PRESIDENTIAL
CLIMATE COMMISSION
TOWARDS A JUST TRANSITION

A Presidential Climate Commission Report

ADAPTATION READINESS IN SOUTH AFRICA

Synthesis Report

March 2025

About the Presidential Climate Commission

The Presidential Climate Commission (PCC) is a multi-stakeholder body established by the President of the Republic of South Africa to advise the Presidency on the country's climate change response and pathways to a low-carbon climate-resilient economy and society. The PCC is guided by the Just Transition Framework, and has inter alia, achieved progress on the energy transition and climate financing. It has also been working on contextualising the Intergovernmental Panel on Climate Change's Sixth Assessment Report (AR6) Climate Resilient Development Pathways concept for the local environment, and employment and economic diversification, to ensure a sustainable low-carbon economy (IPCC, 2022). The Climate Change Act (22 of 2024) is explicit on the plan for a holistic effort across South Africa's spheres of government, driven by a collective leadership of major social partners and across all economic and enabling sectors.

About the Three Sector Adaptation Readiness Study

To further enable the holistic effort, the PCC has chosen to work in three critical areas of economic focus. These were selected because of their importance to the economy, their opportunity for job creation, the potential for transition, and the need for change to enable the transition to a low-carbon and climate resilient economy and society (also known as the Just Transition).

The areas are:

- The water value chain,
- The agricultural sector, and
- The built environment.

The PCC facilitates dialogue between social partners on these issues—defining the type of society we want to achieve, and detailing pathways for how to get there.

In building this society, we need to ensure decent work for all, social inclusion, and the eradication of poverty. We also need to protect those most vulnerable to climate change, including women, children, people with disabilities, the poor and the unemployed. In addition, workers' jobs and livelihoods must be protected.

This study aims to add value to the broader PCC programme of work on climate change adaptation and resilience – and the Just Transition. It will further respond to the context of the South African climate change journey that already spans multiple decades and has highlighted some of the world's best practice examples. South Africa is also known to fall short on transformative and programmatic approaches that are needed for project scale-up, transformational change toward full mainstreaming of climate change

The PCC's 5 Focal Areas

- Creating social partnerships.
- Defining a vision of a Just Transition.
- Conduct analyses into climate change impacts on jobs, economy and policy.
- Monitor progress towards mitigation and adaptation goals, and a Just Transition.
- Engage widely with stakeholders.

(PCC, 2022)

into policy and action, and in converting high quality policies into meaningful and sustained action.

Transformational change that establishes adaptation readiness and enables the pathways for attaining a Just Transition, requires alignment of South Africa's various policy and regulations with climate resilience. This study's analysis of adaptation readiness has considered the strength and existence of governance structures and policy processes, and capacities, which determine how adaptation takes place in the three focus areas. It examines actual experiences with adaptation and climate response planning and seeks to determine whether South Africa's systems are ready to undertake adaptation action in a transformational way.

Application of the Just Transition principles of procedural, restorative and distributive justice attempts to ensure that the most vulnerable groups are protected as much as possible from the bulk of negative impacts of the transition, and/or that these groups are given the opportunity to derive the benefits and opportunities that arise from the transition.

Authors and Reviewers of this Report

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Acronyms

AAMP	Agriculture and Agri-processing Masterplan.
CBO	Community Based Organisation
CSASF	Climate Smart Agriculture Strategic Framework
DFFE	Department of Fisheries Forestry and the Environment
EbA	Ecosystem-based Adaptation
GBCSA	Green Building Council of South Africa
GDP	Gross Domestic Product
HDA	Housing Development Agency
IGR	Intergovernmental Relations
IGSS	Intergovernmental Grant system
IPCC	Intergovernmental Panel on Climate Change
IWRM	Integrated Water Resource Management
KPI	Key Performance Indicator
M&E	Monitoring and Evaluation
MEL	Monitoring evaluation and learning
MSP	Multi-stakeholder partnership
NCCAS	National Climate Change Adaptation Strategy
NGO	Non- Governmental Organisation
NT	National Treasury
PCC	Presidential Climate Commission
RDP	Reconstruction and Development Programme
SDG	Sustainable Development Goal
SOE	State Owned Enterprise
UNDP-HDI	United Nations Development Programme- Human Development Index
UNFCCC	United Nations Framework Convention on Climate Change
WEFE	Water, Energy, Food and Ecosystems
WRC	Water Research Commission

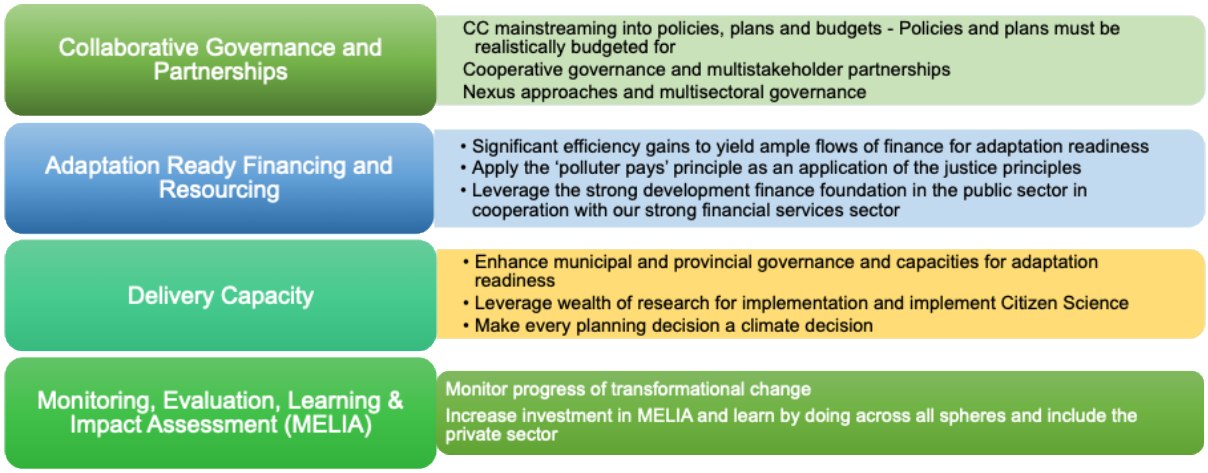
Executive summary

The effects of climate change are starkly visible across South Africa, evidenced through increasingly frequent and intense droughts, storms, floods and landslides (extreme events) as well as wildfires and heat stress, affecting various parts of South Africa. Such dramatic and newsworthy extreme events are set to further increase in intensity and frequency under a range of climate scenarios. Climate change impacts are also cumulative (via the gradual onset of climate change) and the direct and indirect effects are also important. All types of climate impacts are expected to increase in the future, with significant impacts on people, communities, ecosystems and infrastructure. The gradual onset changes and the frequency and intensity of extreme and disastrous events require differentiated responses.

Overarching is the finding that South Africa's readiness to respond to climate change is very low relative to the extent of the need and urgency of the growing climate crisis. This emerged from applying an institutional and governance lens to the PCC's Adaptation Readiness study. Governance and service delivery systems are failing vulnerable communities, a situation that undermines their ability to adapt, or build resilience to climate change. A central feature of this failure is the country's prevalent siloed approach to governance, and the very high levels of dependency we have created through social policies and systems. The analysis therefore explores the necessary conditions for overcoming these barriers and achieving adaptation readiness in South Africa.

Driven by the increasingly urgent need to respond to climate change, this study contributes towards understanding the status quo of adaptation readiness across the three project focus areas – the water value chain, the agriculture sector, and the built environment. This report synthesises findings from these three studies and is the culmination of a socialisation process crafted to create a roadmap for accelerating South Africa's adaptation readiness across society and the economy.

Central to the study conclusions is the need for transformational change in the way South Africa approaches development. The country's dominant development - or 'development as usual' - paradigm is failing to build the climate resilience of most of its people. Transformative development lies at the heart of adaptation readiness in the three economic focus areas, and across all sectors and value chains. Common approaches and findings that emerged from the three studies led to the identification of a set of necessary conditions of successful adaptation readiness, that if addressed synergistically and urgently, will place South Africa well on the trajectory to climate adaptation in a transformative manner. The four necessary conditions of success are summarised in the figure that follows and will be enabled by systemic transformation.



Systemic transformation towards adaptation readiness

South African society is characterised by dualism, informality and the persistent triple challenge of poverty, employment and equality. This necessitates a Just Transition, providing the context within which adaptation readiness needs to be considered. Transformative adaptation is central to addressing the current unequal distribution of climate risk and vulnerability. Fundamental changes are needed to the dominant development paradigm and power structures, norms and standards.

Such change would create the enabling environment for operationalising the water-energy-food-ecosystem (WEFE) Nexus (the nexus), agreed by stakeholders as the gateway to climate resilience. Implementing the nexus would break down the silo mentality and duality that characterises resource government and management in South Africa. It is also understood to have potential for significantly enhancing the climate resilience and security of these critical resources.

Ecosystem-based approaches (EbA) to adaptation go hand in hand with nexus implementation. EbA, or nature-based solutions, will both ensure the health of South Africa's critical ecosystems and their vital services, and establish the guardrails for the shortcomings of the country's traditional engineering, or grey infrastructure solutions. The holistic benefits and focus on sustainability of EbA provide a valuable strategy for enhancing resilience and fostering long-term ecological health. Integrating EbA into nexus management can also be more economically viable than traditional engineering solutions because these approaches rely on existing natural systems and require lower maintenance costs. At the same time, EbA enhances ecosystem health and resilience and contributes to biodiversity conservation.

EbA and nexus implementation enables decision makers – which include communities - to optimise the synergies between key resources, and to manage the trade-offs that maintain the integrity and sustainability of ecosystems, in a just manner. These integrated approaches should give life to power structures, norms and standards that are transformed in a way that empower communities and result in reduced and evenly distributed climate risk and vulnerability.

Transformative adaptation readiness and EbA-based nexus implementation rely on cooperative governance and partnerships, emphasising the interconnectedness of sectors and their behaviour under various climate change scenarios. The value of ecosystems as a driver of adaptation readiness, informs the rationale for this approach. This creates a foundation for a low carbon and climate resilient water value chain while simultaneously protecting ecosystem assets that enable water, energy and food security.

Transformative adaptation readiness and the three areas of economic focus

Transformative adaptation readiness that seeks to transition South Africa away from the dominant development paradigm towards one where communities and institutional decision makers are fully empowered to make climate resilient decisions and take coherent climate action should be front and centre of the PCC's forthcoming Just Adaptation and Resilience Investment Fund. This Fund should develop investment criteria predicated on this study's key findings and recommendations, and target investments towards it's identified recommendations. The key findings that emerged from analysis of each of the study's three focus areas provide foundational synthesis learnings that are highly relevant to these recommendations.

The issues of justice are paramount in this regard. A constant theme emerging from all three workshops is that of duality in South Africa's society and economy, manifesting in different ways in the economy and society, and necessitating intentional cooperative governance:

- In the **water value chain**, water stress is highly unequally distributed in society and economy, and yet water is widely acknowledged as being everybody's business. Municipalities, as the local face of state, play a major constitutional role in water service delivery, national water security and driving climate action. Since water is everybody's business, multistakeholder partnerships are key to accelerating adaptation readiness.

  Water quality is a compounding issue, with scarce water resources contaminated by agriculture run off, industrial and mining effluents, and poor sanitation infrastructure that is not able to withstand the additional pressures of climate change, such as a flood event. Encroaching alien invasive species also place significant pressure on the country's water and land users and resources and infrastructure including dams and catchments. Responsible institutions, such as the municipalities and catchment management agencies lack the capacity to respond appropriately, with low/no integration with the relevant programmes such as Working for Water Programme (DFFE) and the Alien Invasive Clearing Programme (DPWI), both of which seek to create jobs through their implementation.

