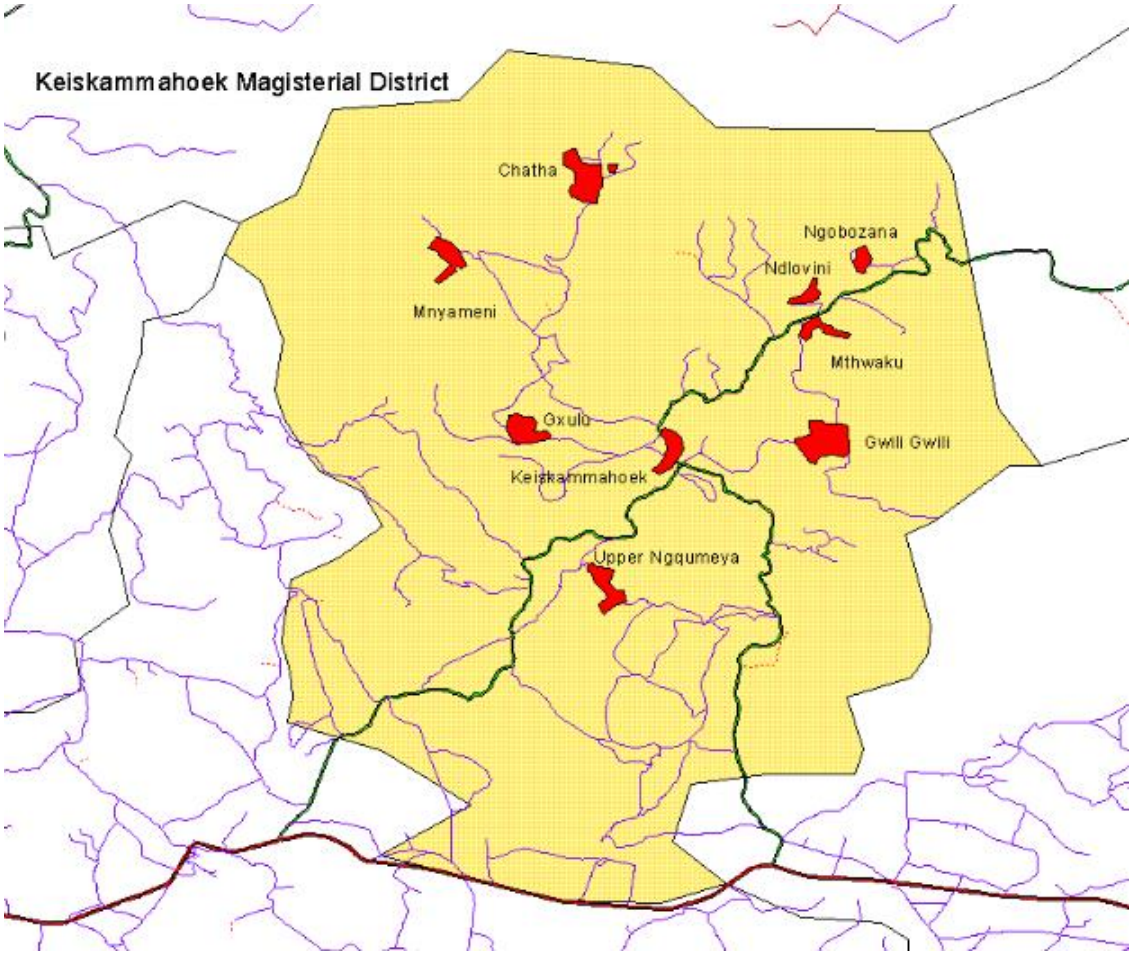


Figure 19: The 9 villages of Keiskammahoek

The land around the Keiskammahoek area hosts a number of types of land-use including indigenous forests, rangeland, rain-fed agriculture, irrigated agriculture, housing and water catchment. Much of the land is under-utilised yet there are nascent problems with soil erosion and alien encroachment. While there are a number of different income generating activities available to small-scale farmers on communal lands the key identified income streams for this project would be derived from two central, and linked project activities. Neither of these two primary project activities is particularly revolutionary, but it is the methodology for their application that reflects the systematic approach to sustainable income generation.

