FINANCIAL AND FISCAL COMMISSION

For an Equitable Sharing of National Revenue

2026/27 SUBMISSION FOR THE DIVISION OF REVENUE

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We, the Commissioners, hereby submit the Financial and Fiscal Commission's researched recommendations for the 2026/27 Division of Revenue in accordance with the obligations placed upon us by the Constitution of the Republic of South Africa

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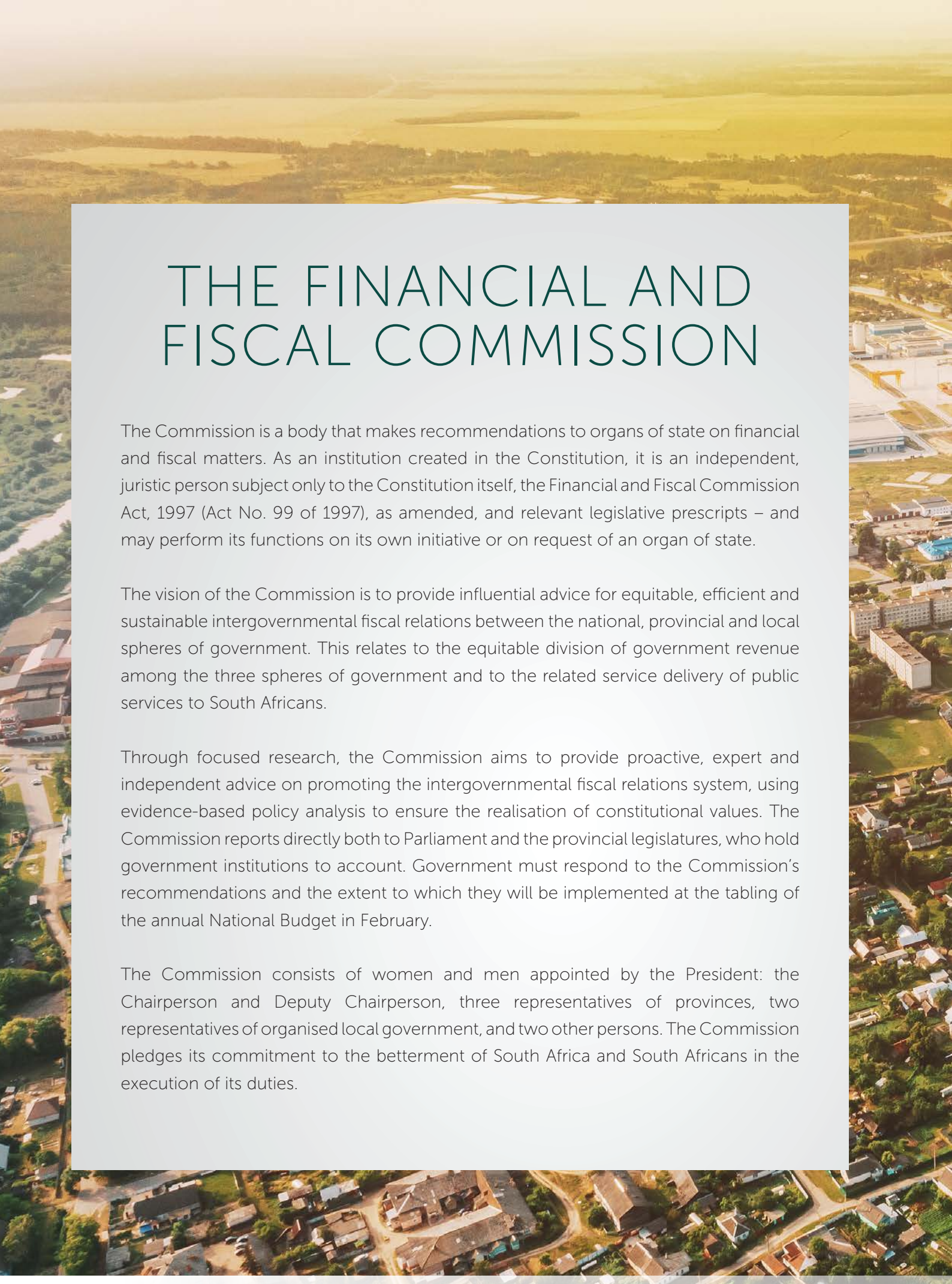

THE FINANCIAL AND FISCAL COMMISSION

The Commission is a body that makes recommendations to organs of state on financial and fiscal matters. As an institution created in the Constitution, it is an independent, juristic person subject only to the Constitution itself, the Financial and Fiscal Commission Act, 1997 (Act No. 99 of 1997), as amended, and relevant legislative prescripts – and may perform its functions on its own initiative or on request of an organ of state.

The vision of the Commission is to provide influential advice for equitable, efficient and sustainable intergovernmental fiscal relations between the national, provincial and local spheres of government. This relates to the equitable division of government revenue among the three spheres of government and to the related service delivery of public services to South Africans.

Through focused research, the Commission aims to provide proactive, expert and independent advice on promoting the intergovernmental fiscal relations system, using evidence-based policy analysis to ensure the realisation of constitutional values. The Commission reports directly both to Parliament and the provincial legislatures, who hold government institutions to account. Government must respond to the Commission's recommendations and the extent to which they will be implemented at the tabling of the annual National Budget in February.

The Commission consists of women and men appointed by the President: the Chairperson and Deputy Chairperson, three representatives of provinces, two representatives of organised local government, and two other persons. The Commission pledges its commitment to the betterment of South Africa and South Africans in the execution of its duties.

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ACRONYMS

AfDB	African Development Bank
AIC	Akaike Information Criterion
ANC	African National Congress
ARMA	Autoregressive moving average
ASGiSA	Accelerated and Shared Growth Initiative for South Africa
BFI	Budget Facility for Infrastructure
BIC	Bayesian Information Criterion
BLUE	Best linear unbiased estimates
BOT	Build-operate-transfer
BRICS	Brazil, Russia, India, China, South Africa
CAB	Fiscal balance
CCPPP	Canadian Council for Public-Private Partnerships
CIDMS	Cities Infrastructure Delivery and Management System
CO_2	Carbon dioxide
CoGTA	Department of Cooperative Governance and Traditional Affairs
CRED	Centre for Research on the Epidemiology of Disasters
DBSA	Development Bank of Southern Africa
DoRB	Division of Revenue Bill
DPLG	Department of Provincial and Local Government
EIG	Education Infrastructure Grant
EM-DAT	Emergency Events Database
ERRP	Economic Reconstruction and Recovery Plan
FAO	Food and Agriculture Organisation
FCCL	Fiscal commitments and contingent liabilities
FE	Fixed effects
FEVD	Forecast-error variance decomposition
FFC	Financial and Fiscal Commission
GDP	Gross domestic product
GEAR	Growth, Employment and Redistribution
GFCF	Gross fixed capital formation
GHG	Greenhouse gas
ICT	Information and communication technology
IDIP	Infrastructure Delivery Improvement Programme
IF	Infrastructure Fund
IFS	International Financial Statistics
IGFR	Intergovernmental Fiscal Review
IMF	International Monetary Fund
IO	Input-output
IPS	Im, Pesaran and Shin
IRF	Impulse response function
ISA	Infrastructure South Africa
IUDG	Integrated Urban Development Grant
JTF	Just Transition Framework
LLC	Levin, Lin and Chu
M&E	Monitoring and Evaluation
MFMA	Municipal Finance Management Act
MIG	Municipal Infrastructure Grant
MISA	Municipal Infrastructure Support Agency