  South Africa is also highly dependent on its neighbouring countries for its water security. Cooperative governance and adaptation readiness therefore extends beyond the country's national borders.

- South Africa's highly climate exposed **agriculture sector** exhibits a stark duality characterised by a well-developed, commercial (predominantly white) sector alongside a largely smallholder, household producer sector (predominantly black) comprising commercial, market oriented and subsistence producers, a legacy of apartheid policies that continues to shape the sector's dynamics. Low investments in extension services and producer support capacities are indicative of South Africa's 'development as usual' paradigm. However, this needs to transition to one that enables the growth and development of market-oriented smallholder household producers in productive agriculture value chains and informal markets. Land restitution efforts should be therefore oriented towards climate resilient productivity. The success of these efforts is highly dependent on WEFE Nexus operationalisation and on monitoring, evaluation, and learning that enables reflection and corrective courses of action.

- Societal disparities are starkly manifested in the **built environment**, where government interventions have been inadequate, and where apartheid era spatial planning approaches continue to prevail today. Financing is characterised by duality, trapping the built environment in a low state of adaptation readiness, with the heavy reliance on grants and subsidies for indigent communities being at risk in a fiscally constrained space. Municipalities are fundamental for adaptation yet are plagued by governance instability and low institutional capacity, while the private sector and communities can play a far greater role through collaboration and partnerships with government. Communities are insufficiently empowered to engage in their own destiny.

Recommendations for accelerating adaptation readiness

The four conditions of success – implemented under the umbrella of transformative and climate resilient development - are necessarily integrated and synergistic.

Adaptation ready cooperative governance and partnerships

Cooperative governance across and within spheres and sectors, and multistakeholder partnerships are necessary to accelerate adaptation readiness and ensuring the just transition.

The Intergovernmental Relations (IGR) Act and the Climate Change Act are important regulatory tools to achieve cooperative governance. However, there is a need for climate mainstreamed policies, targeted plans and feasible budgets that specify the justice interventions to be undertaken as well as the role players and finance sources.

The roles of the state, and the private sector must be tangible and transparent with mandates that are clear and unambiguous in ensuring that the principles of justice underpin adaptation readiness.

Clear institutional arrangements between WEFE Nexus line departments and with transversal departments must be established. Policy alignment between sectors and transversal ministries is also needed.

Transversal structures and processes are critical to align the sectoral legislation that needs to have climate responsiveness at their centre. The Minister responsible for environmental affairs, the PCC, National Treasury, the Department of Planning, Monitoring and Evaluation as transversal are important actors and will need to effectively collaborate to drive and implement transformational adaptation across all sectors.

A common understanding and vision of the Just Transition across South Africa's social partners, especially communities, is critical.

Adaptation ready finance and resources

Areas that can be addressed by government to mobilise resources include addressing wasted investments and inefficiencies and changing unsustainable government practices to release substantial and existing funding into the fiscal system.

The strong development finance institutions such as the Development Bank of Southern Africa (DBSA) and the Industrial Development Corporation (IDC), the intergovernmental grant (IGG) framework, and the public employment programme provide a strong foundation for resource mobilisation for climate adaptation. However commercial banks and the private sector need to be leveraged, incentivised, and guided in the Just Transition

National Treasury's review of the IGG framework to make grants more performance based and to include performance criteria in the assessment criteria for grant allocations is important for mainstreaming climate change. Government can Incentivise WEFE Nexus investments that are founded on EbA principles. It is also important to address municipal abilities to access climate finance and associated challenges besetting local government.

The PCC Climate Change Response Fund and development of a Just Adaptation and Resilience Investment Fund, together with the Disaster Risk Financing Strategy led by National Treasury, are promising building blocks of a sustainable Climate Adaptation Financing System.

Delivery capacity

Low capacities and governance constraints, particularly at municipal level, have emerged as the most urgent to address. Local government must be afforded the means of implementing the principles of the Just Transition while accelerating adaptation readiness.

The policy and regulatory framework for enhanced adaptation readiness is largely reliant upon municipal governance and capacities for implementation. Climate adaptation actions that rely upon implementation at the subnational government level must confront governance, capacity and competency constraints and intentional support from transversal governance structures is needed.

Municipalities should be incentivised to effect transformational change through the policy and regulatory framework (e.g. by-laws, as well as operationalising national policy), climate resilient tender specifications, and planning activities.

Municipalities and provinces are key actors in addressing informality which must be confronted and intentionally and positively embraced. Municipalities need to be incentivised to ensure that indigent and marginalised communities have access to participatory structures and all role players in informal value chains and communities should be sufficiently empowered to make effective contributions to issues affecting them. Without this, it is unlikely that informal communities and economies will be able to absorb and apply climate adaptive knowledge and practices.

A radical change is needed to current capacity building systems for municipalities. Priorities to address include senior management leadership capability, staff turnover, institutional memory loss and poor synergies between critical line departments.

Strengthening the capacities for adaptation readiness of national government should focus on supporting policy reforms that mainstream climate change, developing related regulations and incentives for policy implementation, and for targeted planning, budgeting and MELIA.

Monitoring, evaluation, learning and impact assessments (MELIA)

Investment in monitoring the progress of transformational change, leveraging research for implementation and implementing participatory approaches[1] needs to be ramped up urgently. All spheres of government need effective MELIA systems that foster a "learning by doing and reflection" culture. WEFE Nexus implementation should be the anchor and point of integration to avoid fragmentation and to ensure that common indicators towards a common vision form the basis for monitoring progress on transformational change.

Sufficient knowledge about climate change, and how to respond is needed at all levels of society and the economy, and particularly among the most vulnerable communities. Communities need to be empowered to participate, and learning from indigenous knowledge and practices can be enabled through cooperative governance approaches that empower community voices.

Investment in participatory approaches can also facilitate community ownership of critical infrastructure and rural and peri-urban areas should be prioritised to improve knowledge gaps.

Local governments need to be capacitated to invest in learning from and upscaling impactful community developed solutions and experiences.

[1] Participatory approaches refer to inclusive, community-driven methods that actively engage all (but especially local) stakeholders in decision-making, planning, and implementation processes. In South Africa, these approaches emphasise the integration of local knowledge and perspectives to enhance adaptation readiness. A key element of the participatory approaches described here is citizen science, which would involve communities and individuals in data collection, monitoring, and analysis, ensuring that adaptation strategies are grounded in both scientific research and lived experiences. This definitional outline has been informed by the extensive outputs of this project's widespread stakeholder consultation process.

Many research institutions produce quality data and research but are underused for MELIA and an adaptation ready society. Collaboration between these institutions and government is a low-cost investment in adaptation readiness.

Concluding remarks

No matter the sector under discussion, indigent populations are the most vulnerable to the impacts of climate change. Their ability to cope with the impacts of climate change is compromised by the persistent triple challenges of poverty, inequality, and unemployment. Adaptation readiness must be accelerated as a priority for South Africa with an intentional and funded focus on applying the procedural, distributive and restorative principles of justice.

All three of these justice principles are applicable for transitioning to an adaptation ready society and economy. However, procedural justice is particularly weak and requires urgent effective attention and investment. Cooperative governance can be strengthened through empowered communities.

South African urgently needs to monitor, evaluate and learn, and conduct routine impact assessments. Knowledge and information to enable a climate-ready economy and society is critical. Unless we know where we are, what progress has been made, and what failures we need to learn from, we cannot deem ourselves a climate-ready society. Investments in MELIA, knowledge and community empowerment should be integral to the PCC's forthcoming Just Adaptation and Resilience Investment Fund.

Addressing adaptation readiness in nexus ways would break down the silo mentality that dominates policy making, planning, implementation, and budgeting in South Africa.

The insights gained from the sector and synthesis socialisation process are relevant across South Africa's economy and society. The three economic focus areas of water, agriculture and the built environment are interconnected, highlighting the urgent need for operationalising the WEFE Nexus. Operationalisation of the WEFE Nexus is an important anchor for the PCC's Just Adaptation and Resilience Investment Fund.

Because of their criticality to the economy, to job creation, and to the just transition, the lessons learned should inform all of South Africa's adaptation readiness and just transition efforts – which will rely on systemic transformation that brings about fundamental changes. Key is the question of how this is accomplished by bringing people along, and how diversity, equity and inclusion in the transition process is addressed.

1. Preface

This report relies upon three separate studies conducted for the water value chain, the agriculture sector and the built environment to determine the state of adaptation readiness in South Africa.

The three studies involved individual literature reviews, in-depth sector reviews with key role players in the relevant fields, small focus group discussions with key experts, and a socialisation process comprising dialogue events and consultative workshops. This report synthesises the transversal issues pertinent to each of these – and other – economic focus areas. By consolidating those findings, the document helps create a roadmap for accelerating South Africa's adaptation readiness across society and the economy.

1.1. Study rationale, overview and approach

The effects of climate change are starkly visible across South Africa, evidenced through increasingly frequent and intense droughts, storms, floods and landslides (extreme events) affecting various parts of South Africa. Such dramatic and newsworthy extreme events, which also include wildfires, heat stress and storm surges, are set to further increase in intensity and frequency under a range of climate scenarios.

Climate change impacts are also cumulative (via the gradual onset of climate change) and the direct and indirect effects are also important. All types of climate impacts are expected to increase in the future, with significant impacts on people, communities, ecosystems and infrastructure. Both the gradual onset changes and the frequency and intensity of extreme and disastrous events require different forms of adaptation response that together, bring about economic, ecological, and societal resilience. An advanced state of adaptation readiness is urgently required in South Africa to enable a just transition to a state of social-ecological and economic resilience.

Social-ecological resilience refers to the capacity of a social-ecological system to **absorb shocks and maintain its structure and functions in the face of stressors and disturbances**, while also adapting and transforming to changing conditions over time.

Driven by the increasingly urgent need to respond to climate change, this study contributes towards understanding the status quo of adaptation readiness through analysis of the three project focus areas – the water value chain, agriculture, and the built environment. The research was guided by four central questions:

- What activities are underway to adapt to climate change in South Africa?
- What is currently considered to be international best practice for adapting to climate change in developed and developing countries?

- How is South Africa aligning with international best practice and where are the critical gaps?
- What are the strategic enablers of the transition to a low carbon and climate resilient economy in terms of distributive, procedural, and restorative justice for all South Africans?

Guided by these questions, the study has sought to deepen the national understanding of optimal approaches to ensuring that South Africa's people and economy are climate ready and enabled to build resilience.

Exploring ways of ensuring that inequities are reduced has been central to the study. This has been done by utilising the principles underpinning the National Just Transition Framework - restorative justice, distributive justice, and procedural justice. For example, in the various trade-offs that must be made, efforts will need to be targeted towards attempting to evenly spread the benefits of the country's transition across society and attempt to ensure that the related costs are not solely borne by the marginalised. Furthermore, from a procedural perspective, the PCC will need to ensure agency and inclusion in decision making processes, and that transparency and accountability are evident.

1.2. Socialisation and stakeholder engagement

Climate change has become highly recognised by both the scientific community and the general public. In line with this, the Just Transition discourse has increasingly also assumed national recognition in South Africa. However, this discourse has also revealed that the understanding of how climate change manifests, and how and the extent to which we should respond, are highly varied and complex, and often contested. Transformative change towards the Just Transition is therefore operating in a complex setting necessitating an iterative and adaptive approach rooted in a consultive process of socialisation with relevant stakeholders.

Climate change has shifted firmly into the realm of being a social phenomenon. The shift is appropriate given that the impacts of climate change are physical with long lasting consequences for economies and societies. Getting to grips with these complexities through balanced perspectives requires ownership by all the social partners.