Communal outgrowers – slow growth forestry

Similar in many ways to conventional agriculture outgrower schemes work by incentivising both buyers (timber or sugar mills are common examples in South Africa, but not exclusive end points) and the producers (small-scale farmers) to be actively engaged in making the market work by ensuring a stable supply of materials. This is achieved by ensuring a guaranteed purchase price for the small-scale farmer which is secured through the purchase of a food future on either the Johannesburg Stock Exchange (JSE) or some other exchange.
The Keiskammahoek area is already home to commercial forestry activities, but this sector is largely aimed at plantation forestry, which poses multiple sustainability problems such as the decimation of biodiversity, denudation of the soils and the consumption of vast quantities of scarce water reserves. In the Department of Water Affairs and Forestry position paper titled: "Forests, water and development: seeking effective ways of utilising our resources", Versfeld and Warren (2002) suggest that *"the introduction of alternative forms of slower-growing forest trees (such as indigenous hardwoods for either timber or traditional medicines, but not excluding high-value exotics), using significantly less water than industrial plantations as we know them, might provide an acceptable land use in areas which are stressed or water scarce"*.

Developing contracts with commercial forestry partners to introduce slow growth forestry has the potential to motivate local landholders to remediate land to traditional forests for commercial gain, while reducing the risk of fires, reducing erosion, reducing drought risk and improving biodiversity. Linked to this, there is also potential for revenue generation from a number of related income sources including tourism activities (the area is already home to the internationally renowned 5 day Amathola hike), **Forestry Stewardship Council (FSC)** and **Fairtrade premiums**, **Carbon capture credits**, **non-timber forestry products**, **biodiversity offsets** and sales of **medicinal and other plants**. A brief description of each follows after the list of planned activities.

Holistic Planned Grazing (HPG) & protein salt licks.

HPG is a high density grazing methodology that requires the presence of a lot of animals in a small space for a short period of time. The presence of the livestock deposits large quantities of manure and urine on the land and leads to healthy, vigorous pasture growth achieved without the application of fertilizer to the land. Originally developed by Allan Savory in the 1980's the approach promotes livestock health and weight while improving soil quality, preserving biodiversity and providing an opportunity for soil carbon sequestration (see: https://www.youtube.com/watch?v=pnNaLSKDf-0).

The methodology has already been piloted at the Spier wine estate in South Africa and is presently a beneficiary of soil carbon credit income via the Promotion of Access to Carbon Equity (PACE) voluntary emission reduction scheme.

Supplemental to this the project will also introduce protein salt licks into the area. Protein based salt licks were originally piloted by Conservation South Africa (CSA) in the Umzimvubu Catchment area under the Biodiversity and Red meat Initiative (BRI) which targets small-scale livestock farmers in the country's most rapidly degrading catchment area along the northern boundary of the Eastern Cape between Lesotho and the coast. Under the BRI local farmers were helped to develop alternative

strategies for managing grazing lands that help cattle retain their market value during the winter months by providing them with a cheap source of protein in the form of a salt lick. The result of this is that cattle owners no longer needed to burn the grass in the dry months to stimulate grass regrowth (the main coping mechanism for stock weight loss in winter months being the poor quality of old grass). This translates directly into a financial gain for the cattle owners which supports the sustainability of the project. An additional commercial offshoot of this could be the development of a protein salt-lick manufacturing facility on the coast making use of maritime salt deposits and green sea lettuce (Ulva lactuca) to produce salt licks for increasing market demand.

Similar to the slow growth forest model, this initiative also has a number aligned benefits such as decreased topsoil run-off and erosion, increased grassland biodiversity, potential carbon capture credits and improved soil water retention.

Aligned value-addition initiatives

Biodiversity offsets

The Department of Environmental Affairs defines environmental offsets as follows: "*An environmental offset is an intervention, or interventions, specifically implemented to counterbalance an adverse environmental impact of land-use change, resource use, discharge, emission or other activity at one location that is implemented at another location to deliver a net environmental benefit.*" (DEA 2015). While highly controversial due to concerns around the "trade-ability" of nature and the potential for the licensing of environmental destruction, bio-diversity offsets have played a role in preserving South African ecosystems on a number of occasions already with a high degree of success.