ACRONYMS CONTINUED

MTEF	Medium-term Expenditure Framework
NCCAS	National Climate Change Adaptation Strategy
NCCRP	National Climate Change Response Policy
NDC	Nationally determined contribution
NDP	National Development Plan
NGP	New Growth Path
NIP	National Infrastructure Plan
OHSC	Office of Health Standards Compliance
PCC	Presidential Climate Commission
PICC	Presidential Infrastructure Coordinating Commission
PFMA	Public Finance Management Act
PPI	Private participation in infrastructure
PPP	Public-private partnership
PRASA	Passenger Rail Agency of South Africa
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-analyses
PTNG	Public Transport Network Grant
PVAR	Panel vector autoregressive (model)
RDP	Reconstruction and Development Programme
RE	Random effects
REIPPP	Renewable Energy Independent Power Producers Programme
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
RGDP	Real gross domestic product
SAICE	South African Institution of Civil Engineering
SALGA	South African Local Government Association
SARB	South African Reserve Bank
SBC	Schwartz Bayesian Criterion
SDG	Sustainable Development Goals
SIP	Strategic Infrastructure Project
SOC	State-owned company
SOE	State-owned entity
Stats SA	Statistics South Africa
TMP	Temperature change
TVET	Technical and vocational education and training
UN	United Nations
VAR	Vector autoregressive (model)
WEV	Weather event

FOREWORD

The Submission for the Division of Revenue 2025/26 is tabled by the Financial and Fiscal Commission (FFC) in terms of section 214(1) of the Constitution of the Republic of South Africa, 1996 (as amended), Section 3 of the Financial and Fiscal Commission Act, 1997 (Act No. 99 of 1997), Section 9 of the Intergovernmental Fiscal Relations Act, 1997 (Act No. 97 of 1997) and Section 4(c) of the Money Bills and Related Matters Act, 2009 (Act No. 9 of 2009) (as amended). The FFC is an independent, juristic constitutional institution that reports directly to Parliament and provincial legislatures.

It is my privilege to present our 2026/27 Submission for the Division of Revenue under the theme "Sustainable development across the three fiscal spheres."

At this critical juncture in South Africa's development trajectory, our nation stands at a crossroad. The persistent triple challenge of poverty, unemployment and inequality continues to shape our socio-economic landscape, now further complicated by intensifying climate risks, substantial infrastructure backlogs and accelerating urbanisation pressures. These challenges demand not just incremental adjustments, but a fundamental paradigm shift in how we conceptualise and coordinate intergovernmental fiscal relations.

The constitutional imperative that "finance must follow function" remains our guiding principle. When any sphere of government is assigned responsibilities – whether in infrastructure delivery, housing provision, or climate adaptation – the associated financing must be both adequate and predictable. The chapters in this submission consistently reveal how misalignment between functional responsibilities and fiscal capacity creates unfunded mandates, undermines service delivery and erodes public trust in governance institutions.

Our analysis exposes critical systemic vulnerabilities across the intergovernmental landscape. Climate change emerges as a structural disruptor of fiscal sustainability, threatening long-term growth and revenue mobilisation across all spheres of government. Infrastructure delivery continues to be hampered by a fragmented regulatory environment and weak institutional frameworks that stifle private sector participation. At the subnational level, weak planning, poor execution and inadequate performance incentives prevent the translation of capital budgets into developmental outcomes.

The growing prevalence of coalition-governed municipalities introduces additional complexity, as political instability disrupts budgeting processes and weakens oversight mechanisms. Meanwhile, our metropolitan and secondary cities – engines of economic growth – struggle with the fiscal implications of rapid urbanisation, managing informal settlements and overstretched infrastructure with fiscal instruments that are sufficiently responsive to evolving urban demands.

FOREWORD CONTINUED

Yet within these challenges lie opportunities for reform. The Commission's evidence-based recommendations offer a pathway toward a more equitable, efficient and accountable intergovernmental fiscal system. We propose integrating climate resilience into fiscal frameworks, harmonising public-private partnership regulations, strengthening subnational implementation capacity, and developing targeted support mechanisms for coalition-governed municipalities. For our urban centres, we advocate revising formula-based transfers and enabling innovative revenue sources that can respond to the unique pressures of urbanisation.

This submission argues unequivocally that sustainable development is attainable only through a fiscally empowered, institutionally stable and environmentally resilient intergovernmental system. The recommendations presented here reinforce each other across spheres, recognising that cooperative governance is not merely a constitutional requirement, but a practical necessity for addressing our nation's most pressing challenges.

As we submit these recommendations to Parliament, Provincial Legislatures and other stakeholders in accordance with our constitutional mandate, we do so with the conviction that fiscal reform must serve developmental objectives. Each proposed adjustment to the division of revenue aims to strengthen the capacity of all three spheres of government to work in concert toward inclusive growth, resilience, and long-term sustainability.

The road ahead demands courage, creativity and unwavering commitment to constitutional values. It is my sincere hope that this submission will catalyse the necessary reforms to ensure that public funds are equitably and efficiently directed toward building the South Africa envisioned in our Constitution – a society founded on democratic values, social justice and fundamental human rights.

For and on behalf of the Commission

Dr Patience Nombeko Mbava
Chairperson

INTRODUCTION

South Africa's constitutional framework mandates a cooperative governance model that requires all three spheres of government – national, provincial and local – to work in concert towards developmental objectives. However, the enduring triple challenge of poverty, unemployment and inequality, now compounded by climate risks, infrastructure backlogs and urbanisation pressures, necessitates a paradigm shift in how fiscal powers, functions and funding are aligned. Against this backdrop, the 2026/27 Submission for the Division of Revenue by the Financial and Fiscal Commission foregrounds this imperative by adopting "**Sustainable development across the three fiscal spheres**" as its central theme. This framing recognises that sustainable development is not merely an environmental objective, but a systemic goal that requires **intergovernmental coordination, fiscal resilience and institutional reform.**

An enduring principle underpinning the Commission's analysis is the necessity for fiscal design to respect the constitutional imperative that **finance must follow function**. This principle ensures that, when functions are assigned to any sphere of government, such as infrastructure delivery, housing or climate adaptation, the associated financing must be both adequate and predictable to enable implementation. Misalignment between assigned functions and allocated resources results in unfunded mandates, service delivery failures and the erosion of public trust. Across all chapters, whether in the context of coalition-governed municipalities, urbanising metros or climate-responsive infrastructure, the mismatch between functional responsibilities and fiscal capacity emerges as a binding constraint. Upholding this principle is central to promoting equity, efficiency and accountability in the use of public resources, and forms the foundation for effective cooperative governance and sustainable development.

The chapters that follow interrogate systemic challenges and fiscal opportunities across the intergovernmental landscape, offering evidence-based recommendations to ensure that public funds are equitably and efficiently used, in alignment with intended outcomes to foster inclusive growth, resilience and long-term sustainability.

Chapter 1 foregrounds climate change as a structural disruptor of fiscal sustainability. Through macroeconomic modelling, it demonstrates how sectoral shocks – particularly in agriculture – amplify national-level vulnerabilities via intersectoral feedback loops. These systemic risks threaten long-term growth and revenue mobilisation, ultimately constraining the fiscal space of all three spheres of government. The chapter's core implication is that sustainable development is unattainable without integrating **climate resilience into fiscal frameworks**, including the design of grants and investment prioritisation. Moreover, local governments, which bear the brunt of disaster response, must be fiscally capacitated to adapt and respond to climate shocks – linking this analysis directly to Chapter 3 and Chapter 5 on subnational capacity and urban resilience.