This synthesis report is the culmination of the process whereby social partners, experts, and role-players were engaged in dialogues and workshops for each of the economic focus areas. Key study findings were further analysed in the workshops conducted for each focus area in the latter part of 2024. The workshops allowed the sharing of diverse and important perspectives around adaptation readiness in each focus area and an interrogation of the necessary conditions for success which have led to identifying the priority pathways to progress readiness beyond the status quo. This socialisation process has assisted in understanding what the implications of South Africa's adaptation readiness are for the economy and society as a whole.

2. Introduction

The following sections provide an analysis of adaptation readiness in South Africa, as assessed through a governance and institutional lens applied across the study's three economic focus areas. This analysis provides a basis for assessing adaptation readiness across the country, with learnings synthesised in this report that can be applied and adapted to different sectoral and transversal contexts.

Building on this report's comprehensive, multi sector-wide study and socialisation process, this synthesis report presents the key issues that detract from or advance readiness and examines the pathways for the Just Transition to a low carbon and climate resilient society and economy. Through the synthesised analysis, recommendations for the necessary conditions for successful adaptation readiness, applicable across the economy and society, are identified. These conditions provide a basis for building consensus around the priority pathways and strategic enablers for accelerating adaptation readiness and a Just Transition across South Africa.

2.1. Adaptation readiness in South Africa requires systemic transformation

Achieving system-wide socio-ecological resilience involves transformational change which gives rise to the risks involved in transitioning to a low- or lower-carbon and climate resilient economy and society. These transition risks are likely to have the greatest impact on the people who have contributed the least to the climate crisis i.e. the poor and marginalised. This is especially true for a country like South Africa, which is characterised by widespread informality, and a deeply dualistic economy.

Box 1. Informality, dualism and South Africa's triple challenges in the context of a Just Transition

South Africa faces the compounding challenges of climate change, which intersects with the country's persistent triple challenges of poverty, employment, and equality, within a constrained fiscal environment, stagnant economic growth and high unemployment. The most vulnerable – those in informal settlements, marginalised communities, and dependent on compromised livelihoods – bear the brunt of climate impacts, with their resilience is further undermined by these persistent socioeconomic disparities. These disparities play out in a country defined by social and economic dualism and widespread informality.

Although informality is pervasive and growing, the country's governance mechanisms and institutional arrangements largely fall short of enabling the resilience of informality throughout the society and economy. Municipal by-laws through to national legislation and

policy are either silent on this growing segment of the country's economy and society or are misguided in attempts to mainstream the informal into the formal economy, ignoring the dynamics, norms and standards that characterise informality in South Africa (and elsewhere).

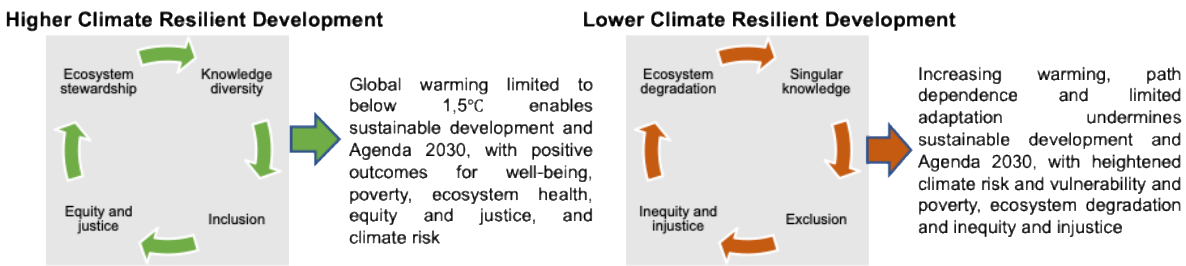
Informality is not a transient or opposing force to formality but a structural reality with its own resources and capabilities. However, governance and institutional frameworks fail to integrate informality into climate adaptation (and broader development) strategies. Similarly, the nation's deep-rooted duality – where economic opportunities, services, and amenities are unequally distributed across urban and rural spaces – is not being effectively addressed. Post-1994 policies, particularly in agriculture, have exacerbated this divide, further entrenching inequality.

Therefore, a just transition which is grounded in the exigencies of these challenges demands a new approach – one that moves beyond formal-sector solutions to embrace the potential within informal economies and marginalised communities, fostering equitable and sustainable climate adaptation. Policies which inadvertently entrench and exacerbate South Africa's dualistic nature must better tackle the unequal divide in the country's resources and access to services. It is also essential to ensure that government at all spheres is willing and able to upscale proven solutions in a short turnaround time – this includes establishing pilot sites, incentivising innovation, widespread sharing of practical solutions to informality, funding resources and regulatory considerations. It is essential that these do not get caught up in drawn out bureaucratic timelines.

Without these elements of transformational change, the transition to a low-carbon, climate resilient society cannot be just.

The transition to a low carbon and climate resilient society can either deepen or reduce existing inequities in South African society. Transformative adaptation is central to addressing the unequal distribution of climate risk and vulnerability. Transformative adaptation is defined by the UNFCCC as "actions aimed at adapting to climate change resulting in significant changes in structure of function that go beyond existing practices". (IPCC WG II AR6, 2022). The dimensions considered to enable actions towards higher or lower climate resilient development are ecosystems; knowledge; inclusion; and equity and justice, as depicted in Figure 1.

Figure 1. Dimensions of Climate Resilient Development



(Source: adapted from IPCC WG II AR6, 2022)

This synthesis study highlights a range of findings leading to necessary conditions which are important first steps in addressing these systemic challenges. If applied properly they can assist in accelerating the countries adaptation readiness.

Climate resilient pathways or trajectories combine adaptation and mitigation to realise the Sustainable Development Goals (SDGs). Certain coping or incremental adaptation strategies are inadequate for addressing the enormity of the climate problem, are unsustainable, or result in unintended negative consequences. This implies that fundamental changes may be needed in existing socio-ecological systems to address the root causes of vulnerability. Transformative adaptation characteristics can be deliberately included in adaptation plans to enable desired changes for more sustainable climate responses – and is about *transitions* from old to new norms and values, rules and customs, and power structures. Transformative adaptation can therefore help societies and systems to anticipate, guide or recover from climate impacts.

There are two key and related approaches for enabling climate adaptation readiness and the Just Transition in South Africa – the water-energy-food-ecosystem (WEFE) Nexus, and ecosystem-based adaptation (EbA). These integrated approaches enable key actors to address the complexity of interrelated sectors, mechanisms and phenomena necessary for adaptation readiness, and the criticality of preserving the country's key ecosystems, respectively. These approaches have emerged through this study and its socialisation process, as fundamental for both framing the state of South Africa's adaptation readiness across the three economic focus areas and outlining a roadmap for enhancing and accelerating readiness.

Common to both approaches are cooperative governance and resource management, emphasising the interconnectedness of sectors – particularly key resource sectors – and their behaviour under various climate change scenarios. The value of ecosystems as both an interconnected resource and as a driver of adaptation readiness, informs the rationale for both approaches.

Importantly, the two approaches are not to be seen as separate and applied independently of each other. Rather, they should be seen as complementary, where the WEFE Nexus approach is enabled and enhanced by application of the EbA approach.

The Water-Energy-Food-Ecosystem (WEFE) Nexus

The Water-Energy-Food-Ecosystems (WEFE) Nexus provides a critical framework for increasing climate resilience by identifying synergies and trade-offs between water, energy, food, and the supporting ecosystems. The Nexus approach seeks to integrate governance and management across multiple sectors and resources, important to the achievement of sustainable, equitable, and resilient socio-economic development. This approach is predicated on the need to view water, energy, food and ecosystems as being complex and inextricably entwined, rather than as separate entities, thereby necessitating integrated and sustainable management (PCC, 2021; European Union, 2018; WRC 2017).

The majority of freshwater is used for agriculture (more than 60%), whilst other major users include industry, domestic use and power generation. Water needs to be retained in dams and reservoirs to serve the irrigation needs of food production, particularly in water stressed countries such as South Africa. At the same time, electricity generation usually requires substantial amounts of water. Likewise, water reticulation depends on electricity to ensure that water and sanitation infrastructural services function adequately. These interdependencies can create competing demands and possibly conflicts between sectors and users about limited water resources. Applying the WEFE Nexus approach (see Figure 2) helps to improve the understanding of the interdependencies across sectors and the ecosystems they depend on with a view to improving integrated solutions that enable the SDGs.

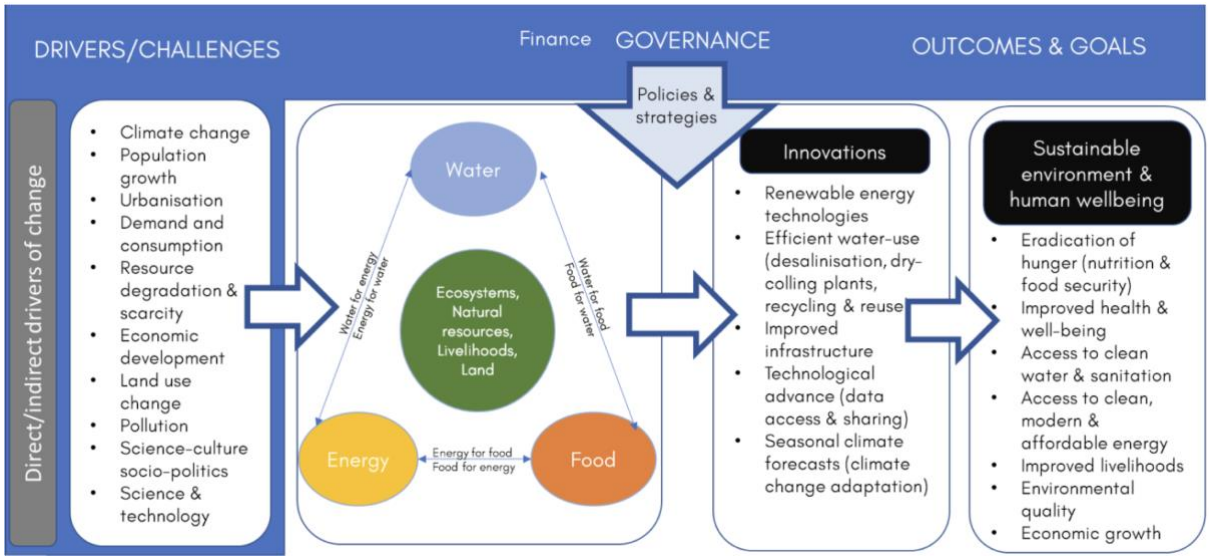
Furthermore, the impacts of climate change have increasing effects on people and ecosystems. This is exacerbated by a rising demand for water due to population and economic growth, higher temperatures as well as a decrease in precipitation in some geographies.

The Nexus approach requires transformative governance and institutional arrangements and is a stepwise change from the single sector approaches that we are used to. Since 1992 the principles of Integrated Water Resource Management (IWRM) have been actively applied in the water value chain in coordinating and optimising water use between different users. Because of the centrality of water to Nexus security, applying the Nexus approach builds off the basic principles of IWRM, expanding them to target food and energy security, and to optimise the use of natural resources.

As shown in Figure 2, managing Nexus interactions needs to be considered in the context of multiple globally relevant, as well as more context-specific, drivers. These drivers have a significant impact on the natural resource base and can cause environmental degradation and resource scarcity. They also affect and are affected by different social, economic and environmental conditions. The WEFE Nexus provides an informed and transparent framework for determining appropriate trade-offs and synergies that maintain the integrity and sustainability of ecosystems, creating a foundation for a low carbon and climate resilient water value chain, while simultaneously protecting ecosystem assets that enable water, energy and food security.