While an overall national policy determination is still being finalised, two provinces (the Western Cape and Kwa-Zulu Natal) have already developed environmental offset guidelines. In both the Western Cape and Kwa-Zulu Natal draft provincial guidelines a ratio of 30:1 is required in order for the offset to be accepted when the impact is in areas that are critically endangered. The implication of this is that for every 1 hectare of land disturbed in the development process 30 hectares of land needs to be conserved elsewhere. The potential net environmental benefits of this approach are obvious, but if they are to be achieved the creation of some sort of offset market would prove invaluable in facilitating this process. Enter the DEA's Effective Environmental Improvement Intervention (2E2I) programme which is a proposed programme that will allow for the registration of ecosystem re-mediation projects under a specific set of standards. In essence the programme will allow those conducting re-mediation work to connect with those seeking opportunities to offset their impacts. While still in the development phase this programme has a great deal of potential to facilitate effective environmental improvement project development and could well prove itself to be an area of value add for environmental improvements on small-scale farms, especially in areas under communal land tenure.

A useful tool in facilitating biodiversity offsets is the Conservation of Agricultural Resources Act (CARA, Ac t no. 43 of 1983). This act has established a legal framework for the conservation of agricultural resources and has the potential to play a significant role in directing funds towards ecosystem goods and services markets (TIPS 2008). The act aims to support the sustained

productivity of the land by prevention soil erosion and rehabilitating soil degradation as well as conserving water sources and eradicating alien invasive species.
A similar initiative that has been developed since 2000 has been the introduction of biodiversity stewardship programmes which have already been rolled out in several provinces. The stewardship programmes work by developing a partnership between conservation authorities and landowners which allows for the landowner to retain title of the land as the management authority of a newly proclaimed protected area. The cost of establishing the protected area is hugely reduced for the conservation authority as they do not have to purchase the land and their role in management of the area becomes a supportive one where the private landowner is the principal actor. Asides from additional income generation opportunities such as through tourism and game meats the landowner also benefits by avoiding property taxes as well as certain areas of income tax.

Carbon Offsets

The South African government is committed to reducing the country's greenhouse gas emissions by 34% by 2020 and 42% by 2025 over a business as usual case (which has still not been entirely defined). As part of meeting these targets the state developed the Carbon Tax Bill of 2015. The bill is due to be enacted in January 2017 and will have an initial marginal carbon tax rate of R120 per tonne of CO2e (carbon dioxide equivalent). This will give a significant boost to a domestic carbon market, where those who emit excess carbon can seek to purchase the right to emit this excess carbon by buying someone else's rights, or by buying the carbon that is either captured or avoided through mitigation or sequestration. This form of carbon trading has great potential to add value to agro-ecology initiatives, particularly those related to agro-forestry.

At present the larger international carbon market (CDM – Clean Development Mechanism) is in abeyance until the Paris agreement determines a new form for a market based carbon offset scheme. In contrast to this there is a small but vibrant voluntary carbon trading market active in South Africa which is represented by highly reputable organisations such as Credible Carbon. These mechanisms allow for independently verified emission reductions and carbon capture projects to deliver tradeable results at favourable prices (R120 per tonne at the present rate). Linking such a mechanism with small-scale farmer initiatives has proven to be a viable source of income in the Baviaanskloof where spekboom thickets have regrown due to changes in agricultural practise. This strategy could also be highly effective in indigenous forest programmes described in the section on timber and non-timber forestry products.
In addition to this a recent FAO study (FAO 2012) analysed datasets from 74 studies which had made comparisons between the carbon sequestration capacity of organic vs. nonorganic farming systems and found that there were "significant differences and higher values for organically farmed soils". This type of carbon sequestration has also received a large boost at the COP 21 negotiations in Paris where the "4 pour 1000" initiative was launched, which aims to mainstream the value component of soil carbon. Clearly there is much potential for carbo offsets to channel funding towards this endeavour.

Fairtrade certification

With 1147 Fairtrade premium product prices on a comprehensive range of fresh and processed agricultural commodities as of March 2016 (Fairtrade 2016) Fairtrade accreditation provides a real financial incentive for the integration of sustainable environmental management practices into small-scale agriculture. With the seventh highest number of workers on Fairtrade certified plantations 2014 receiving some €1,156,700 worth of Fairtrade Premiums, South Africa is an established location for Fairtrade producers.

Fairtrade's mission is to "connect disadvantaged producers and consumers, promote fairer trading conditions and empower producers to combat poverty, strengthen their position and take more control over their lives." Fairtrade standards provide a mechanism for small-scale farmers to receive a price that covers the cost of sustainable production while providing additional funds which may be invested in social, environmental or economic projects.