Chapter 2 examines the bottlenecks inhibiting South Africa's use of public-private partnerships (PPPs) in infrastructure delivery. The chapter highlights how a fragmented regulatory environment and weak institutional frameworks have stifled private sector participation. As infrastructure is a long-term public asset with multi-sphere implications, the Commission argues for a harmonised PPP framework, supported by national guidelines and subnational implementation protocols. Crucially, this chapter reveals that sustainable development depends not only on the volume of infrastructure investment, but also on the **fiscal efficiency and risk allocation mechanisms** embedded in project finance. The findings directly inform Chapter 3, where the focus shifts to implementation at the provincial and municipal level.

Chapter 3 builds on the national infrastructure discussion by zooming in on the implementation challenges facing subnational governments. Despite increased allocations, many provinces and municipalities struggle to translate capital budgets into developmental infrastructure due to weak planning, poor execution and lack of performance incentives. The chapter proposes a Subnational Infrastructure Coordination Framework and performance-linked grant reforms to address these inefficiencies. The implication is clear: national-level infrastructure strategies (as discussed in Chapter 2) will fail without strengthening institutional coordination and accountability mechanisms at the point of delivery. This also links to Chapter 4, as the effectiveness of these reforms is conditioned by political stability and governance quality in municipalities.

Chapter 4 shifts the analytical lens to the political economy of local government, focusing on the rising prevalence of coalition-led municipalities. Through case studies, the Commission identifies the governance risks posed by unstable coalitions – such as disrupted budgeting processes, unplanned expenditure and weak oversight. These dynamics compromise service delivery and erode public trust. The chapter's implications are far-reaching: **institutional sustainability** must be redefined to include political and administrative coherence. This is critical for effective infrastructure implementation (Chapter 3) and urban service delivery (Chapter 5). The findings point to an urgent need for national and provincial governments to provide **targeted support and oversight** to politically fragile municipalities.

Chapter 5 quantifies the fiscal impact of rapid urbanisation on metropolitan and secondary cities. While urban areas contribute significantly to the country's gross domestic product (GDP) and service delivery improvements, they also face intensifying pressures – rising informal settlements, overstretched infrastructure and soaring operational costs. The analysis finds that existing fiscal instruments, such as the local government equitable share, are **not responsive to the dynamic demands of urban growth**. The chapter proposes revising formula-based transfers and enabling municipalities to unlock new revenue sources, including land value capture and spatially linked tariffs. This chapter serves as a convergence point for the preceding analyses. It reflects the compounding effects of climate vulnerability (Chapter 1), infrastructure underperformance (Chapter 2 and Chapter 3) and coalition instability (Chapter 4), all of which are most acutely felt in urban areas.

The overarching narrative emerging from these chapters is that sustainable development can only be achieved through a **fiscally empowered, institutionally stable and environmentally resilient intergovernmental system.** Each chapter highlights specific deficiencies – regulatory, fiscal, governance or technical – that undermine development efforts, but also presents actionable recommendations that reinforce each other across spheres.

A few cross-cutting implications stand out:

- **Fiscal frameworks must be future-proofed:** This includes integrating climate risk into fiscal planning and ensuring that capital budgets reflect long-term infrastructure maintenance obligations.
- **Intergovernmental coordination must be deepened:** Particularly between National Treasury, sector departments and local authorities, to enable alignment between macro strategies and local delivery.
- **Governance matters:** Fiscal sustainability is not only a budgetary issue, but also a function of political stability and institutional coherence, particularly at local government level.
- **Performance-based funding is key:** All fiscal instruments must increasingly be linked to measurable developmental outcomes to incentivise results across the system.

Sustainable development across the three fiscal spheres is not a technocratic goal – it is a constitutional obligation. It requires synchronised reforms that strengthen climate resilience, infrastructure governance, urban fiscal capacity and political accountability. The Financial and Fiscal Commission's recommendations for the 2026/27 Division of Revenue are intended to realise this vision by guiding the equitable, efficient and developmentally oriented use of public resources. In doing so, the Commission affirms its mandate to safeguard the long-term financial and fiscal sustainability of South Africa's democracy.

The Commission makes the following recommendations:

CHAPTER 1: EXAMINING THE MACROECONOMIC CONSEQUENCES OF CLIMATE-CHANGE AND SECTORAL INTERDEPENDENCIES IN THE SOUTH AFRICAN ECONOMY

1. The Minister of Forestry, Fisheries and the Environment, in conjunction with the Minister of Finance and the Presidential Climate Commission, headed under the Presidency, should make coordinated efforts to partner with international role players to strengthen international climate funding, based on the principle of fairness, proportionate to nations' carbon emissions.

2. The Minister of Finance must restore fiscal credibility in South Africa to build budget resilience as buffers against the adverse impacts of climate change and, in doing so, should strengthen measures to enhance spending productivity in climate-adaptive infrastructure in an integrative manner to ensure efficient, sustainable infrastructure development in South Africa.

3. The Minister of Forestry, Fisheries and the Environment, in conjunction with the Minister of Agriculture, the Minister of Trade, Industry and Competition, the Minister of Transport and the Minister of Mineral and Petroleum Resources, should consider deregulation in those sectors where supply chain inefficiencies due to overregulation could exacerbate the knock-on effects on related sector economies.

4. The Minister of Forestry, Fisheries and the Environment, in collaboration with the Presidential Climate Commission, headed by The Presidency, should be charged to spearhead climate change policy goals aimed at implementing mitigation and adaptation responses. Furthermore, climate change policy objectives need to have clearly defined and measurable criteria to ensure that implementation progress can be effectively monitored.

5. The Minister of Forestry, Fisheries and the Environment, in conjunction with the Minister of Public Works and Infrastructure, and Trade and Industry, must devise a clear approach on implementing climate change adaptation strategies aimed at the development of climate-resilient infrastructure.

CHAPTER 2: OPTIMISING THE CONTRIBUTION OF INFRASTRUCTURE TOWARDS ECONOMIC GROWTH AND THE ROLE OF PUBLIC-PRIVATE PARTNERSHIPS

1. The Commission recommends that infrastructure development should be prioritised on projects that make a direct contribution towards sustainable development, particularly in sectors such as water and energy, which have the most significant impact on economic growth.
2. To enhance efficiency and clarity for the use of public-private partnerships for public infrastructure delivery, the Minister of Finance, and the Minister of Public Works and Infrastructure should create a framework for public-private partnerships to replace the current fragmented approach.
3. The Minister of Finance, and the Minister of Public Works and Infrastructure should collaboratively ensure contract enforcement and adopt robust risk-sharing mechanisms to improve and enhance the way infrastructure development projects that utilise public-private partnerships are monitored, managed and controlled.

CHAPTER 3: STRENGTHENING SUBNATIONAL GOVERNMENTS' CONTRIBUTION TO INFRASTRUCTURE-LED GROWTH IN SOUTH AFRICA

1. As a means to a single window of coordination, the Minister of Finance, in collaboration with the Minister of Public Works and Infrastructure, should seek to establish a Subnational Infrastructure Coordination Framework to streamline infrastructure development at the provincial and municipal level.
2. To strengthen the link between infrastructure performance and funding allocation, the Minister of Finance should introduce a performance-linked feedback mechanism in provincial and municipal incentive grants.