An effectively implemented Nexus enables a focus on long-lasting changes in social equity, employment and poverty through transformative projects in energy, food and water. Case studies have demonstrated that the whole is greater than the sum of its parts – i.e. greater benefits can be derived from Nexus implementation than from the individual components, enabled by economies of scale attained through integration.

Figure 2. The Water-Energy-Food-Ecosystem Nexus (PCC, 2021, after WRC, 2020)



Ecosystem-based Adaptation

Ecosystem-based adaptation (EbA) offers a nature-centric approach to addressing climate change. It emphasises the interconnectedness of ecosystems, communities, and the climate. Its holistic benefits and focus on sustainability make it a valuable strategy for enhancing resilience and fostering long-term ecological health. Through an appropriate interface and balance with hard infrastructure solutions for resource security, (such as dams that serve as water reservoirs and support of irrigation systems for agriculture), EbA can both secure hard infrastructure assets, and increase the amount of water resources that can be retained or returned to ecosystems in a way that places less pressure on constrained fiscal resources.

EbA can be more economically viable than traditional engineering solutions because these approaches rely on existing natural systems and require lower maintenance costs in the long run. At the same time, EbA enhances ecosystem health and resilience and contributes to biodiversity conservation which is critical for ecosystem resilience and ensuring that ecosystems can continue to provide services in the face of climate change.

Additional value can be derived from EbA, to include carbon sequestration, increased climate resilience, support for livelihoods, and achievement of the Sustainable Development Goals (SDGs):

- **Carbon sequestration**: healthy ecosystems such as forests and wetlands serve as carbon sinks that by absorbing carbon dioxide (CO2) from the atmosphere, can play a vital role in mitigating climate change.
- **Increased resilience**: ecosystems provide an important buffer for communities from climate impacts, such as floods, droughts, and heat stress by regulating water flow and temperature, thus enhancing overall community resilience. In this way, EbA uses natural systems to reduce vulnerability to climate change. For example, restoring mangroves can protect coastal areas and their communities from storm surges and erosion.

- **Support for livelihoods**: in maintaining or improving ecosystem services, EbA initiatives can sustain agricultural productivity, fisheries, and other livelihoods that are critical for local communities.
- **Achievement of the SDGs:** Integrating EbA into broader development strategies assists in the alignment with the country's sustainable development objectives, fostering economic development and poverty alleviation while addressing climate change.

EbA involves the sustainable management, conservation, and restoration of ecosystems to help communities adapt to the impacts of climate change. It integrates biodiversity and ecosystem management into climate change adaptation strategies, recognising the role healthy ecosystems – such as forests, wetlands, and coastal areas – play in enhancing resilience against climate impacts. As such, EbA represents a coherent approach for adaptation to climate change that makes use of the role that well-functioning ecosystems play in achieving positive societal and development outcomes.

Effective EbA necessitates a multi-sectoral approach that is integral to the WEFE Nexus. EbA recognises that ecosystems provide services crucial for various sectors, including agriculture, energy, water management, and disaster risk reduction, therefore promoting cross-sector collaboration and governance. Successful EbA also involves local communities in decision-making and implementation, fostering local knowledge and practices that enhance resilience, and establish understanding and ownership of critical natural resource provisioning.

Figure 2 also depicts the centrality of ecosystems for climate resilient development, emphasising the need for nexus/systems approaches. Healthy ecosystems provide services, such as water and soil nutrients, essential for water energy and food security. These are vital for achieving most of the SDGs including the cross-cutting goals of, for example, "No Poverty" and "Decent Work and Economic Growth".

The EbA approach is recognised especially (but not only) for its potential to support poor and rural communities who are relatively more directly dependent on natural resources and ecosystem services in adapting to climate change. This makes it especially important in the context of a Just Transition towards a climate resilient, low carbon economy, as the principles of EbA can help ensure the most vulnerable are less likely to be left behind.

EbA interventions also have the potential to be relatively cost-effective and adaptive in the long-term when compared to adaptation solutions that rely strictly on engineering and hard infrastructure. The co-benefits of EbA can contribute towards a broader set of socio-economic and development goals, including job creation, poverty reduction and rural/peri-urban development.

This adaptation readiness study has found that, in conjunction with the WEFE Nexus, EbA is an important approach for accelerating climate adaptation readiness in the South African context. Together the WEFE Nexus and EbA can enhance efficiency and promote adherence to the three principles of justice embodied by the Just Transition - procedural, restorative and distributive justice.

3. Findings from each area of economic focus

Several findings have emerged from analysing adaptation readiness in each of this study's three focus areas. These key outcomes are illustrated below and ultimately lay the foundation for the synthesis learnings which are discussed later in this report.

3.1. The water value chain

South Africa is water stressed and highly exposed to climate risks.

At 450mm average annual rainfall, South Africa experiences well below the world average of 860mm per annum. The country's insufficient, unreliable, and poorly maintained water resources expose society and the economy to severe climate risk. The impacts of climate change in South Africa manifest largely through critical water resources, with knock on effects across sectors, the economy, and society.

> South Africa's current water crisis has devastating effects on the well-being of the country's entire population, especially the poorest and most vulnerable (Greenpeace Africa, 2022).

The continued trend in industrialisation and urbanisation is expected to place further pressure on fresh water supplies. Without corrective action, water demand is expected to exceed the availability of economically usable freshwater resources by 2025.

Water stress is unequally distributed in South Africa's society and economy.

The inequalities in water and sanitation access across the water value chain, coupled with unmaintained infrastructure and avoidable water losses, leave economic centres and cities unprepared for extreme climate events such as prolonged droughts while communities living in peri-urban or informal settlements are disproportionately impacted by floods. These communities, who often live and work in areas located on flood lines, or exposed to sea level rise, poor air quality, fires and heat stress, are disproportionally exposed to climate risk across the water value chain. Children, the disabled, and the elderly are the most vulnerable within this broader vulnerable grouping.

Incremental rises in temperature and changes in rainfall variability exacerbate water scarcity, particularly for marginalised communities and population groups. Those hoarding water and able to access groundwater, have a much greater advantage over those that do not have enough nor the resources to access alternative sources of water.

The 1998 National Water Act sought to address inequities in the water value chain. The Act shifted the country's water resource development emphasis to a focus on efficiency and sustainability of water use. This shift in emphasis sought to redress past imbalances around access to water for all South Africans, and reserving sufficient water to maintain the natural environment.

Municipalities play a major constitutional role in water service delivery, national water security and driving climate action.

Local governments, however, face enormous capacity and resource constraints, severely limiting their ability to provide water services sustainably. At the same time, the IPCC's 6th Assessment Report recognises the centrality of the local government sphere to taking priority climate action.

According to a National Treasury (NT) diagnostic review of the system of capacity building for local government (2022) "...the current state of local government in many places is of grave concern: a significant percentage of municipalities are in financial distress, and service delivery levels are declining in many places." Yet, in the preceding five years, more than ZAR 40 billion was invested in building local governments' capacity. The 2022 NT report highlights that a radical change to the current capacity building system is needed, and by all actors, to enable the local government function to fulfil its constitutional mandate.

Such radical change would also accelerate the readiness of municipalities to prioritise and implement climate action, which goes hand in hand with ensuring South Africa's water security. Heavily compromising is the combination of unattended water leakages and losses, Non-Revenue Water (NRW) - water tariffs that do not reflect the true costs of abstraction and delivery - subpar water and sanitation infrastructure. Governance and finance issues are also prevalent, with most municipalities unable to meet their financial obligations to Water Boards, underinvested in water infrastructure and maintenance, and failing to ensure equitable access. At the same time, South Africa – along with most global countries - struggles to shift to a paradigm that places a high value on water and on water generating ecosystems. Overarching is that water investments are trickling rather than flowing to where they are needed most.

These are among the key characteristics that undermine both water security, and adaptation readiness, rendering millions of households highly vulnerable to climate risk.

Water is however everybody's business, and multistakeholder partnerships are key to accelerating adaptation readiness.

Water relates to almost every aspect of development, linking to each of the 17 Sustainable Development Goals (SDG) and enabling the economic productivity of almost all sector, and the economy as a whole. Diminishing water supplies stymie poverty alleviation and translate into slower growth and reduced GDP. According to the World Bank (2023) some regions could see their growth rates decline by as much as 6 percent of GDP because of water related losses in agriculture, health, income and prosperity.

South Africa is significantly dependent on its international neighbours for water.

The country has tried to resolve its water scarcity problem through engineering dams and importing water from inter-basin transfer schemes, including from other countries. South Africa relies heavily on regional water resources that largely come from other countries and/or shared river basins and aquifers (shared ecosystems). About 70% of South Africa's GDP is supported by water from the Limpopo, Inkomati, Maputo (Great Unsuthu), and Orange Rivers, which collectively drain around two thirds of the country's land area and are shared by our six neighbouring countries.

South Africa's water use, and ecosystem practices, also impact shared ecosystems and neighbouring countries. The impacts of climate change are felt across the region

and a continent widely considered to be the most impacted by climate change. Its leaders need to be more responsive than is currently the case, and should take the lead in local, regional and global climate initiatives.

South Africa's excellent research capacity is not being translated into policy and implementation.

Key policies and strategies are not applying the principle of adaptive management or learning by doing. Case studies of how the National Water Act's shift in emphasis has shifted inequalities through benchmark pathways are not available, while world class research and guidelines on the WEF nexus produced by the Water Research Commission for well over a decade have yet to translate into governance, institutional and financing arrangements needed to give economic life to water. At the same time, the country lacks a comprehensive and coherent monitoring framework at the WEFE Nexus level.

3.2. The agriculture sector

The agriculture sector is highly exposed to climate change

Climate change impacts on agriculture, multiplied by water and land stress, are significant for all farmers, including for smallholder and household producers who are especially vulnerable. Logistics failures in roads, rail, and ports are one of the major problems facing sustained agricultural exports. Such failures stem not only from mismanagement and corruption; they are also a result of climate change induced extreme weather events severely disrupting bulk infrastructure.

The impact of climate change on agriculture is expected to be severe. Rainfed field crops and range animal production are extremely vulnerable to the impacts of climate change. High value, export oriented products (e.g., fruit) produced under irrigation are seemingly less vulnerable to climate change impacts. However, it requires significant capital investment to ensure adaptive capacity. Horticulture is highly dependent on irrigation and reduced water availability will have very negative consequences on production. Land degradation is expected to increase, especially in communal cropland and grazing lands. Finally, increased alien plant invasions are altering ecosystems, reduce water availability, change fire regimes, and reduce ecosystem carrying capacity.

The impact of the historically inherited dualist structure in agriculture is severe

The agricultural sector is heavily influenced by a long history of state policies and interventions based on racial discrimination, extended financial support for white commercial farmers, labour migration, and discrimination against black farmers. This created a highly 'dualistic' and unequal agrarian structure. Post 1994 government policy and interventions aimed at sharpening agriculture's international competitiveness have exacerbated this dualism and increased stratification amongst commercial farmers. Agricultural is now dominated by a small group of mega farms (2,610) heavily concentrated in irrigated horticulture. Lowering tariff barriers, deregulation, dismantling or underfunding agricultural support services has left all farmers (including small scale) without the previous extensive agricultural support

services (Sihlobo & Kirsten 2021). The remaining commercial farmers are making reduced profits, whilst the large number of black smallholders, whether commercially oriented or subsistence, are left poorly integrated into formal markets.

Large scale, predominantly white, formal commercial farming continues to dominate the numerically much greater black labour-intensive, small-scale sector, where production is mainly for own consumption and informal markets. Food production for most households is an adjunct to other sources of income, notably remittances and social grants. These household farmers are dependent on traditional land tenure arrangements which act as a barrier to increased crop production, inhibiting the growth of independent small scale commercial or market oriented black farmers with some form of direct title over their land.

