Roundtable on Small Business Development
in the Climate Change Space in South Africa
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Small Business Development in the Climate Change Adaptation Space in South Africa: From needs to markets to business models

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Background

Climate trends for South Africa from 1960 to 2010 are:

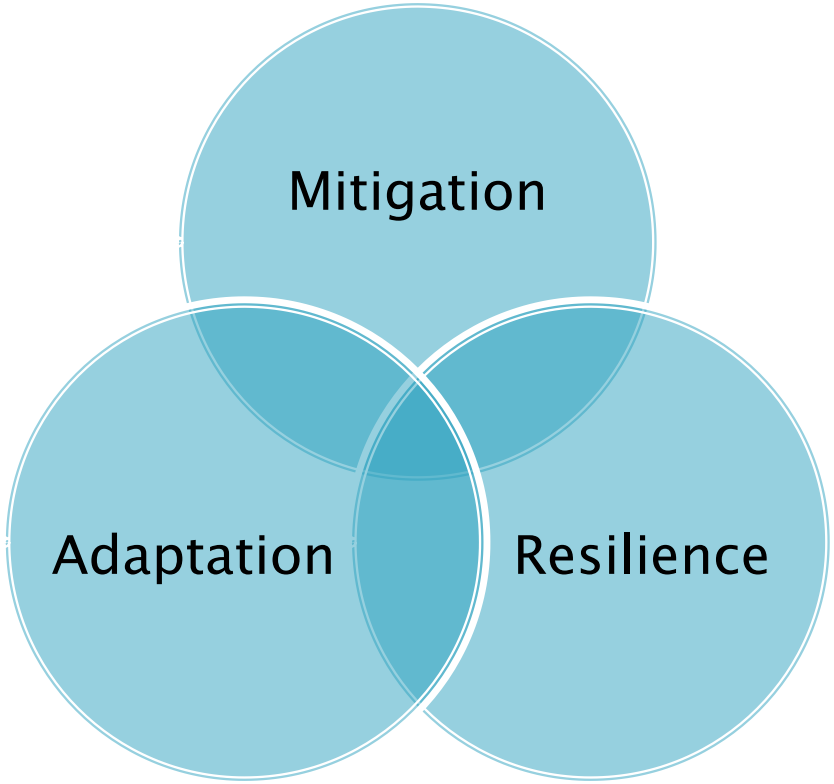
- Mean annual temperatures have increased by at least 1.5 times the observed global average of 0.65°;
- Maximum and minimum daily temperatures have been increasing annually, and in almost all seasons;
- There is a tendency towards an increase in the intensity and frequency of extreme rainfall events, including dry spell duration.

South Africa is highly vulnerable:

- It is already one of the driest countries, and is expected to face serious water security issues going forward.
- With 2 798 km of coastline, South Africa is also vulnerable to sea-level rise.
- Relies on an economy which is heavily carbon- and energy-intensive further puts the country at risk of climate change response measures (i.e. the range of actions that countries undertake to address climate change), domestically and globally.

Background…

The Three Pillars of Climate Change Response



- Mitigation, adaptation and resilience are inherently integrated.
- Mitigating climate change, i.e. reducing GHG emissions, is imperative to limit impacts and, in turn, reduce the future need to adapt.
- Adaptation is a core component of resilience. In many respect, adaptations solutions also contribute to decreasing GHG emissions.
- Efforts towards building a climate-resilient society, in addition, drive both mitigation and adaptation actions

Rationale

- Climate change adaptation open opportunities for innovation, both at the policy and business levels.
- SMMEs, and particularly small businesses (i.e. micro, very small and small enterprises), are particularly well-suited to seize such opportunities.
- Small businesses are generally more versatile, innovative, adaptive and entrepreneurial than large businesses.
- New and young firms tend to exploit technological or commercial opportunities neglected by more established companies and often bring new business models, such as social enterprises.

- The potential for adaptation-driven needs (and investments) to generate socio-economic opportunities for small businesses remains largely unexplored and misunderstood
- The focus to-date has been on mitigation-driven prospects, on the premise than mitigation-related interventions and investments are more financially viable and provide more imminent benefits.