CHAPTER 4: AN ASSESSMENT OF THE PERFORMANCE OF COALITION-LED MUNICIPALITIES

1. The Provincial Department of Cooperative Governance and Traditional Affairs, and the South African Local Government Association should identify key challenges and risks associated with hung councils, particularly in terms of the capabilities and performance of basic services.

CHAPTER 5: MEASURING THE FISCAL PRESSURES OF URBANISATION

1. The Commission reiterates its recommendation from the 2018/19 Submission on the Division of Revenue that the Minister of Finance should create an awareness of the land value capture fiscal instruments among large cities and extend the scope of the Financial Management Grant to cater for capacity building in the design and implementation of land value capture mechanisms.

2. The Minister of Cooperative Governance and Traditional Affairs, in conjunction with the Minister of Finance, should speed up the review of the local government equitable share formula. The new formula must reflect growth in urban populations, as well as the rising cost of service delivery and the unique challenges faced by urban municipalities.

3. Municipal councils should introduce innovative ways for their municipalities to generate revenue. This can be done through the modernisation of the property tax collection system through digital valuation and automated billing systems.

Section 1: Macro-fiscal

Chapter 1: *Examining the macroeconomic consequences of climate change and sectoral interdependencies in the South African economy*

CHAPTER 1
Examining the macroeconomic consequences of climate change and sectoral interdependencies in the South African economy

Gianni Delle Donne, Thando Ngozo, Lwazi Senzo Ntshangase and Ongezwa Ngotana

1.1 INTRODUCTION

Globally, climate change and its potential impact on inclusive economic growth have become a growing concern. The literature on the macroeconomic effects of climate change emphasises that climate risks are complex and multifaceted, revealing themselves through demand-side and supply-side shocks that can impact investment, consumption and economic growth. The extent to which countries can cope with these risks through policy intervention will likely impact their future economic resilience. With climate spillovers becoming more pronounced, addressing their broader economic impact will require global coordination in policy responses.

Certain economic sectors or industries may be more susceptible to disruptions in economic activity brought about by extreme weather shocks associated with climate change. The agricultural sector is directly dependent on changes in weather patterns, making it vulnerable to extreme weather fluctuations. Droughts tend to have negative consequences for agricultural production, causing supply chain disruptions, with knock-on effects in other sectors of the economy through sectoral linkages. Building climate resilience within the South African economy encompasses, among other things, ensuring that sectoral production processes become more resilient and independent to environmental volatility. Gaining insights into the macroeconomic impact that climate change has is critical for designing impactful mitigation strategies in South Africa. Furthermore, understanding which sectors have significant direct or indirect linkages to the domestic agricultural sector can provide useful insights into how the South African economy will respond to climate-induced economic shocks that affect policy decisions.

This chapter seeks to examine the macroeconomic effects of climate change, with a focus on economic growth outcomes and fiscal consequences across African countries. It explores data trends in global warming and attempts to quantitatively measure the impact of temperature variability on macroeconomic outcomes to inform mitigation and adaptation strategies that are suitable for the South African context. Furthermore, this chapter examines the sectoral interdependencies between the agricultural sector and other sectors in the domestic economy to identify sectoral vulnerabilities to climate-induced shocks that disrupt economic activity.

1.2 LITERATURE REVIEW

1.2.1 The macroeconomic impact of climate change

Economic shocks from climate change can impact both demand and supply in the economy, creating systemic risks that may hinder macroeconomic stability. Shocks on the demand side can be triggered by climate-related events such as severe weather, which, according to Krogstrup and Oman (2019), can diminish household consumption, interfere with business investment decisions and depress global trade. Gassebner, Keck and Teh (2010) recognise how natural disasters can disrupt trade flows, particularly in export-dependent countries.

On the supply side, climate shocks can have devastating consequences on transportation networks and energy grids, potentially lowering the productive capacity of numerous economic sectors, including agriculture, construction and manufacturing (Arent et al., 2014; Department for Environment, Food and Rural Affairs, 2012).

Weather-induced damages to physical capital and infrastructure may therefore adversely affect production, particularly in a country such as South Africa, where poor-quality and deteriorating infrastructure already hinder productivity in the economy.

Several studies have empirically investigated the relationship between gross domestic product (GDP) and weather conditions, as a proxy for climate change. Dell, Jones and Olken (2012) examined the relationship between changes in a country's weather patterns and its economic performance, measured by aggregate output. According to their estimates, higher temperatures have the effect of reducing economic growth in low-income countries (Dell et al., 2012). However, the same relationship was not established for high-income countries – in the latter case, temperature changes were not found to have any significant effect on growth (Dell et al., 2012).

There is evidence that low- and middle-income countries may be more vulnerable to extreme weather events, particularly if they have a higher baseline temperature and lack sufficient adaptive capacity (Xie, 2021). Developing economies that face challenges of high unemployment, poverty and low growth tend to be more vulnerable to climate risks and have fewer resources available for adaptation (Fay et al., 2015).

Zhao, Gerety and Kuminoff (2018) explored subnational data and examined the differentiated effect of regional temperature changes over time on economic productivity. Specifically, the authors show that the economic impact of the overall temperature increase is more pronounced in warmer regions and less pronounced in colder ones. Similarly, as pointed out by Kotz, Wenz, Stechemesser, Kalkuhl and Levermann (2022), patterns of rainfall variability, including both total annual precipitation and patterns of daily rain, exert non-linear effects on the economic output.

Findings from Zhao and Liu (2023) indicate that temperature variability can have significant consequences for economic growth in African countries, specifically through its adverse impacts on agricultural production and services. However, the results differed across different climatic regions of the African continent (Zhao & Liu, 2023). Geda et al. (2023) also examined the macroeconomic impact of climate change on the African continent, emphasising the effects on real GDP and agricultural value added in Eastern Africa.

In the short run, climate change was found to have a detrimental impact on both GDP and agricultural growth (Geda et al., 2023). Climate change was not found to have a negative impact on GDP in the long run, although there was evidence that agricultural expansion could still be adversely affected (Geda et al., 2023). The results suggest that countries that are more reliant on the agricultural sector for GDP growth may be more vulnerable to climate change, which may be explained by the sector's direct reliance on, and sensitivity to, weather fluctuations.

Asafu-Adjaye, Ndung'u and Shimeles (2022) investigated the response of real output and inflation to temperature shocks. In doing so, they estimated the impact of a decline in agricultural productivity on household incomes and real GDP across a number of African countries. In Ethiopia, Ghana, Malawi, Senegal and Tanzania, household incomes were estimated to decline by at least 14 per cent – with Kenya and Rwanda seeing the largest declines at approximately 18 per cent (Asafu-Adjaye et al., 2022). In terms of the broader macroeconomic impact of climate change, Asafu-Adjaye et al. (2022) estimated that real GDP could decline by up to 8 per cent in some African economies.

The literature review points to significant nuances that have emerged in research on the macroeconomic effect of climate change that complicates the establishment of a direct and causal negative relationship between climate change and economy growth in the general sense. In some global regions, temperature variability appears to have significant consequences on the macroeconomy, while, in other regions, there is less certainty on the impact, creating ambiguity. Undoubtedly, the macroeconomic impact of climate change involves rising uncertainty, which may impact macroeconomic variables such as investment, consumption and output decisions (Batten, 2018). However, uncertainties are compounded by the fact that the impact of climate change on economic growth may be strongly influenced by the domestic structure of the economy, the drivers of economic growth and socio-economic conditions.