The land reform programme does not address the critical issues

Post 1994 land reform has not involved a substantial agrarian reform programme. Instead, it has focused on restitution and redistribution either through transfer of land or cash payment (Cousins 2023, Cousins et al 2020, Kirsten et al 2022, Sihlobo 2023). Security of tenure remains key, but more effort needs to also go into growing small holder commercial and supporting market seeking subsistence farmers.

Government policy and institutional arrangements have also fallen short of addressing climate change impacts on farmers. Generally, small-scale black producers remain highly disadvantaged and are particularly vulnerable to climate change as well as other shocks. This is partly because they farm on marginal and degraded land – so often in the most water scarce, infertile parts of the country – and under traditional land tenure systems which act as a barrier to a transition to a focused commercial approach to farming. The sector's deeply ingrained dualism means that vulnerable farmers, in the face of the challenges of climate change impacts, struggle to access value chains, markets, inputs, finance, technology and adequate extension services.

Government policy falls short of addressing the climate change issues

The Just Transition (underpinned by the three principles of distributive, restorative, and procedural justice) and the close dependence between farming and the WEFE Nexus requires an integrated approach between stakeholders across the agriculture sector to ensure climate resilience through achieving both adaptation and mitigation objectives. However, climate smart technologies and practices are not integral to the Agriculture and Agri-processing Masterplan (AAMP) and the Climate Smart Agriculture Strategic Framework (CSASF) is not part of the AAMP and Department of Agriculture. The policy and implementation relationship between farmers and government departments is fraught and the necessary partnerships to maintain a sustainable adaptation readiness approach has been neglected.

Many provincial departments of agriculture – the main face of government support for farmers - are under resourced, under capacitated and badly managed with ineffective and uneven support processes, inadequate extension services, and poor policy implementation. Climate change will exacerbate this when institutional capacitation to meet climate change is most required.

Climate finance is limited and imbalanced between public and private sectors
Government has not invested sufficiently in adaptation to absorb climate change

impacts. Only large, wealthy farmers have been able to substantially invest in climate adaptive measures to protect their own farms. Those who are poorer or unable to access finance, display less readiness and are highly vulnerable to climate change impacts. This encompasses a significant section of commercial farmers (medium and even some larger farmers) as well as the entirety of those in the small scale farming sector. Small scale farmers, in particular, are highly dependent on state financial support for investment in adaptative capacity. The power of traditional leaders over land tenure exacerbates the inability of household farmers (including most on restituted and redistributed land where tenure rights are insecure) to mobilise resources and practices to raise their adaptive capacity.

Monitoring, learning and research to pave a way forward are inadequate

There are inadequate techniques to monitor progress in countering climate change impacts and there is a lack of a coherent monitoring and evaluation framework to incrementally monitor and learn from progress on the agriculture sector's response to climate change. This is required to inform policy responses and support mechanisms.

Smallholder and household producers lack knowledge, resources and capacities to respond effectively to climate change. Farmer support needs capacitation on climate response solutions. However, government is not well placed to provide this and has institutionally separated agricultural growth and development plans from a climate change response framework. Extension services are not always going where needed most, nor are they climate responsive. National government has attempted to revive the widely needed provincial extension services programme, but this progress is uneven and is not inclusive of other actors who could/do play this role - (e.g. cooperatives and NGOs).

3.3. The built environment

The disparities in South African society are starkly manifested in the built environment and government interventions have been inadequate.

The inequalities in South Africa are evident in the differences in the living environment quality, access to services and amenities, and spatial location. The spatial inequity further affects the social, economic and liveability aspects of the built environment.

Urbanisation (68,3% in 2022) and informality are increasing which has consequences for the way the built environment develops. Attempts by Government to overcome and improve the built environment have been inadequate to address the mounting backlogs in housing and infrastructure as well as the poor quality of built environments, particularly in the formal subsidised and informal areas. The SOEs performance has further exacerbated the infrastructure challenges

The RDP social housing programme has delivered approximately 2,3 million units since 1994. It has impacted the built environment through the development of large-scale mono-functional, single storey, peripheral developments with inadequate access to services, amenities and jobs. These developments exacerbate climate change impacts through, inter alia, urban sprawl, increased travel distances to opportunities and amenities and consumption of the natural environment and agricultural land.

Informal settlements, micro developers and informal systems fall outside the formal control systems designed to protect people from hazards and loss of life (e.g., floodlines, tip sites, health regulations).

But informal processes and settlements have their own dynamics, rules and regulations and satisfy legitimate needs of communities and society across all sectors and value chains because informal solutions and processes are borne of needs that government is unable to keep pace with. It is important that informality is not seen as the opposite of formality nor a temporary state on a trajectory to formality, but rather as a societal condition that has resources, capacity and capabilities that once understood can be mainstreamed into legitimate solutions towards, inter alia, climate adaptation readiness.

> The taxi industry which is operated outside of the public sector to serve indigent communities that are also often displaced from socio-economic centres, is a good example of 'informal' solutions satisfying demands that the government is unable to meet.

Informality also behaves differently and takes a different shape to the formal sector. In the built environment for instance, reblocking (the rearrangement and voluntary movement of shacks in an informal settlement to improve overall safety and amenity), was initiated from within an informal settlement. Reblocking is now a government supported programme.

Urgent and transformative change is needed to impact positively on those communities "captured" within informality. A challenge is to find interventions that can enhance the justice, resilience and adaptability of the "illegal" informal settlements where the poorest and most vulnerable live.

Financing for the built environment is inadequate, trapping the built environment in a low state of adaptation readiness.

The built environment is not prioritised for funding amongst the largest recipients of tracked climate finance in South Africa. This includes areas of clean energy, energy efficiency and water. What funding there is, is directed towards mitigation. Climate finance tracking and reporting for the built environment specifically, is important for understanding the need and implications of lack of funding and vice versa.

The private sector is responsible for financing development on and for private property and the government sector finances subsidised residential development, public services and amenities and national and regional infrastructure. Affordability of resilient public infrastructure and housing within a highly dependent social system is a challenge, with the state having to bear the cost of more sustainable solutions that must simultaneously uphold the principles of a Just Transition which is directly dependent on how funding is prioritised and allocated in development.

The Human Settlements sector receives approximately R35 billion in grants for housing and infrastructure annually of which approximately R7-10 billion is used for planning. The resources that are currently used for development in the subsidised sector are inefficiently managed with cost and quality implications. This includes the human settlements grants for housing and infrastructure. With better management to improve

efficiencies, more funding could be released, and better quality and more climate responsive structures and communities could be developed.

Intentional efforts to secure adequate funding within a well-articulated fiscal and institutional context that is geared towards adaptation as well as mitigation, at government level are not in place. In addition, private sector investment as well as community resources are insufficiently leveraged.

Built environment development occurs at local government level and the impacts of severe capacity and competence limitations are not being addressed.

All development takes place within the jurisdictional space of municipalities, and they are mandated to provide services and infrastructure as well as create the policy and regulatory framework (e.g. by-laws) for development. The role of municipalities is therefore fundamental to the adaptation of the built environment. Many municipalities are faced with ongoing instability and political and administrative leadership challenges whilst most municipalities do not have the capacity structurally, financially, or operationally, to address or implement climate change adaptation strategies effectively.

It is very important that municipalities are systemically, financially and technically capacitated to be effective in climate adaptation and building resilience. Apart from specific capacity to understand and implement effective climate adaptation, there is a lack of capacity to integrate the aspects of a Just Transition into adaptation and resilience solutions.

Effective implementation of adaptation responses requires clear guidelines and regulations from national/local government. Government is not providing strong direction nor creating an enabling environment for city adaptation projects such as having basic laws, regulations and other compulsory standards and targets in place that can be adopted at the local level.

The private sector and communities can play a far greater role in built environment climate adaptation through partnerships and collaboration with government.

The private sector has the potential to play a key climate response role in partnership with the government as they are implementing private development of the built environment within government regulations. In addition, the private sector implements public sector contracts for infrastructure such as housing and road networks. This is not being sufficiently leveraged.

The informal construction industry – and related services - are not well understood and mostly fall outside of the regulatory environment. Much of the built environment construction and services are undertaken informally and the methods, materials and placement of structures considerably influence climate resilience within the built environment, placing poor communities at the greatest risk.

Communities, NGOs and CBOs are important implementation partners for adaptation and mitigation efforts. Many poorer communities are insufficiently empowered to engage effectively and thus do not have agency in the determination of their built environment. The capacity and capability within poorer communities and the

informal sector is not readily appreciated as communities have resources, ingenuity and commitment that can benefit the climate response agenda.

Government is not aligned for an effective built environment climate adaptation response.

Cross sectoral alignment of government departments alignment is critical given that the built environment is not a sector but needs a coherent and transversal response. The overall responsibility for climate adaptation in the built environment and transversal governance and collaboration structures have yet to be fully developed and implemented at a national government level and filtered down to other spheres of government.

DFFE is a key player in the built environment through its mandate to lead government's overall climate change response effort, as cemented in the Climate Change Act, and is leading on green building and Ecosystem-based Adaptation (EbA) norms and standards. Importantly, the Act requires that the Minister coordinate the development of the NCCAS which offers a framework for adaptation response across a variety of built environment-relevant sectors.

Traditional leaders have influence through their allocation of land for settlement (e.g. on wetlands or in flood prone areas), where grazing takes place, and instilling indigenous knowledge and cultural values in relation to land and its use. Consequently, traditional leaders have great potential to drive the climate adaptation agenda in their areas of jurisdiction. Traditional leaders need to be involved in government programmes for climate adaptation.

The overarching outcome of the three studies and socialisation process is that readiness to respond to climate change in the country is very low relative to the extent of the need, and the urgency necessitated by a growing climate crisis. Governance and service delivery systems are failing vulnerable communities, a situation that undermines their ability to adapt, or build resilience to climate change. A central feature of this failure is the country's prevalent siloed approach to governance, and the very high levels of dependency we have created through social policies and systems. The following section therefore explores the necessary conditions for overcoming these barriers and achieving adaptation readiness in South Africa.

4. The necessary conditions for accelerating adaptation readiness

A set of integrated conditions have emerged as necessary for accelerating adaptation readiness from this study's research, international benchmarking of emerging best practice, and the project's stakeholder socialisation process. Although based on findings from the three study economic focus areas, the identified conditions of effective cooperative governance, strong delivery capacity, efficient and adequate adaptation readiness resourcing, and integrated monitoring, evaluation and impact assessments (MELIA) have broader applicability to advancing readiness across all climate change affected sectors and value chains, and to

society. With all four necessary conditions in place, specific climate interventions can be undertaken with a greater likelihood of a successful outcome for just socio-ecological resilience in South Africa.

Putting these conditions in place requires transformative adaptation – with fundamental changes to South Africa's dominant development paradigm and power structures - to ensure coordinated, integrated, sustained and scalable climate action. In the absence of the necessary conditions, efforts aimed at climate response and adaptation are likely to be ad hoc, uncoordinated and stuck in a 'development as usual' paradigm. Additionally, the conditions should be viewed as synergistic and interrelated, impacting upon each other in many ways. The four necessary conditions are summarised in Figure 3 and elaborated in the sub sections that follow.

The main outcome of the study socialisation process is that readiness to respond to climate change in the country is very low relative to the extent of the need and urgency. Transformative adaptation readiness that seeks to transition South Africa well away from the dominant development paradigm towards one where communities and institutional decision makers are fully empowered to make climate resilient decisions and take coherent climate action should be front and centre of the PCC's forthcoming Just Adaptation and Resilience Investment Fund. This Fund should develop investment criteria predicated on this study's key findings and recommendations, and target investments towards it's identified recommendations.