Objectives and Approach

Objectives

- Investigate the interplay between climate change adaptation and small business development in the South African context.
- Understand the global and local adaptation needs, as a proxy to understand the future demand of adaptation solutions, and the size of the market.
- Explore how small businesses can seize business opportunities arising from adaptation.

Approach

- Literature review
- Key informant interviews
- Case studies – Interview based (6)
  - EWEF Sustainable Technologies; TnM Innovations (Loo Afrique); Isidima; AB Farms; MySmartFarm
- Case studies – Literature based (3)
  - Managing environmental risks: from climate-vulnerable agriculture to farming 4.0.
  - Managing social risks: greening human settlements for sustainable development
  - Managing economic risks: securing market access for South African wines

Adaptation Needs

Biophysical and Environmental

- Need to protect natural systems which provide resources and ecosystem services (food, fibre, water; regulating services such as climate regulation, pollination, disease control, and flood control)

Social

- The displacement of communities, destruction of homes, and loss of life, have implications on mental and occupational health, hence the need for emotional and psychological support, and safety nets.

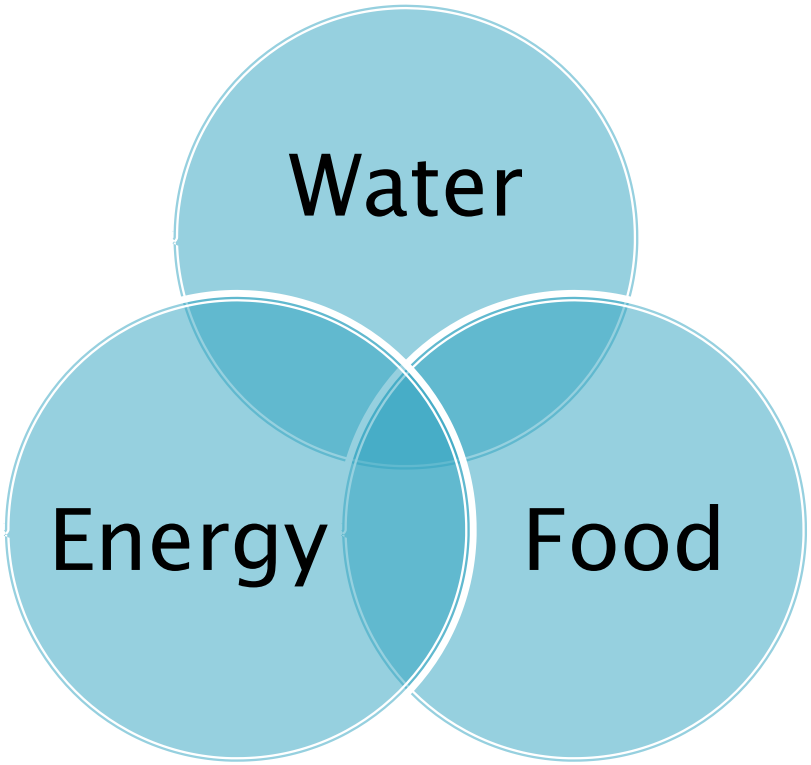
Institutional

- Institutions provide the guides, incentives, or constraints that influence the extent and distribution of climate risks, as well as create incentive structures that can enhance adaptation.

Information, Capacity, and Resources

- These include additional vulnerability and impact assessments, country-specific down-scaled socioeconomic scenarios, and enhanced understanding of costs and benefits of different adaptation measures.

The Food-Energy-Water Nexus Market



- Energy
  - The potential in renewable energy
  - Improving energy efficiency in air conditioning
- Water
  - Expanding and improving efficiency in irrigation
  - Non-revenue water (NRW)
  - Improved water efficiency in the sanitation sector
- Food
  - Climate smart agriculture
  - Organic agriculture

Energy

- Renewable energy has both adaptation and mitigation co-benefits
- The global market for sustainable fuels is forecasted to reach US$185 billion by 2021 (We Mean Business, 2018).
- Energy audits enhance efficiency
- The potential market size for solar-powered irrigation systems is worth R2.9 billion in South Africa.