1.2.2 Sectoral vulnerabilities to climate change

Given that climate change has ripple effects on the economy, which impact economic growth through various channels, vulnerability – as a concept – is highly nuanced (Gbetibouo, Ringler & Hassan, 2010). The concept of vulnerability not only refers to the exposure of a system to climate variations, but also to more complex internal dimensions that comprise the system's sensitivity and adaptive capacity to such stressors (Füssel & Klein, 2006). The agricultural sector, as a channel through which weather shocks or temperature changes can adversely impact the economy, has gained attention in the literature, given that temperature and water are direct inputs in the agricultural production process (Dell, Jones & Olken, 2014; Gray, Taraz & Halliday, 2021; Schlenker & Lobell, 2010; Song, Park, Kim & Kim, 2024).

Gray et al. (2021) estimate the causal impact of extreme weather conditions (rising temperatures and drought) on employment in South Africa, both at the macro level and across specific sectors, such as agriculture, manufacturing and services (Gray et al., 2021). Year-to-year weather fluctuations were used to estimate the impact of drought conditions on the likelihood of sectoral employment by merging weather data with panel data on individual labour market outcomes (Gbetibouo et al., 2010). The authors find that, at the macroeconomic level, drought conditions have a negative impact on employment. However, these effects are concentrated in the services (tertiary) sector of the economy (Gray et al., 2021).

The relationship between temperature increases and unemployment conditions in South Africa's agricultural or manufacturing sectors was inconclusive according to Gray et al. (2021). This contradicts the findings of Xie (2021), who found a significant negative relationship between the occurrence of heat shocks and employment outcomes in Brazil's manufacturing sector. This could suggest that the domestic labour market structure is critical in determining the impact of temperature variability on employment outcomes across sectors.

Acevedo, Mrkaic, Novta, Pugacheva and Topalova (2020) studied the transmission mechanisms whereby temperature shocks could adversely impact on an economy by investigating the effect such a shock can have on agricultural production (measured in real value added), manufacturing, the service sectors and crop production. The authors estimated a significant negative relationship between temperature and agricultural value added, including crop production (Acevedo et al., 2020). Some evidence of a decline in manufacturing output in response to a rise in temperature was also presented. However, estimates were less precise than those in the agricultural sector (Acevedo et al., 2020). These findings suggest that some economic sectors are more vulnerable to temperature variability than others, and emphasise the potentially harmful impact on agriculture, in particular. However, the negative impact that higher temperatures have on agricultural output was specific to countries with relatively hotter climates (Acevedo et al., 2020).

In the context of sub-Saharan Africa, Schlenker and Lobell (2010) estimated a yield response model to weather fluctuations, inputting historical crop production and weather data into a panel analysis. They found that higher temperatures tend to increase the probability of lower agricultural yields (Schlenker & Lobell, 2010). Similarly, across Asian countries, Welch et al. (2010) estimated that rice yields decline with an increase in average temperatures.

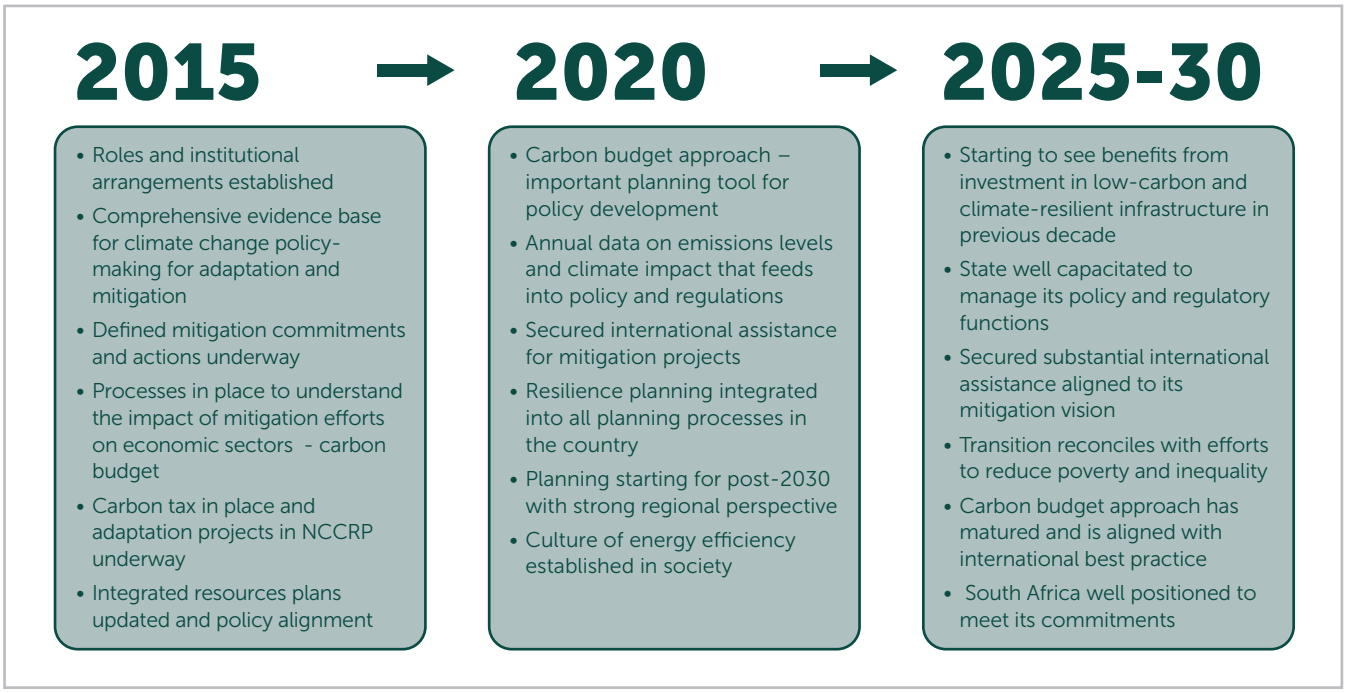
From the literature reviewed above, there appears to be supporting evidence in the agricultural sector that agricultural output is vulnerable to temperature variability. However, employment in the agricultural sector is not necessarily vulnerable to climate shocks, emphasising differentiated impacts within sectors. Gray et al. (2021) assert that climate change is becoming a prominent concern. Economic development will, to a large extent, be determined by the degree to which economic production is independent of environmental volatility. While broadly stated, this argument is plausible. It is also crucial to recognise the influence that the structure of an economy – and its sectoral linkages – has on shaping the transmission mechanisms whereby climate-induced shocks can hinder economic production.

The economic impact of agricultural drought in Korea, for instance, has been investigated through an input-output method, estimating production inducement effects to assess the degree of sensitivity between the agricultural sector and other sectors of the economy, and identifying crucial interdependencies (Song et al., 2024). The authors uncovered very strong linkages between the agricultural sector, and the food and beverages industry, among others, such as in the case of chemical products, wholesale and retail, and coal and petroleum products (Song et al., 2024). Identifying such sectoral interdependencies can enhance an understanding of the knock-on effects of a climate-induced agricultural output shock on the South African economy.

1.2.3 Recent developments in climate change policy in South Africa

The National Development Plan 2030 (NDP), adopted in 2012, is a long-term strategic plan and guide to eliminate poverty and reduce inequality by 2030. While the policy acknowledged that a transition to a low carbon economy will be a collective effort, it positioned government as a strategic facilitator by developing the necessary institutional capacity to support the transition (National Planning Commission, 2012). The NDP emphasises the need for alignment in the policy framework to ensure effective coordination and the importance of having a monitoring system in place to track progress in implementation. The NDP set specific targets for 2015, 2020 and 2025–2030, as illustrated and summarised in Figure 1.1.