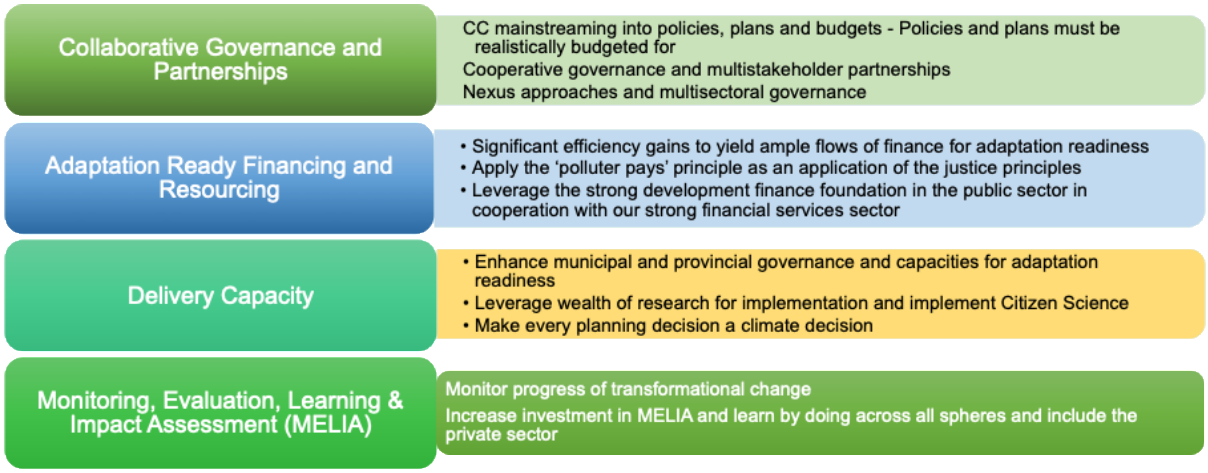
The issues of justice are paramount in this regard. A constant theme emerging from all three workshops is that of duality in South Africa's society and economy, manifesting in different ways in the economy and society, for example:

- In the **water value chain**, water stress is highly unequally distributed in society and economy, and yet water is widely acknowledged as being everybody's business. Water quality is a compounding issue, with scarce water resources contaminated by agriculture run off, industrial and mining effluents, and poor sanitation infrastructure that is not able to withstand the additional pressures of climate change, such as a flood event. Encroaching alien invasive species also place significant pressure on the country's water and land users and resources and infrastructure including dams and catchments. Responsible institutions, such as the municipalities and catchment management agencies lack the capacity to respond appropriately, with low/no integration with the relevant programmes such as Working for Water Programme (DFFE) and the Alien Invasive Clearing Programme (DPWI), both of which seek to create jobs through their implementation.
- South Africa's **agriculture sector** exhibits a stark duality characterised by a well-developed, commercial (predominantly white) sector alongside a largely subsistence (predominantly black) smallholder and household producer sector, a legacy of apartheid policies that continues to shape the sector's dynamics. Low investments in extension services and producer support

capacities are indicative of South Africa's 'development as usual' paradigm, that evidently needs to transition to one that enables the inclusion of market-oriented smallholder and household producers in productive agriculture value chains and informal markets.

- Societal disparities are starkly manifested in the **built environment**, where government interventions have been inadequate, and where apartheid era spatial planning approaches continue to prevail today. Financing is characterised by duality, trapping the built environment in a low state of adaptation readiness, with the heavy reliance on grants and subsidies for indigent communities being at risk in a fiscally constrained space. Municipalities are fundamental for adaptation yet are plagued by governance instability and low institutional capacity, while the private sector and communities can play a far greater role through collaboration and partnerships with government. Communities are insufficiently empowered to engage in their own destiny.

Figure 3. The Necessary Conditions for Adaptation Readiness in South Africa



4.1. Adaptation-ready cooperative governance and partnerships

Cooperative governance across spheres and sectors, and multistakeholder partnerships are the primary means of accelerating adaptation readiness and ensuring the just transition. Best practice case studies from around the world demonstrate the efficacy of breaking down typically siloed approaches. Inter-governmental coordination that integrates broader multi stakeholder partnerships is necessary to both operationalising the WEFE Nexus - an approach that stakeholders have shown consensus for implementing as a gateway for climate resilience - and to unlocking finance for its substantial investment deficit.

South Africa's established policy and legislation for Intergovernmental Relations (IGR) is an important lever for integrated development, that requires innovation for effective coordination. The Climate Change Act (22 of 2024) (the Act) can enhance coordination, particularly towards mainstreaming the just transition, but needs to tackle current misalignments between policy making, planning and budgeting processes.

Although the President proclaimed the Act's commencement under section 38 on 17 March 2025, not all provisions are in force, meaning that they still need to be operationalised. Notably, the excluded provisions are those for adaptation response planning, some functional aspects of the PCC, and the climate duties of District and Metropolitan Municipalities (as well as those relating to sectoral emissions targets that apply to Ministers, and all the provisions relating to carbon budgets for companies). Proclamation of the outstanding provisions is urgently needed.

Workable and impactful climate mainstreamed policies have targeted plans and feasible budgets. These plans and budgets must specify what procedural, restorative and distributive justice interventions will be undertaken, who will action these, and how they will be paid for. The respective roles of the state, and the private sector must be tangible and transparent. Clearly articulated scope and role of the various government and private sector actors, and a clear and unambiguous mandate to those identified, is essential for ensuring that the principles of justice underpin Adaptation Readiness in South Africa. Examples are outlined in Boxes 5, 5 and 6 in the latter part of this section of the report.

As highlighted in these illustrative examples, cooperative arrangements between the public and the private sector is essential. Integration is needed within and between departments, and across sectors, to mainstream them within policy and operational activities. Clear institutional arrangements between WEFE Nexus line departments (agriculture, water and sanitation, environment, and energy) and with transversal departments (finance, economy, planning, monitoring and evaluation, health) must be established. Policy alignment between sectors and transversal ministries is also needed.

Transversal structures and processes are critical to harmonise and align the various pieces of sectoral legislation that need to have climate responsiveness at their centre. In terms of the Act, the Minister responsible for environmental affairs (The Minister) is also responsible for collaboratively setting the national climate response agenda and for coordinating the response plans. The PCC, on the other hand, is the mandated advisory body to the President on climate change and the just transition. With its mandate to manage public finances, National Treasury is also instrumental to operationalising the Act, while the Department of Planning, Monitoring and Evaluation (DPME) plays a key role in facilitating, influencing, and supporting effective planning, monitoring and evaluation of government programmes aimed at improving service delivery, outcomes and the impact on society. Together, these transversal actors will need to effectively collaborate to drive and implement transformational adaptation across all sectors.

The Climate Change Act, 22 of 2024 aims to develop a national climate change response that ensures a long-term just transition to a climate-resilient low-carbon economy and society in South Africa. The reference to "just transition" in the objectives of the Act and its reference throughout the Act, makes clear that implementation will not be done at the expense of any one section of the public.

The Act has sent a very strong signal to all organs of state to review, and if necessary, revise/amend, coordinate and harmonise their climate response policy and actions, and thus also contribute to South Africa's global climate diplomacy efforts and commitments.

The Act clearly instructs every organ of state to consider the risks of climate change impacts and associated vulnerabilities, and to ensure that just transition outcomes are explicitly outlined in their annual performance plans.

The Act does not impose specific obligations on private sector stakeholders; however, specific obligations may be imposed on persons, which in South African law include corporate entities and natural persons.

The Act therefore sets out the legal mandate for an aligned countrywide climate change response through aligned policy, decisions and actions.

The successful implementation of the Act is imperative. It provides the legal mandate for aligned institutional arrangements in government. The weak link between the private and public sectors, can be addressed through partnerships that extend beyond but include the mandated IGR responses. Non-mandated partnerships and cooperation arrangements are also critical for enhanced adaptation readiness through promoting social equity, economic efficiency, and ecosystem sustainability. There are opportunities to leverage private sector investment for equitable ecosystems and economies and these should be understood and capitalised upon for transformative adaptation. Deliberate action and processes will need to be put in place by government to drive this.

Governance must also be adaptive, where coordinated players continuously harvest learnings from implementation and good practices, and build on achievements. Empowered communities, with local governments and community leaders that are accountable to ordinary citizens, are key. A transparent and clear regulatory

framework will allow individual citizens to directly access public bodies to protect their individual rights against capricious and corrupt administrators and councillors.

Government needs to be incentivised to foster cooperative partnerships for enhanced adaptation readiness. This can be done through the Annual Performance Plans and performance indicators as well as municipal auditing processes. A coherent policy framework is necessary to guide all forms of partnership. The private sector must be incentivised to participate and the role it can play in a transformative agenda should not be underestimated.

Lessons can be drawn from existing partnerships, and successes and failures. Collaborative approaches with poorer communities and the informal sector are important to the Just Transition. Capacity and capability within the informal sector needs to be recognised for its resources, ingenuity and commitment. With appropriate regulation and activities by government that recognise and embrace informality and its dynamics, positive local solutions can be upscaled to have meaningful impact.

International Best Practice 1. Cooperative governance and enabling environments in China

In Wuhan, China, a strong enabling environment facilitated by national government was fundamental to the success of the pioneering *Sponge City Programme.* In a region historically vulnerable to floods and storm-related disasters, the *Sponge City Programme* instituted a range of ecosystem-based adaptation practices (including parks, rain gardens, artificial lakes and green roofs) to help drain storm water, mitigate severe flooding, and cool the urban environment.

Without a strong cooperative governance approach, the programme would not have enjoyed the success it had. National government was able to develop, budget for, and roll out comprehensive training and knowledge sharing programmes to ensure that local administrations could employ and manage the climate response plans effectively. This also relied on strong two-way cooperation and communication networks. China's enormous size necessitates strong inter-sectoral and inter-departmental coordination, both of which were demonstrated here.

For South Africa, strong and operationalised cooperative governance structures and functionality are key to enabling adaptation readiness, not least because of the sheer number of actors who must work in concert for any climate-response programmes to have the greatest impact – and China's experience echoes this reality.

Successful partnerships and collaboration for transformative adaptation will rely on a common vision and trust. A common understanding and vision of the Just Transition across South Africa's social partners, especially communities, is critical. Empowered and accountable communities are engaged communities.

4.2. Adaptation-ready Finance and Resources

South Africa's prevailing 'development as usual paradigm' is exacerbated by poor cooperative governance, and by a heavily constrained fiscal environment. Poor cooperative governance is also not conducive to building the trust needed to mobilise resources outside of the fiscus, such as from the private sector and commercial banks. While the state will have to bear much of the cost burden of

facilitating the resilience of vulnerable communities, indigent populations, and the informal sector in enabling the Just Transition, it also plays an important role in leveraging additional resources, for example through applying and implementing the 'polluter pays' principle and ringfencing these resources towards addressing infrastructure maintenance backlogs and strengthening the climate resilience of infrastructure and ecosystems.

Wasted investments and inefficiencies exist across all three study focus areas. Addressing poorly located major infrastructure, the use of unsustainable construction materials, avoidable water losses and non-revenue water as well as inefficiencies in the agricultural sector around ensuring land restitution for productive agriculture are key targets. Reducing inefficiencies and redirecting unsustainable government practices can release substantial and existing funding into the fiscal system. Strengthened cooperative governance between COGTA and National Treasury could enable incentives for better leverage of finance already in the system and to ensure / mandate reduction of inefficiencies in the system.