The scheme also has additional investor benefits in that Fairtrade makes pre-financing available for farmers that require it while achieving a number of social impacts in the process, which may in turn be applicable to social impact bonds, thus yielding another potential income stream. The environmental components of the standard include thresholds for energy and greenhouse gas emission reductions, soil and water quality, pest control, biodiversity, genetically modified organisms (GMO's), chemical use and waste management.

Not only does Fairtrade certification present a significant opportunity for income from environmental investment through its own internationally recognised label, but given that over 50 percent of all Fairtrade certified producers are also certified as organic, there is yet another avenue for value addition.

Medicinal plants

The role of medicinal plants is an aligned potential income sector that cuts across both rural and urban areas. With over 27 million consumers within the traditional medicine market in South Africa (and many more interconnected markets in other parts of the SADC region) making use of some 771 species to the tune of R2,9 Billion per annum (Mander et al 2007) present extraction rates are simply not sustainable, particularly as harvesting is fatal to the plant in around 90% of the cases. At present the plants are harvested from the wild, with the most sought-after species reaching local extinction quickly and subsequently being exchanged at very high prices. According to Mander: "*Much of the current research and development effort focuses on novel drugs research, with little effort being directed at improving the current harvesting, production, processing, storage and treatment technology.*".

Creating market links for sustainably harvested medicinal plants from the slow growth timber forests thus has clear potential for income generation and will stimulate the incentive for local, indigenous nursey development.

Non-timber forestry products

Shackleton (2004) lists the role of non-timber forestry products in rural livelihood security is an often overlooked component of coping mechanisms employed by up to 40% of South African households. From edible insects and plants, to honey, grasses, building materials, bushmeat, firewood and much more the direct use financial value to rural households in particular of non-timber forest products is considerable. Shackleton's review of villages in the Eastern Cape, Limpopo and Kwa-Zulu Natal showed that direct-use values could be as high as R12 000 per household per annum with an average of R3 854. While these may not represent a direct commercial component of the project, it does show the aligned utility value to community members of securing biodiversity in the area. On the commercial front some benefits derivable from non-timber forestry products include traditional medicines, honey, mushrooms, thatching and curios.

Working for Water/Land/Wetlands

These three linked programmes are all state led initiatives aimed at reducing alien vegetation, reducing fire risk, improving water quality and conserving wetlands and landscapes. The original programme that they stemmed from was the Working for Water (WfW) programme which was launched in 1995 to tackle the issue of the 198 invasive alien species that cover around 10% of South Africa. While falling short of the state's objective of "*reducing the density of established, terrestrial, invasive alien plants, through labour intensive, mechanical and chemical control, by 22% per annum*" (DEA 2016) it has nevertheless been able to clear over one million hectares of alien invasives since 1995 and is recognised as an exemplary conservation project globally.

Based on the success of the WfW programme the Working for Wetlands (WfW) is aimed at improving livelihoods through job creation that protects agricultural resources, enhances biodiversity, yields cleaner water, reduces impacts from flooding and sustains base-flows in rivers (DEA 2016). Since its inception in 2004, the programme has directed over R800 million towards the rehabilitation of over 1,000 wetlands on state owned land, private farms and communal lands. A similar initiative that is presently under development in the Taung region in North West is the Working for Land programme which seeks to address degradation of land due to desertification, overgrazing, soil erosion, poor storm water management and unsustainable farming practices. Working for Land intends to make more land productive for the communities to sustain their livelihoods.

Tapping into these programmes in order to roll-out components of the environmental improvements required in order to sustain functioning ecosystem infrastructure has the potential to act as a significant in-kind co-investment by the state.

9.2 Project roll-out methodology

In the build-up to this project discussions will need to be had with all major contributing parties to assess the level of buy-in. Contact will need to be made with representatives from the EPWP (Expanded public works programme) with regards to accessing the working for water programme, the Land Rehabilitation Society Southern Africa (LARRSA) and DEA/2E2I with regards to biodiversity offsets, Fairtrade and FSC about certification, PACE, as well as state and private timber operations.

The primary point of these engagements is to determine under what settings accessing supplemental funding from carbon sequestration, biodiversity offsets, Fairtrade etc will be possible so as to ensure alignment from the outset.