Figure 1.1: Climate change mitigation targets in the NDP



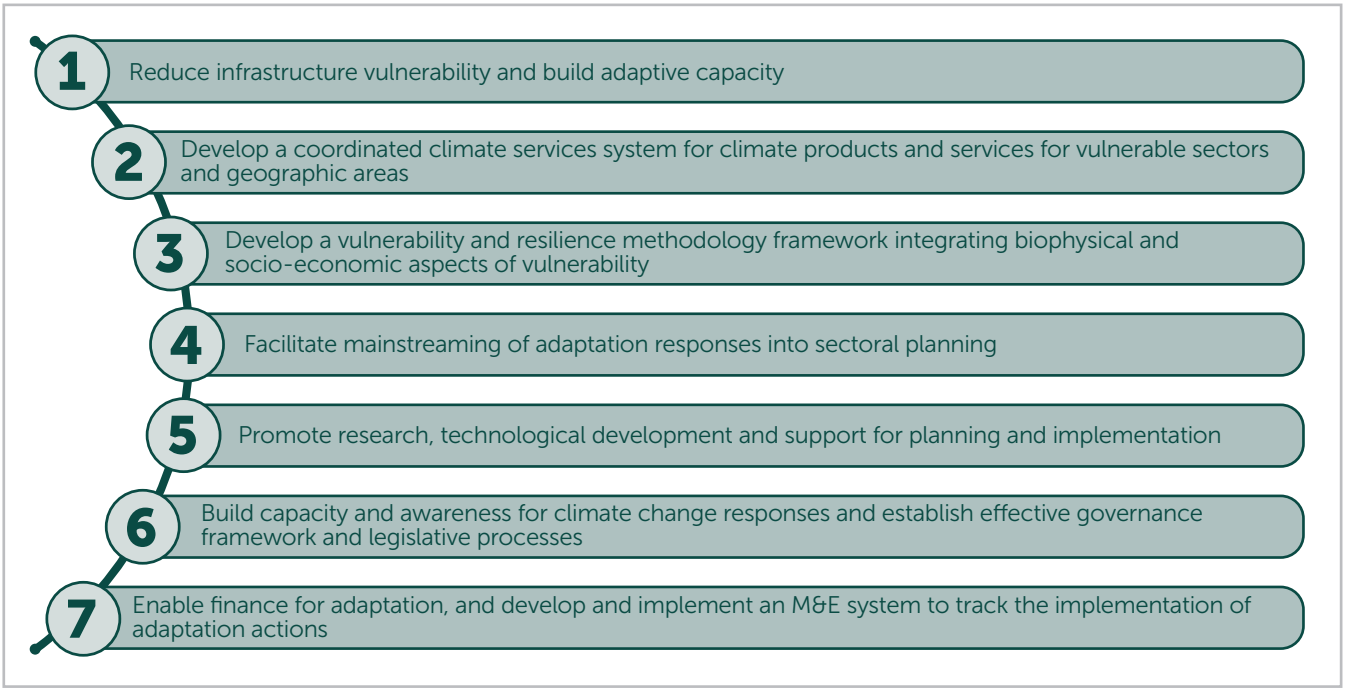
Source: National Planning Commission

The NDP envisaged that, by 2030, the country would have made substantial progress in its transition to an environmentally sustainable, climate-resilient and low-carbon economy. While some progress has been made, South Africa is currently not on course to meet all its commitments set out in the NDP (National Planning Commission, 2022).

In 2015, South Africa adopted the United Nations (UN) Sustainable Development Goals (SDGs) as part of the UN's 2030 Agenda for Sustainable Development, a plan of action containing 17 SDGs and 169 associated targets. Goal 13 emphasises the need to take urgent action to combat climate change and its impacts. Furthermore, South Africa ratified the Paris Agreement in 2016, signalling government's commitment to address the threat of climate change in the context of fostering sustainable development and its commitment to eradicate poverty. At the heart of the Paris Agreement are nationally determined contributions (NDCs), which delineate each country's efforts to reduce national emissions.

Government adopted the National Climate Change Adaptation Strategy (NCCAS) in 2019, strengthening its commitment to combatting climate change and mitigating its adverse impacts (Department of Forestry, Fisheries and the Environment, 2019). The NCCAS sought to provide a common vision of climate adaptation and fostering resilience in South Africa. The policy aimed to facilitate development initiatives in the different spheres of government and across sectors through better coordination and policy coherence to implementing adaptation measures. The NCCAS makes provision for specific strategic interventions, which are summarised in Figure 1.2.

Figure 1.2: Strategic interventions identified in the NCCAS



Source: Commission's own compilation adapted from the Department of Forestry, Fisheries and the Environment

In terms of climate change adaptation financing (Strategic Intervention 7), the NCCAS reveals a high degree of uncertainty and lack of data regarding how much investment is needed for South Africa's climate adaptation response. According to the strategy, the projected costs under the low mitigation scenario range from R4.2 billion to R308 billion (Department of Forestry, Fisheries and the Environment, 2019). The primary source of funding from the public sector for implementing adaptation measures is through direct allocations from the National Budget through the Medium-term Expenditure Framework (MTEF). This includes funding for research programmes and activities that contribute to supporting and building resilience.

The NCCAS also envisages funding to be sourced from public intermediaries, such as the Global Environmental Facility, the Development Bank of Southern Africa and the World Bank, as well as other funds such as the Green Climate Fund and the Adaptation Fund. From the private sector, the strategy acknowledges that there have been investments in adaptation activities, such as the building of ecological infrastructure and sustainable farming practices. The private sector is envisaged to play a core strategic function in both the funding and implementation of climate change adaptation measures.

The strategy recognises the critical role of financial instruments that have already been put in place by public and private stakeholders, such as equity, concessional and non-concessional loans and debt, grants and the operational funding of private and state-owned entities (SOEs).

The Presidential Climate Commission (PCC), established in 2020, provides evidence to support better decision making for South Africa's transition to a low-carbon, climate-resilient economy. In 2022, the PPC adopted the Just Transition Framework (JTF) (Presidential Climate Commission, n.d.). The JTF sets out the framework within which South Africa's just energy transition should take place by specifying the foundational principles to guide the transition, identifying specific sectors that are at risk and key policy areas, establishing governance arrangements, and providing a strategic framework for climate financing (Presidential Climate Commission, 2022).

The key policy areas identified in the JTF are human resources and skills development, industrial development, economic diversification and innovation, and social protection measures. The JTF provides further guidance on how economic diversification can be achieved, as illustrated in Figure 1.3.

Figure 1.3: Strengthening economic diversification

Source: Commission's own compilation adapted from the Presidential Climate Commission

In 2024, the President enacted the new Climate Change Act, which sets out a national climate change response, solidifying government's commitment to achieving a just energy transition, and promotes and enables an alignment within government's climate change policy framework. The Act established a formal legislative framework for governing South Africa's climate change response in achieving a just energy transition, including the setting of emissions targets, measures to monitor progress, and the promotion of climate resilience across all sectors of the South African economy.

The costs associated with adapting to climate change – such as investing in flood defences, drought-resistant crops, or cooling technologies – divert resources from other productive investments (Dell et al., 2014), and therefore come at an opportunity cost. The literature points to the potential stimulatory effects of proper fiscal policies on innovation, productivity and greening public investments for climate-resilient infrastructure (Fay et al., 2015).