Improving energy efficiency in air conditioning

Energy consumption for space cooling in buildings (in terawatt-hours)

	1990	2000	2010	2016
South Africa	4	6	6	8
World	608	976	1602	2021

Source: Extracted from IEA (2018, p. 19)

Air-conditioning units and cooling capacity, 2016

		Million units		
		Residential	Commercial	Total
South Africa	Installed stock	1	1	3
	Annual sales	0.1	0.1	0.3
World	Installed stock	1093	529	1622
	Annual sales	94	40	135

Source: Extracted from IEA (2018, p. 19)

Water

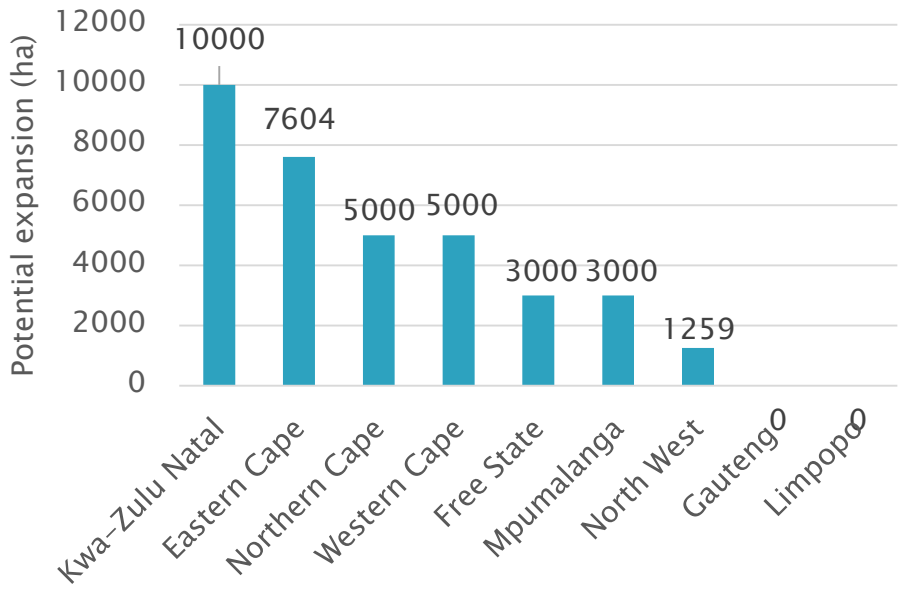
Expanding and improving efficiency - Irrigation

- Need to improve efficiency in the irrigation sector
- A significant number of the schemes were non-operational and some not at full capacity.

Selected Irrigation Data	2008	2014
Number of Irrigated Fields	56 812	61 956
Registered Water Users	38 243	35 642
Registered Irrigation Area (ha)	1 675 822	1 440 748
Actual Area under Irrigation (ha)	1 399 221	1 252 601

Source: Schulze (2016, p. 19); Van der Stoep and Tylcoat (2014)

Possible area for irrigation expansion by Province



Source: Authors based on DAFF (2015b, p. 42)

Water…

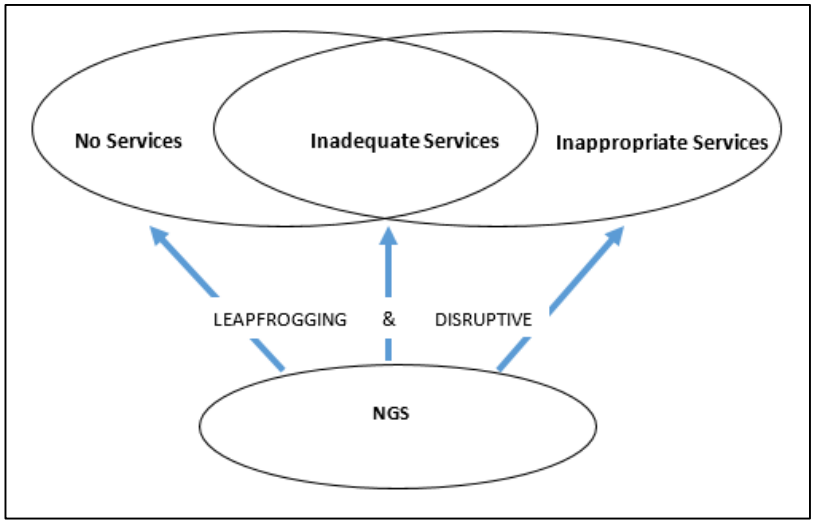
Non-revenue water (NRW)