Having concluded these initial engagements community engagement may begin to determine the level of community buy-in. From BRC's 10 year history in the community they anticipate that we will enjoy a good deal of community support. Having secured community support an area of land suitable for grazing, but currently encroached by alien vegetation will be identified (numerous such sites exist). Thereafter the EPWP crew from the Working for Water programme already operating in the area will be enlisted to remove the alien species, during which time the area will have mobile electric fencing installed operating from photo-voltaic power (already successfully trialled by the BRI initiative outlined in section 8.4). At the same time two other processes will be initiated. Firstly, cattle owners will be requested to volunteer to have their cattle placed under the care of the project, based on the inducement that their cattle will receive veterinary attention as well as full day-time supervision with the aim in mind of retaining their weight during the dry winter months (a historic problem in the area). The second process will be to initiate the planting of indigenous plants at the existing EPWP nursery, with a primary focus on timber species and those that have medicinal value.

Once the land has been cleared and the portable fencing erected HPG will be initiated in the area. If this coincides with the dry season the project will also introduce protein-salt licks to the cattle. Once the land has been suitably restored by the HPG programme the cattle will be relocated to a neighbouring block and the saplings from the nursery planted on the HPG restored land. This process is to be repeated until a suitable block of land has been reforested. During this time careful monitoring will take place to track the impact of the HPG and protein salt-lick projects on cattle weight and health with the aim in mind of proving a net-positive commercial outcome to the cattle farmers, as has been seen under the BRI.

The following phase centres around establishing sustainable harvesting practises for medicinal plants, honey, mushrooms and grasses from the newly forested areas to be rolled out while timber species develop. Needless to say this is likely to take a considerable period of time (a minimum of twenty years seems a realistic estimate for faster growing species). It is hoped that an agreement can be made with DEA so that selective harvesting of specific trees in existing conserved areas can be initiated in this time so as to provide the necessary skills for the establishment of a slow growth timber industry.

These combined initiatives will produce the results highlighted by the BRC as follows:

1. Enhancing the **production of good quality water** in Northern Keiskammahoek (Hogsback/ Stutterheim) – Alien clearing will reduce the amount of water lost to alien vegetation (Richardson 2004, Le Maitre 2000) while reducing the erosion of topsoil thus improving water production and quality, while reducing siltation of the Cata dam. The re-

introduction of indigenous forests will also help to regulate the flow of water over the seasons (DAFF 2011)

2. 2. Preserving **endangered species** and promoting **biodiversity** in Northern Keiskammahoek (Hogsback/ Stutterheim) through tourism. – The expansion of indigenous forests will replenish stocks of endangered flora while providing habitat for endangered fauna.
3. Brokering a **stewardship agreement** between Cata Community Property Association and state. – This will be one of the first steps in the process.
4. Youth and the environment **education** programme – The youth and women will be primary targeted demographics for project roll-out and environmental awareness will form an integral part of the training process.
5. Environmentally-conscious **local economic development. –** The whole project is designed to produce commercial and ecosystem good and services outputs.
6. Improved **soil quality** and reduced **erosion. –** Improved soil quality from HPG, increased and improved grassland cover and mulch build up from indigenous forests will all positively contribute towards this goal.

Recommendations

While far from exhaustive this paper has detailed a variety of mechanisms that are capable of adding financial value to investments in small-scale agro-ecology and land-use management. Tools such as derivatives, insurance premium discounts, Corporate Social Investment income streams, revenue bonds, accreditation premiums, state support programmes such as Working for Water, carbon emission reductions trading, income tax incentives and biodiversity stewardship and offsets amongst others all represent examples of such mechanisms.

Each of these tools deserves thorough analyses in its own right, which is beyond the scope of this paper, but what is clear is that with each mechanism that is added to the project basket so the financial viability improves. Cases such as the Port Elizabeth catchment management programme which brings together a number of these value streams in the form of agricultural revenues, carbon offsets, the Working for Water programme, Corporate Social Investment, DFI support, tourism incomes and sales of game meats are the front-runners in establishing a new and far more comprehensive holistic approach to deriving value from landscape based investments.

As project development processes that incorporate these multiple value streams are truly in their infancy each one of these mechanisms is deserving of concerted development attention so that the parameters that facilitate the actualisation of the benefits associated with each are most affectively achieved.

Investor awareness is another key component of the development work that must be taken forward to boost the growth of this sector. Twelve investment firms and asset managers were approached during the course of this research, of which only firms that had a specific impact investment mandate were aware that market competitive returns could be realised impact investment strategies.