The state is integral to providing sustainable, climate smart solutions and to ensuring that the principles of distributive and restorative justice are applied. South Africa has a solid foundation to build from in developing adaptation ready resource mechanisms. This foundation includes strong development finance institutions such as the Development Bank of Southern Africa (DBSA) and the Industrial Development Corporation (IDC), a robust intergovernmental grant (IGG) framework, and the public employment programme, among others. National Treasury's reported review of the IGG framework to make grants more performance based and to include performance criteria in the assessment criteria for grant allocations is critical and must mainstream climate change. An example of what can be achieved through integrated financing approaches is available in Georgia's agriculture sector.

International Best Practice 2. Climate-smart value chains in Georgia

The agriculture sector in Georgia is highly vulnerable to climate change and climate variability, leading to serious problems of production loss and threats to food security. Smallholders' lack of access to financial resources and technologies and limited adaptation knowledge results in a low adaptive capacity and higher vulnerability to extreme events.

The Agriculture Modernization, Market Access and Resilience (AMMAR) project (run by the Georgian government) has been focused on developing inclusive, climate smart value chains to enhance resilience to climate change and boost private sector investments. The project has prioritised product value chains that are expected to offer sustainable comparative advantages under future climate change scenarios. Already, the project is helping to facilitate greater financial flows towards smallholders by demonstrating harvesting success at the small-scale level.

Outcomes from this case study are highly relevant to South Africa, not least because of the large number of smallholder and household producers that farm for incomes and livelihoods. But the importance of national entities helping to create an enabling environment for further public and private sector financing cannot be overstated. Moreover, the positive cascading impacts of these initiatives are immense, as once the business case is made for certain farming-directed investments, the finance ecosystem can become self-contained and private-sector led, and therefore no longer reliant on public funding. This is especially

relevant in South Africa where constraints on the fiscus are significant, and where unemployment, especially in rural agriculture areas, is rampant.

National Treasury's grant funding for major projects should include climate response measures in all project/programme phases including conception, design, execution and monitoring. This is further elaborated in Box 2.

Box 2. A foundation for climate finance readiness

A foundation for climate finance readiness

Development and Climate Finance

DBSA is an internationally credible development finance institution that both supports municipal development, for example through infrastructure finance (including the Municipal Infrastructure Grant, integral to the IGG framework) and is one of South Africa's two Accredited Entities to the Green Climate Fund, through which the DBSA has accessed climate finance for example for the national Water Reuse Programme (WRP) through a GCF award of US$235 million in funding.

The WRP seeks to address South Africa's water security challenge – a governance crisis exacerbated by climate change – through enabling the scaling up of water reuse projects that will improve water security and climate resilience at local and provincial levels across the country. An intergovernmental cooperative model has been established to implement the WRP which is located within the Water Partnerships Office (WPO), a ring-fenced programme office, owned by the Department of Water and Sanitation (DWS) and housed at the DBSA. The WPO is one of the outputs from the National Water Partnerships Programme (NWPP), the brainchild of DWS, DBSA and the South African Local Government Association (SALGA).

The approved capital will enable the WRP to coordinate a government-wide response that provides financial resources and building institutional capacity. A critical focus point for this intervention will be at municipal level, where climate-induced water insecurity has a debilitating effect on the lives of citizens. The programme expects to directly increase the resilience to climate change of 3,424,737 beneficiaries.

Intergovernmental Grant Framework

The IGG system is adaptation ready in that it can easily be adapted and utlised as a source of climate finance, for example by integrating a climate resilience focus and criteria or conditions.

National government provides several grants to municipalities on an ongoing basis. These grants are not all necessarily performance based, nor have climate related conditions been applied to the disbursement of the funding. NT is currently reconsidering the grant architecture so that grants such as the Urban Settlements Development Grant, (USDG), Municipal Infrastructure Grant (MIG), Informal Settlements Grant, (ISUPG), Human Settlements Development Grant (HSDG), and others, are to be conditional upon certain climate criteria being met, as well as performance based.

Notably, municipalities rely on the unconditional Equitable Share Grant (ESG) that they receive from National Treasury, to finance national Free Basic Electricity and Free Basic

Water policies, both of which seek to ensure that indigent households receive a minimum amount of water and electricity free of charge. While the ESG is deliberately unconditional, these policies must be enforced at the municipal level, and both fall very short of meeting the basic service needs to their recipients. The policies have not been reviewed since their inception nearly a quarter of a decade ago. A cooperative governance approach towards revising these policies in a climate change constrained environment, and how the ESG is applied in ensuring effective policy implementation, is required. How the term unconditional grants is applied also requires a review. Stakeholders to this study noted that non conditional relates to payback requirements and not to transparency and accountability.

Public Employment Programme

Public employment programmes (PEP) in South Africa have a history rooted in the Expanded Public Works Programme from which key initiatives such as the Working for Water Programme – which created over 100,000 jobs, evolved. The role of PEPs in South Africa's evolving social protection landscape has gained prominence because of the transformative impact of the Covid-19 pandemic, which led to the introduction of the Social Relief of Distress (SRD) Grant and also the Presidential Employment Stimulus (PES). An adaptation ready finance environment should leverage these initiatives to continue to redefine the relationship between social assistance and public employment, as complementary dimensions of an "…integrated approach to social protection, that allows for layered and differentiated support across the spectrum of the economically excluded"(Philip, K., 2025). The PEPs are currently focusing on the added value of work, for participants, communities and the economy, an important focus for enabling for example the WEFE Nexus and Ecosystem-based Approaches (EbA) to farming by South Africa's vulnerable smallholder and household producers.

In addition, the government can Incentivise WEFE Nexus investments that are founded on EbA principles. The underlying consultation process should prioritise implementation. The 'polluter pays' principle can be applied across all sectors/value chains to infringements that exacerbate the impacts of climate change, and ringfenced for climate resilient measures targeted towards vulnerable populations, as a means of distributive justice.

At the macroeconomic level, South Africa has the ability and institutional arrangements needed to attract international capital, including through leveraging its relatively sophisticated financial services sector and national development finance institutions.

The private sector, particularly financial institutions, is insufficiently leveraged to contribute towards climate adaptation. The private sector has a significant role to play through investment, partnerships and corporate social responsibility initiatives across all three focus areas.

The commercial banks have a key role to play but need to be incentivised and guided in the context of adaptation readiness and the Just Transition. South Africa however needs to demonstrate that "its own house is in order". It must be evident that embedded within our institutional and governance arrangements are commitments to effective, efficient, and transparent implementation strategies.

Investments in adaptation readiness need to be clearly defined, particularly if a ringfencing approach is to be adopted, and if targeted funding mechanisms are to be developed. Stakeholders for example have agreed on the criticality of investments in climate education at school level, adequate access to water by all communities, sustainable building materials and climate resilient infrastructure, effective waste management, community education and communication, and effective early warning systems and disaster risk reduction and preparedness. Overarching is the agreed need to invest in breaking down silos within departments, between different levels of government, and between government and stakeholders (including private sector and communities). Stakeholders further concur that adaptive resilience interventions will be most effective if plans and projects cascade down the various levels of government on focal issues, and if policies, plans and budgets go hand in hand.

Important to address is municipal abilities to access climate finance. The interrelated associated challenges need to be addressed, including resource and capacity constraints, poor leadership and governance, and lack of understanding and low prioritisation of climate change. It is imperative that access to external funding can be achieved at the local government sphere to ensure adaptation ready delivery capacity.

The PCC has developed recommendations of a Climate Change Response Fund, and is currently pursuing the development of a Just Adaptation and Resilience Investment Fund. These together with the Disaster Risk Financing Strategy led by National Treasury are promising building blocks of a sustainable Climate Adaptation Financing System.

4.3. Delivery capacity

The state of South Africa's delivery capacity is an overwhelming factor of its adaptation readiness. Low capacities are prevalent across all spheres of government and relevant institutions. However, municipal capacity and governance constraints have emerged as the most urgent to address.

Municipalities, and provinces in the case of agriculture, are the local face of the State. With their constitutional mandate to deliver basic services and local economic development, enabled in part by their ability to regulate through by-laws, they are key to the implementation and monitoring of climate response strategies. Much of the policy and regulatory framework for enhanced adaptation readiness is reliant upon municipal governance and capacities for implementation. Many municipalities are faced with ongoing instability and political and administrative leadership challenges. Most municipalities, and provincial departments of agriculture, do not have the capacity structurally, financially, or operationally, to address or implement climate change adaptation strategies effectively. Climate adaptation actions that rely upon implementation at the subnational government

South Africa's local government institutions must be afforded the means of implementing the principles of the just transition while accelerating adaptation readiness.

Every planning decision should be a climate decision.

level must confront governance, capacity and competency constraints that will rely on intentional support from transversal governance structures.

Municipalities should also be incentivised to effect transformational change through the policy and regulatory framework (e.g. by-laws, as well as operationalising national policy), climate resilient tender specifications, and planning activities.

International Best Practice 3. Capacitated local government in Denmark

Denmark's approach to water management in its urban areas echoes a strong, capacitated local governance philosophy. The country is almost exclusively reliant on groundwater. However, through innovative, targeted local government solutions to water drainage, storage and pricing, it has been able to ensure widespread and sustainable access to safe drinking water. Simultaneously the impacts of severe storms and flooding have been mitigated at a local level.

As the interface between people and government, local municipalities play a profoundly important role in the functioning of any country, including South Africa. The lessons from international best practice emphasise this, but also illustrate that a *capacitated, and financially secure*, local government is key. Local government's need to be enabled with the tools necessary to provide effective service delivery, must be capacitated to use those tools, and to manage and deploy finance in an effective and sustainable manner. In Denmark, this has been realised through careful decentralisation, in conjunction with the maintenance of strong cooperative governance frameworks between local municipalities and the national governance architecture.

Specific to the South African context is the issue of informality. Municipalities are key actors in addressing informality through enabling the meaningful inclusion of South Africa's growing informal economy and communities into the 'mainstream' economy. Provincial departments of agriculture, through extension services, are likewise key actors in supporting market oriented small holders. Informality, which equally refers to informal settlements or smallholder and household producers, must be confronted and embraced. Intentional plans and strategies are needed to take account of the dynamic peculiar to informality, rather than treating it as a sequential stage on the road to formality.

In line with this, municipalities need to be incentivised to ensure that indigent and marginalised communities have access to participatory structures to enable their voices to be heard. An empathetic local government should cooperate with informal communities to understand their dynamics and processes. All role players in informal value chains and communities should be sufficiently empowered to make unfettered contributions.

Without this, it is unlikely that informal communities and economies will be able to absorb and apply climate adaptive knowledge and practices. An example is reflected in the Box that follows on the challenges of engaging with informality at the local level, and strategies for overcoming them.

Box 3. Spaza shops – engaging with informality in South Africa

Spaza shops – engaging with informality in South Africa

The approach to informal processes and economies by government needs careful consideration so that negative unintended consequences do not arise from a single-minded focus. An example is the recent spaza shop clamp down by the government because of harmful foods being sold by unregulated vendors. Enforcing all spaza shops to register and closing many facilities has a profound impact on the critical, multi-functional local micro economies which support local livelihoods, local needs, and economic growth in impoverished areas.

The unintended consequence is that, in the absence of spaza shops, residents are forced to buy groceries from larger formal economic entities which are generally located further away from settlements. This drives funding out of impoverished areas, away from micro businesses to corporate entities that are less invested in and further away from the impoverished communities. This has a dual effect of squashing valuable micro businesses and reducing community access to important local amenities. A further unintended consequence is the spread of concentrated capital in these communities as large supermarket chains will enter to fill the gap as informal spaza shops close down.

A more considered approach, that could recognise the important role of spaza shops while simultaneously dealing with the dangers to communities is possible. For example, some of the causes of contaminated foods include weak or non-existent waste management, vermin infestations, pesticide contamination and poor food handling hygiene. Effective and coordinated service delivery by municipalities could address some of these issues.