- The average NRW for all the metros was 34.5%, giving a total volume NRW of 923.5 million m3 per annum for all metros =a loss of about R 5.5 billion per annum (DWS, 2015).
- The average Infrastructure Leakage Index (ILI) for all metros was 5.4 i.e. the leakage in the system was 5.4 times the expected minimum leakage.
- Ways to reduce NRW: employing new technologies to detect leaks, replacing aging infrastructure, improving the billing systems, and adopting smart metering.

Improved water efficiency – sanitation

- About 40% of water consumed by households is for flushing
- In this context, next generation sanitation (NGS) is being promoted

Potential for NGS



Source: Mudombi (2018b, p. 5)

Food

Climate smart agriculture

- Focuses on reducing GHGs, adapting to climate change, and reducing vulnerability.
- Production systems include organic farming, agro-ecology and conservation agriculture
- Market for no-till planting machinery in SA worth about R1.14 billion (GreenCape, 2017).
- Market for controlled environment agriculture (CEA) in the Western Cape about R600 million, predicted to grow by 15% per annum

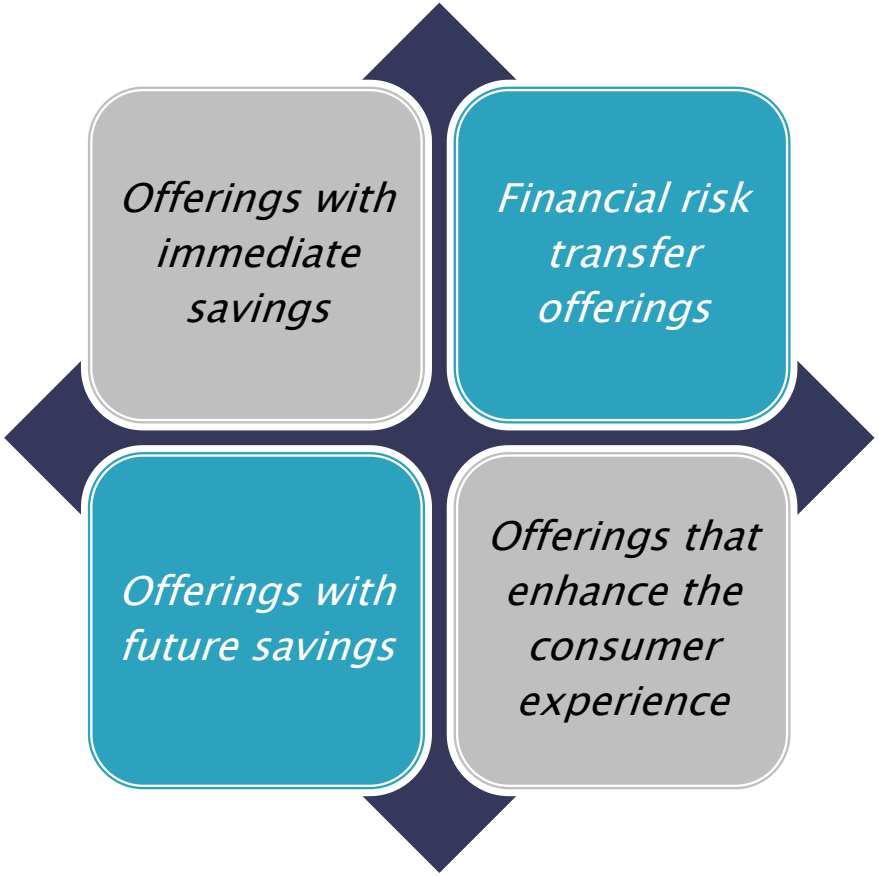
Organic agriculture

- Globally, organic food and drink sales increased from US$ 15 billion to about US$ 90 billion over two decades, to 2016 (Ecovia Intelligence).
- In 2016, about 57.8 million ha under organic agriculture globally, with Africa had about 3% (1.8 million ha).
- SA had about 14196 ha, which decreased by 35816 hectares over a 10-year period.
- World average organic shares of total agricultural land is 1.2%, while SA's is just 0.01% (Helga and Lernoud, 2018).