Transition risks emanate from the economic changes needed to move to a low-carbon economy. These risks include slowing short-term economic growth as new low-carbon technologies and policies are phased in. For example, fossil fuel-dependent industries may experience economic shrinkage as they are compelled to comply with more stringent emission rules (Arezki & Belhaj, 2019). A trade-off in climate mitigation policies is the balance between short-run emission reduction, which can be costly, and long-term environmental sustainability (Krogstrup & Oman, 2019). Green investment and technological policy provide substantial long-term benefits, but may drive near-term demand-side shocks if they crowd out private investment and consumption (Dell et al., 2014).

Developing a balanced design for climate policies that ensures dual economic growth and sustainability is therefore critical. However, implementing adaptation measures aimed at mitigating the harmful impacts of climate change will have significant consequences for South Africa's fiscal framework, potentially over-burdening an already constrained fiscus, highlighting the need for global coordinated efforts to fund adaptation strategies.

1.3 PROBLEM STATEMENT AND RESEARCH QUESTIONS

Increasing global temperatures has the potential to cause extreme weather shocks and economic disruptions, impacting macroeconomic stability. In South Africa's constrained fiscal environment, the costs of implementing mitigation and adaptation strategies present a challenge to transitioning to a low carbon-resilient economy. While there is evidence in the literature that demonstrates the vulnerability of agricultural production to temperature variability, making it more vulnerable to climate-induced shocks (Acevedo et al., 2020; Gbetibouo et al., 2010; Schlenker & Lobell, 2010; Welch et al., 2010), fewer studies have explored the transmission mechanisms and impact of extreme temperature variability at the sectoral level, particularly within the South African context. Gaining insight into sectoral interdependencies provides necessary insights to devising appropriate and well-targeted mitigation and adaptation responses.

Research questions

The research questions are as follows:

1. What are the climate change demand- and supply-side macroeconomic effects on African economies?
2. What role does the agricultural sector play in the South African economy in terms of output and employment and why is agricultural output sensitive to extreme temperature variability?
3. Which sectors of the economy are most vulnerable to drought-induced losses in agricultural production?

1.4 RESEARCH METHODOLOGY AND DATA

1.4.1 Quantitative research methods

Trend analysis

A preliminary trend analysis is conducted to investigate the correlation between key variables concerning climate change, including global average temperature change and CO_2 across global regions and selected countries. Data on agricultural value added is also combined with temperature data to illustrate how extreme weather events over time seem to coincide with fluctuations in agricultural production. Fiscal spending trends on adaptation and mitigation measures, as well as disaster relief funding support, are also briefly analysed to recognise the funding mechanisms government has in place to support climate-related events.

Panel vector autoregressive estimation

Climate change fiscal effects on African countries from 1990 to 2023 are examined using the panel vector autoregressive (PVAR) model[1]. The advantage of the PVAR model over the simple random and fixed effects models lies in its ability to capture dynamic climate change shocks to economic growth and the fiscal balance through impulse response functions (Hill, Davis, Roos & French, 2020; Naidenova & Parshakov, 2013). First-generation unit roots tests will be performed before estimating the PVAR model following both Levin, Lin and Chu (2002) and Im, Pesaran and Shin (2003).

The PVAR model of Holtz-Eakin, Newey and Rosen (1988) is used to evaluate climate change and other macroeconomic factors in several African countries. Additionally, a South African vector autoregressive (VAR) model will be computed for comparison. The PVAR model handles heterogeneity and endogeneity in panels. This method combines VAR characteristics with panel data methodologies, which treat all variables as endogenous and allow unobserved endogeneity and heterogeneity (Love & Zocchino, 2006).

The matrix form for the PVAR model is:

$$X_{it} = \beta_0 + \beta_1 X_{i,t-1} + \cdots + \beta_p X_{i,t-p} + \varepsilon_{it} \quad (1)$$

Where,

X_{it} is a (4x1) vector of system variables: temperature change *(TMP)*, weather event (*WEV*) a variable of interest, real gross domestic product (*GDP*) and fiscal balance (*CAB*); β_0 is a (4x1) vector of constants; $\beta_{1,2,\ldots,s}$ is a (4x4) matrix of coefficient estimates; ε is a (4x1) vector of the white noise error term; i is a cross-sectional identifier; and s is the maximum lag length of each variable chosen using the Schwartz Bayesian Criterion (SBC) and the Akaike Information Criterion (AIC).

According to Kunawotor, Bokpin, Asuming and Amoateng (2022), the variables are ordered from the most exogenous variable to the least exogenous variable. Post-diagnostic tests include stability tests. If the values are within the circle, the stability of the model will be confirmed. To include the endogenous variables, equation (1) may be represented by equation (2):

$$logGDP_{it} = \beta_0 + \beta_1 CAB_{i,t-1} + \beta_2 TMP_{i,t-1} + \beta_3 WEV_{i,t-1} + \varepsilon_{it} \quad (2)$$

1 The complete list of countries is in Appendix A.

Input-output model

An input-output model is derived to estimate the production inducement effects of a change in agricultural production on other sectors in the economy. Importantly, it is not within the scope of this analysis to estimate a causal relationship between temperature variability and agricultural output. Rather, the production inducement coefficients are used to simulate the impact of an agricultural output shock and estimate the potential sectoral losses. The input-output table is derived from Statistics South Africa (Stats SA)'s supply use tables following the construction of the Leontief (inverse) matrix.

The following equations are used to estimate the production inducement coefficients. Equation (3) defines the final demand conditions, following Song et al. (2024):

$$X = (I - A)^{-1} (Y - M) \tag{3}$$

Where X is the output matrix by industry, A is the input coefficient matrix, Y is final demand and M is total income. Equation (4) is derived from equation (3) to estimate the production inducement effects:

$$\Delta X^{e} = (I - A^{e})^{-1} \cdot (A(A_g)^{e} \Delta X(A_g)) \tag{4}$$

Where ΔX^{e} is the change in output in other industries, $(I - A^{e})^{-1}$ is the Leontief (inverse) matrix, excluding the columns and rows of the agricultural sector in Matrix A, $A(A_g)^{e}$ is the column vector of the agricultural sector, the columns and rows of the agricultural sector in Matrix A, and $\Delta X(A_g)$ is the output of the agricultural sector. The production inducement effect measures the change in output in industries other than the agricultural sector that increases when agricultural output increases by one unit. Conversely, the effect of a one-unit decrease in agricultural production can be modelled and estimated using this method.

The drought period itself is defined as spanning two years, 2015 and 2016, since, based on data from the World Bank, these years saw the highest number of days with temperatures exceeding 30 °C, which are outlier years compared to the historical average (these 'drought' years also have corresponding drops in agricultural production). To account for dispersion in the data and uncertainties around the quantified drought-induced shock to agricultural production, a 90% confidence interval was constructed to reflect a range of potential impacts of the shock.

1.4.2 Data

Data for the trend analysis is sourced from the World Bank Development Indicators and the Emergency Events Database (EM-DAT). For the PVAR model, annual data for the selected African countries is retrieved from secondary sources according to data availability. Fiscal balance data comes from the African Development Bank (AfDB)'s Socio-economic database and the International Monetary Fund (IMF)'s International Financial Statistics (IFS).

The temperature data is sourced from the United Nations Food and Agriculture Organisation (FAO). World Bank Development Indicators provide real economic growth, debt ratio, unemployment, inflation and real interest rate data.