Enhancing strategic links with SANBI, the Department of Agriculture and the Department of Environmental Affairs in particular is essential for the formulation of an effective strategic approach that identifies priority ecosystems for restoration work, and facilitates the integration of existing programmes that maximise both the return on investment and impact. These institutions are ideally placed to support project preparation, especially with regards to aggregation and bundling of projects that can attract large scale investors.

Establishing relationships with organisations such as the Land Rehabilitation Society of South Africa (LARSSA), landscape management oriented NGO's such as WWF, Conservation South Africa, Endangered Wildlife Fund and AWARD, as well as Corporate Social Investment funds that target conservation initiatives must be a priority area of focus for asset managers wishing to operate in this space. The projects outlined around the GEF's blended finance investments show how collaboration between a broad coalition of stakeholders around a particular issue, including multilateral development agencies, private commercial investors, impact investors, civil society and others can yield impressive results. While blended finance instruments are not a silver bullet to deal with the challenges associated with environmental impacts on global economic systems, they must clearly be viewed as an important element in the tool box available to private investors.

As far as state policy is concerned, the worthy strides made around tax incentives are admirable, but need to be supported by a suite of other actions. National biodiversity offset standards require urgent and official promulgation and biodiversity stewardship partnerships need to made more appropriate to community level structures in communal land tenure areas.

Two promising developments include the roll-out of the Local Government Climate Change Support Program (LGCCSP) as part of the National Adaptation Strategy (NAS) and The Spatial Planning and Land Use Management Act (SPLUMA). Both processes require the integration of climate risk reduction plans into land-use management and Integrated Development Plans (IDP's). These two policies can support EGS preservation by working with the following guiding principles:

- Well planned anticipatory land-use management projects can limit exposure and vulnerability to at least some of the projected impacts of climate change.
- Adaptation to climate change incorporates a reduction of vulnerability to underlying development stresses, alongside a reduction of vulnerability to specific climate change stresses.
- Existing development work forms the foundation for resilience interventions, acknowledging the interdependence of social, natural and economic systems and the need to maintain their health.
- Local government development processes need to be prioritised as the locus of ecosystem vulnerability identification and strategic response development. Recent assessment of the failure of local government to integrate climate adaptation planning as identified in the 2016 study by Lethoko (2016) titled "Inclusion of climate change strategies in municipal Integrated Development Plans: A case from seven municipalities in Limpopo Province, South Africa"

shows that these municipalities “have not included adaptation and mitigation strategies adequately in their IDPs despite being the most vulnerable municipalities in the province”. The reasons advanced for this lack of inclusion include the following: “low local human capacity to undertake this kind of planning; limited knowledge and understanding of climate issues at local level; limited financial resources and competing resources which often result in medium- to long-term planning being side-lined; projects that do not fit into the short political life of decision makers are not implemented. It is difficult to convince decision makers to consider a need for a climate strategy when climate projections cover a longer time horizon than political and development agendas of municipalities”. This status quo is hardly unique to the Limpopo province and is widely reflected not only in climate adaptation planning, but also around community based land-use management planning in general around the country.

- Capacitating local government planning officials in existing state developed tools such as the “Local government climate change strategy vulnerability assessment tool” and the SALGA “Let's Respond” guide to integrating climate change risks should be play a central role in addressing the roots causes of land-use management problems identified by Lethoko (2016), but should not take precedence over participatory community engagement processes.

- Effective communal land-tenure land-use decision making is community based, and acknowledges that resource poor communities are best placed to: establish their own development priorities, drive the implementation of interventions in own spaces, and identify own limits to adaptation.

- Land-use management work incorporates climate mitigation objectives so that the causes of climate change are addressed as part of the strategy for coping with climate change.

- Land-use programming acknowledges the strong interlinkages between, and integrates work across, the thematic areas of water security, food sovereignty, energy security, land security, community based natural resource management, human wellbeing and livelihood diversity.

- Land-use planning uses a broad set of approaches that spans research, sharing of both traditional and non-traditional knowledge, advocacy, and investment in technology and infrastructure with an emphasis on locally replicable and implementable interventions.

- There is flexibility in project design and implementation to allow for room for experimentation with new concepts, and also to change design as knowledge, understanding, and geophysical, biophysical and sociopolitical conditions change.

- The state adopt the lens that EGS response development should act as an engine of locally based economic development, and not provide a platform for further adverse incorporation of rural communities into extractive economies.

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