From markets to business models

- Small businesses and entrepreneurs face unique circumstances when compared to larger businesses
- Face the daunting task of bringing a quality product, service or technology to market, often where markets are new and undeveloped – with limited resources
- Business models for small businesses have to take into account their constraints for these businesses to reach consumers and for adaptation to occur

Business model classification



- *Immediate savings* refer to those – certain and immediate benefits
- *Future savings* – uncertain savings that require costs to be incurred currently
- *Financial risk mitigation* products – provide financial protection and build climate resilience
- *Consumer experience* – provide a superior experience to consumers
- Each business model type has key characteristics that have to be considered
  - *Voluntary vs. involuntary*
  - *Savings vs. cost*

Model 1: Offerings with immediate savings

- Offerings a consumer purchases to adapt to climate change and the benefit is realised fairly soon with certainty
- Typically voluntary and represent an associated savings rather than a pure cost with an uncertain benefit
- Government incentives can drive market interactions where activity is stagnant.

Water
- Leak detection and repair
- Next-generation sanitation solutions
- Water efficient taps and showers

Energy
- Increasing the energy efficiency of existing generation plants
- Small-scale embedded generation (SSEG)
- Smart meters to monitor consumption

Agriculture
- Efficient irrigation
- Water-efficient crops
- Removal of invasive species

Model 1: Offerings with immediate savings

Techno-economic/social aspects:

- Easier to sell – savings can be demonstrated
- Vital that offerings are viable and competitive on price
- Novel/technically complex offerings harder to sell
- Acceptability, convenience and desirability also important

Small business actions:

- Business strategies build on niche and innovative products that are well-demonstrated
- Approach development finance institutions
- Important to develop sustainable business models

Financing:

- *Poorer households/communities* – mix of assistance from the state, donors and private sector (through incentives)
- *Large businesses and households* – rebates/tax incentives; state procurement creating an environment of adaptation; linking of adaptation to profit-making (e.g. sale of power)
- *Public sector/Utilities* : State procurement of adaptation goods – e.g. reduction of water losses

Model 2: Offerings with future savings

- Do not provide immediate benefits, but build resilience and provide protection at some future date
- Generally accompanied by a degree of uncertainty and tend to be costlier i.t.o. time value of money
- Typically involuntary and represent costs coupled with savings that are not immediate

Water
- Desalination plants
- Increasing dam capacity/ heightening dam walls

Energy
- Diversification of energy mix through increased alternate energy supply options (solar, wind, biomass, hydro)
- Design, construction and fortification of generation and T&D infrastructure

Agriculture
- Landscaping modifications to protect against flooding
- Crop yield forecasting

Model 2: Offerings with future savings

Techno-economic/social aspects:

- Viability largely depends on technology and costs
- Offerings in water and energy sectors are largely unlikely to face technical issues with market uptake, except where new and not developed to operate scale

Small business actions:

- Encouragement of state procurement from small business either directly or through allied services in large projects
- Small businesses targeting larger tender projects through JVs

Financing:

- Target consumer an important determinant of affordability and uptake
- *Utilities:* capital subsidies and soft loans; project financing arrangements; greater IPP involvement
- Vulnerable/agricultural consumers: direct state support to assist in purchasing; use of state land for interventions where possible

Model 3: Financial risk transfer offerings

- Transfer risk to the financial sector in exchange for a premium
- Assist in protecting the vulnerable through smoothening consumption and lessening the financial and economic impacts
- Also can assist in adaptation to climate change
- Insurers able to identify and predict risks – assist consumers to understand, manage and limit risk

Energy & Water

- Insurance models that promote investments in infrastructure resilience
- Parametric insurance which links payouts to certain metrics (e.g. paying out a utility during water shortages triggered by a threshold dam level)
- Premiums linked to investments in efficiency