However, municipalities need to be capacitated and supported to overcome these challenges, and to enhance their adaptation readiness. The current capacity building system requires radical change - and by all actors - to enable the local government function to fulfil its constitutional mandate. Capacitation must be targeted towards needs rather than perceptions and address deep seated challenges. Priorities to address include:

- The lack of confidence in and leadership capability at senior management level.
- Low levels of institutional memory associated with municipal management turnover, approaches that do not value middle management, and a regulatory environment that does not enable security of tenure.
- Non-alignment and interaction, and poor synergies between critical departments within municipalities.

Intergovernmental cooperation should start with fostering a strong capacitated local governance philosophy by establishing basic functioning and institutional arrangements within municipalities that lack internal coordinating mechanisms, for example between engineering and finance who should report on Non-Revenue Water with one voice.

Provincial government governance and capacities are also important for adaptation readiness. While municipalities have a budget mandate for their respective roles in the water value chain and the built environment, provincial governments plan and budget for agriculture sector development. Capacitated provincial agricultural departments, including climate smart extension services should be central to South Africa's transformative efforts for adaptation readiness that supports and resources producers to counter the impacts of climate change.

A National Treasury diagnostic review of the system of capacity building for local government (2022) states "...the current state of local government in many places is of grave concern: a significant percentage of municipalities are in financial distress, and service delivery levels are declining in many places." Yet, in the preceding five years, more than ZAR 40 billion was invested in building local governments' capacity.

South Africa is comprised of contiguous local authority jurisdictions including the metropolitan municipalities, district municipalities and local municipalities – referred to as category A, B, and C municipalities respectively. Consequently, all activities and development, both rural and urban, take place within the jurisdiction of a local authority/ municipality. Critically, municipalities, particularly metropolitan and district municipalities, carry the large measure of planning responsibility in South Africa.

Strengthening the capacities for adaptation readiness of national government should focus on supporting policy reforms that mainstream climate change, developing related regulations and incentives for policy implementation, and for targeted planning, budgeting and MELIA. Government agencies, such as the Catchment Management Agencies, and partner institutions are included in these recommendations for enhancing climate adaptation ready delivery capacity.

4.4. Monitoring, Evaluation, Learning and Impact Assessments (MELIA)

The importance of ongoing monitoring and evaluation, and learning by doing through impact assessments, has been emphasised throughout this study. Investment in monitoring the progress of transformational change, leveraging the wealth of research for implementation and implementing participatory approaches needs to be ramped up and urgently. All spheres of government should design and implement MELIA systems frameworks that foster a learning by doing and reflection culture. WEFE Nexus implementation should be the anchor and point of integration to avoid fragmentation and to ensure that common indicators towards a common vision are the basis for monitoring progress on transformational change to our 'development as usual' paradigm. Learning between actors on trends and experiences of climate resilient investments across the economy and society should be central to the learning by doing and impact culture.

Investments in mechanisms for the application of knowledge and information at the policy reform and implementation levels are critical to accelerating adaptation readiness. Sufficient knowledge about climate change, and how to respond is needed at all levels of society and the economy, and particularly among the most vulnerable communities. Learning from indigenous knowledge and practices is also key and will be enabled through cooperative governance approaches that empower community voices.

Investments in participatory approaches for the collection and analysis of data can also facilitate community ownership of critical infrastructure such as boreholes, important to limiting theft and vandalism. Rural areas and peri-urban areas should be prioritised for applying participatory approaches that uses accessible cell phone and digital technology to improve knowledge gaps. Government coordination is important to optimise and utilise the information obtained. Local governments need to be capacitated to invest in learning from and upscaling impactful community developed solutions and experiences.

South Africa's effective research institutions must be leveraged for effective MELIA that leads to more effective implementation. They are a critical but under-utilised component of an adaptation ready society. South Africa's institutions produce quality data and research. Collaboration between these institutions and government should be enhanced as a low-cost investment in adaptation readiness. Emphasis is needed on feeding science and learning into policy and institutional reforms, and on informing climate change response action, particularly at local government level. Advocacy and knowledge sharing should be a foundational aspect of an adaptation ready MELIA system. Communities need to be empowered to participate. Tanzania provides some important insights for nexus based MELIA.

International Best Practice 4. Science-informed evaluation and learning in Tanzania

The Ikondo-Matembwe project (aimed at improving access to energy, food and water) implemented in Tanzania, is a useful demonstration of the efficacy and importance of monitoring, evaluation, learning and impact assessments (MELIA) for successful, integrated resource management. A country which is hugely reliant on rain-fed agriculture for its economy and food security, and severely impacted by climate change, the need for plans which accommodate the water-energy-food-ecosystem (WEFE) nexus is clear. Evaluations of the project's expected outcomes employed detailed micro and macroeconomic assessments, and strong scientifically backed impact assessments. This level of rigorous evaluation demonstrates the project's viability to government partners, funders, and community stakeholders. It also establishes an important foundation for emphasising the business case for such initiatives elsewhere in the region, and the continent more broadly.
For South Africa, this case study reaffirms the need for strong assessment frameworks in the path to enhancing adaptation readiness. The likelihood of project success is massively enhanced through focused application of MELIA, and the measurable indicators which emerge from such processes allow for replicability and create a far more appealing enabling environment for public and private investors. This reality has also been vocalised by stakeholders throughout the socialisation process, emphasising the importance of ensuring MELIA's consistent and widespread application in adaptation initiatives.

Important to emphasise is the interconnectedness of the four necessary conditions of transformative adaptation readiness. Illustrative examples of positive outcomes of integrated approaches are provided in the three boxes – boxes 4, 5 and 6 - that conclude this section. Each of these address an indicative situation, the complications around that situation, and possible solutions (the resolution).

Box 4. Illustrative example of Adaptation Readiness: Water Value Chain

Water Value Chain – addressing water stress inequalities

Situation

Unmaintained water and sanitation infrastructure and avoidable water losses create significant water stress. Unequal distribution of water stress means that those that can hoard water and access groundwater are more adaptation-ready, while recent Stats SA data shows that 3 million don't have direct water access and 16 million don't have sanitation.

Complication

Poor governance and low investments leave cities, towns, and communities unprepared for climate change. Women and the poor suffer the most.

Resolution

Recognise and invest in the economic and social value of water. Facilitate equality and resilience by:

- Accelerating the adoption, implementation and investment in the DWS CC Strategy including through the PCC's forthcoming Just Adaptation and Resilience Investment Fund.
- Regulating and financing climate resilient water and sanitation infrastructure
- Releasing water into the system by incentivising/regulating for aggressive water conservation and demand management among water intensive users
- Ensuring that intensive users pay the true value of water and apply the polluter pays principle
- Ringfencing money collected towards infrastructure and access backlogs, and climate resilient standards.

Box 5. Illustrative example of Adaptation Readiness: Built Environment

Built Environment – addressing informality in the sector

Situation

In a township in Gauteng, RDP housing recipients are building additional rooms rather than backyard shacks and renting these out for income. The positive is that this leverages a fixed asset, provides housing at a better standard than shacks, and involves the private sector upfronting investment costs.

Complication

- unplanned/chaotic, unregulated, places additional stress on services, and significantly increases climate vulnerability (cons)
- climate responses are not mainstreamed into relevant policy

Resolution

Accept this mode of informality by facilitating densification, with regulations that:

- enforce brick extensions rather than backyard shacks
- limit number of extensions to ease pressure on services
- enforce utilisation of climate resilient building materials

- enforce restrictions for building in threatened ecosystems (flood management)

Accelerate the adoption, implementation and investment in the National Human Settlements Climate Response Strategy and Implementation Plan for example through the PCC's forthcoming Just Adaptation and Resilience Investment Fund.

Establish standards and specifications for climate resilient building material. e.g. in municipal tenders and by-laws. Specific actions include:

- Financially incentivise utilisation of climate resilient building materials through collaboration with large private sector
- Partner with municipalities to ensure adequate, climate resilient services provisioning

Box 6.. Illustrative example of Adaptation Readiness: Agriculture Sector

Agriculture - addressing dualism in the sector

Situation

Smallholder & market-oriented producers are disconnected from markets. Formal markets cover extensive geographies with complex value chain linkages and relationships. Simpler informal markets need physical infrastructure & municipal investment.

Complication

For supermarkets to embrace smallholders, production standards and logistical requirements must be met. Producers are not receiving adequate extension and value chain linkages support; yields and productivity are also increasingly impacted by climate change.

Municipalities do not hold an agriculture budget mandate

Smallholder and household producers are not supported with climate smart knowledge, practices and technologies. Relevant policy is not in place.

Resolution

National government urgently mainstreams climate smart agriculture into the Agriculture and Agro-processing Master Plan (AAMP) and ensures adequate budget for extension system capacitation and support to producers. The PCC's forthcoming Just Adaptation and Resilience Investment Fund should target support for policy mainstreaming and accelerated implementation.

Government capacitates extension services to work with producers and specialised NGOs to increase productivity, access value chains and adopt climate smart agriculture.

Provincial government collaborates with specialised NGOs and supermarkets to create value chain linkages. DFIs play a significant role in enabling formal market linkages by assisting specialised NGOs.

Provincial government collaborates with municipalities to establish informal market infrastructure in appropriate locations. DFIs provide concessional finance for establishing informal market structures.

5. Concluding remarks

No matter the sector under discussion, indigent populations are the most vulnerable to the impacts of climate change. Their resilience and ability to cope with the impacts of climate change is compromised by the nation's persistent triple challenges of poverty, inequality, and unemployment. Adaptation readiness must be accelerated as a priority for South Africa with an intentional and funded focus on applying the procedural, distributive and restorative principles of justice.

While all three of these principles have been shown to be applicable in transitioning to an adaptation ready society and economy, procedural justice is particularly lagging in South Africa and requires urgent investment. Study experts and stakeholders have been explicit and eloquent in the need for empowering communities to strengthen their agency in community development initiatives. It is a procedural injustice that development as well as service delivery is misaligned with community needs because mandated institutions fail to learn from communities, reflect, and adjust their course of action. Cooperative governance can be strengthened through empowered communities, while we urgently need to monitor, evaluate and learn, and conduct routine impact assessments. Knowledge and information is absolutely critical to enabling a climate-ready economy and society. Unless we know where we are, what progress has been made, and what failures we need to learn from, we cannot deem ourselves a climate-ready society. Investments in MELIA, knowledge and community empowerment should be integral to the PCC's forthcoming Just Adaptation and Resilience Investment Fund.

Integration and partnerships are the underlying themes of adaptation readiness. Nexus approaches, particularly the WEFE nexus is an overarching climate adaptation strategy, that through managing trade-offs and optimising the synergies between the nexus sectors, is understood to yield positive social outcomes. Considering the principles of justice, it is clear that trade-off decisions would need to take serious consideration of the unequal distribution of nexus resources across society and the economy. Importantly, addressing adaptation readiness in nexus ways would break down the silo mentality that dominates policy making, planning, implementation, and budgeting in South Africa. Operationalisation of the WEFE Nexus is an important anchor for the PCC's Just Adaptation and Resilience Investment Fund.

The insights gained from the sector and synthesis workshops are relevant across South Africa's economy and society. The three economic focus areas of water, agriculture and the built environment are interconnected, reflecting the WEFE nexus. Because of their criticality to the economy, to job creation, and to the just transition, the lessons learned from these sectors should inform all of South Africa's adaptation readiness and just transition efforts – which will rely on systemic transformation that brings about fundamental changes to the dominant development paradigm and associated power structures. Key is the question of how this is accomplished by bringing people along, and how we address diversity, equity and inclusion in the transition process.