Agriculture

- Insurance index mechanism with incentivised risk reduction: reference farm plot
- Livestock insurance

Model 3: Financial risk transfer offerings

Techno-economic/social aspects:

- Insurance does not face substantial technical barriers per se but prediction tools are a barrier
- Certain consumers unable to afford insurance, especially high-risk events which inflate premiums

Small business actions:

- Providing insurance – low capital and operational costs with some regulatory barriers
- Vital for an insurer to possess capacity to assess and predict climate risk as well as the appropriate funding to access
- Insurers should also develop niche expertise (e.g. flood prediction)

Financing:

- *Vulnerable communities/farmers:* state subsidies combined with well-tailored insurance packages that incentivise the building of resilience into business activity (e.g. microinsurance)
- To crowd in insurance firms, state has to commit to increasing reliance in the economy through infrastructure investment
- PPP arrangements have succeeded in some countries (e.g. flood schemes)
- Government guarantees can provide confidence to insurance firms initially

Model 4: Enhanced consumer experience

- Offerings primarily sold on offering an aspirational experience while also contributing to adaptation
- Consumers of such products would tend to generally fit a middle-to-upper income demographic and derive utility from luxury and climate friendliness
- Offerings that posit the consumer experience as paramount provide additional utility to consumers in that the offerings are eco-friendly and sustainable

- Water-efficient coffee machines
- Luxury LED lighting and fixtures
- Use of sustainability-certified inputs in foods
- Plant-based and recycled packaging
- Chemical products with limited additives
- Non-electric clay refrigerators
- Eco-furniture
- Solar battery storage units

Model 4: Enhanced consumer experience

Techno-economic/social aspects:

- Aspirational goods are those for which there is high demand already – unlikely that such offerings will face any technical constraints
- room for such products to be marketed at the middle-to-upper income demographic

Small business actions:

- Important for small businesses to enter established value chains to sell their products.
- Large retailers should be targeted and product should aim to bolster both the aspirational nature of the good combined with the climate benefits.

Financing:

- Unlikely that any form of external funding would be required on the demand-side
- Due to their aspirational nature, however offerings in this model do have a high risk of cyclicality with the business cycle and their demand will probably wane during economic downturns

Policy implications – Demand

Laying the foundations for adaptation – a public sector lead

- Prompt finalisation of adaptation strategy/policy
- Awareness and understanding of adaptation to both climatic events and climate policy across govt departments/SOEs
- Appropriate legislation to promote adaptation markets – e.g. new building laws; public housing
- Regulatory framework for NGS/SSEG etc

State procurement as a driver for markets

- Procurement of adaptation goods by the state to lead by example
- Use of renewable energy in municipal buildings
- Rainwater harvesting
- Water efficiency products
- NGS

Direct state-support for vulnerable poor

- Subsidies

Tax-incentives and rebates for general h/h's

Policy implications – Supply

Funding

- Provision of dedicated funding to small businesses through funding institutions (e.g. IDC, DBSA, TIA)
- Funding needs to account for the nature of adaptation

Market access

- Access to skills/resources that enable small business to reach consumers
- Access to marketing/advertising expertise

Institutional support

- Provision of infrastructure (e.g. agricultural land/manufacturing floor) at preferential rental
- Provision of access to facilities which lower operational costs
- Access to technical skills/expertise

Conclusions / Way forward

- Climate change is unavoidable and SA is vulnerable – the need to adapt is urgent
- Much focus has been placed on mitigation with adaptation largely neglected
- Small businesses are particularly well-suited to seize adaptation opportunities but require the right environment to flourish
- Adaptation needs can be explained according to biophysical and environmental, social, institutional and information, capacity, and resource factors
- Adaptation offerings are classed into four model types depending on what the adaptation firm is selling

Conclusions / Way forward

- A mix of demand- and supply-side interventions are necessary
- The state can lead the way forward through providing the proper environment/legislation for adaptation to occur
- Preliminary research and case studies have been done
- Based on feedback from the Roundtable, report will be finalised

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