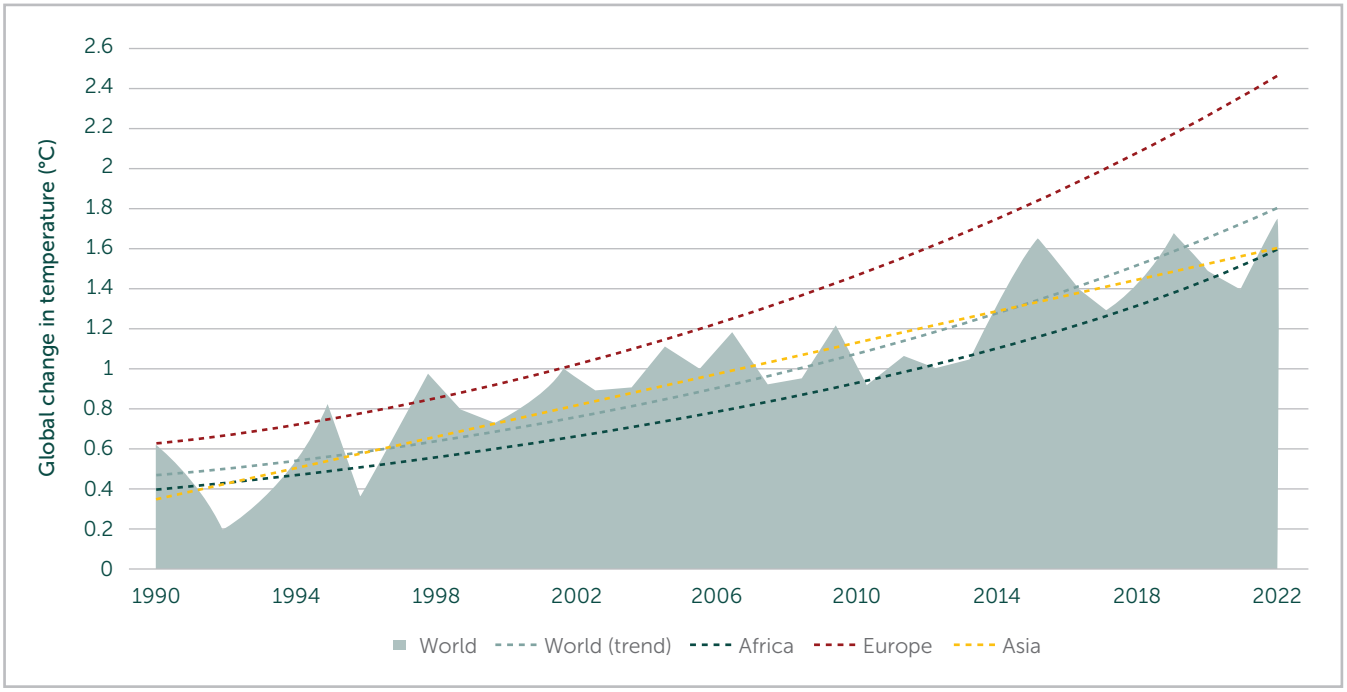
Weather data is sourced from the EM-DAT, maintained by the Centre for Research on the Epidemiology of Disasters (CRED) at the University of Louvain's School of Public Health in Brussels, Belgium. Stats SA's supply-use tables were used for the input-output analysis findings.

1.4.3 Macroeconomic effects of climate change

Rising global temperature and the distribution of global emissions

Climate change refers to the transformation of the earth's weather patterns over the long term, including the phenomenon of global warming, which may be observed in rising average global temperatures. As illustrated in Figure 1.4, the global mean surface temperature, compared to the 1951–1980 baseline of 14 °C, has been gradually increasing since 1990. An increase of 1.8 °C, compared to the baseline, was recorded in 2023, surpassing the Paris Agreement limit of 1.5 °C.

Figure 1.4: Temperature changes globally and across selected regions (1990–2023)

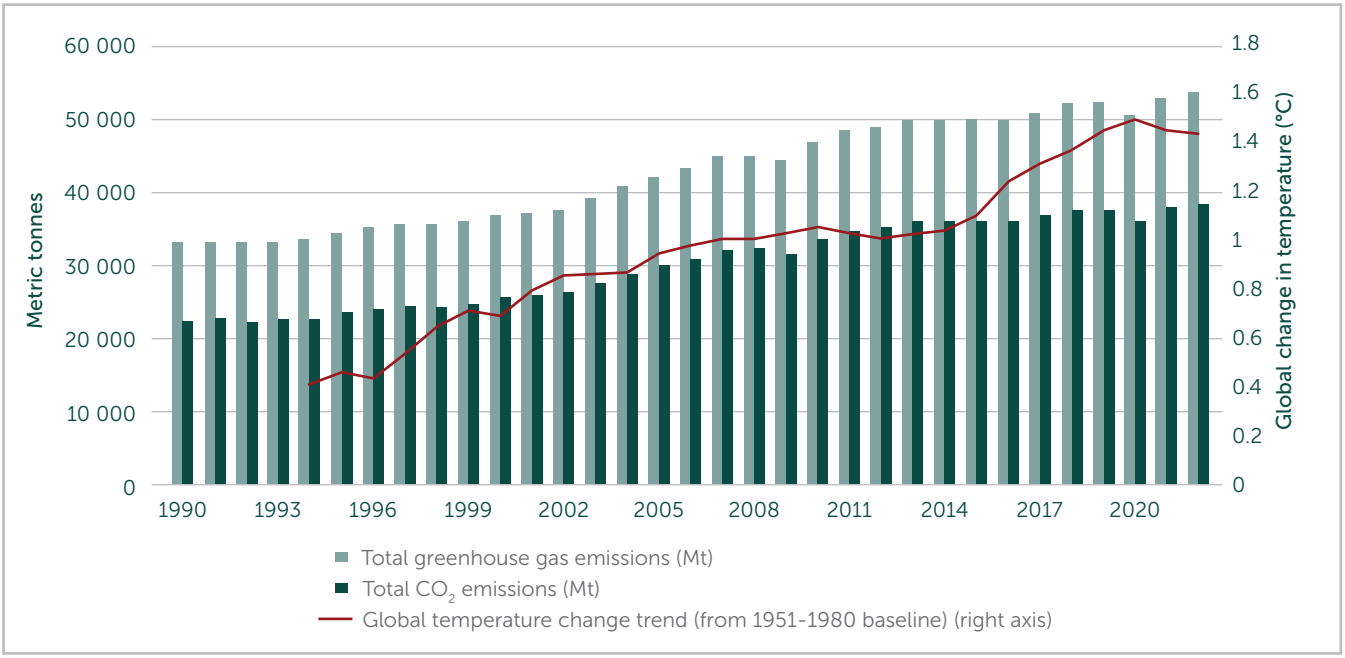


Source: Emergency Events Database

Note: The temperature change in degrees Celsius is measured as the increase in temperature relative to the baseline, which is the average temperature recorded during 1951–1980.

Coinciding with the rising global temperatures shown above, Figure 1.5 illustrates CO_2 and greenhouse gas (GHG) emissions, measured in metric tonnes. The global average temperature change measured in degrees Celsius is shown on the right-hand axis. The data suggests a positive correlation between GHG and CO_2 emissions, on the one hand, and global temperature, on the other. The increase in emissions between 1990 and 2022 corresponds with positive changes in global average temperature.

Figure 1.5: Carbon emissions and global mean temperature (1990–2023)

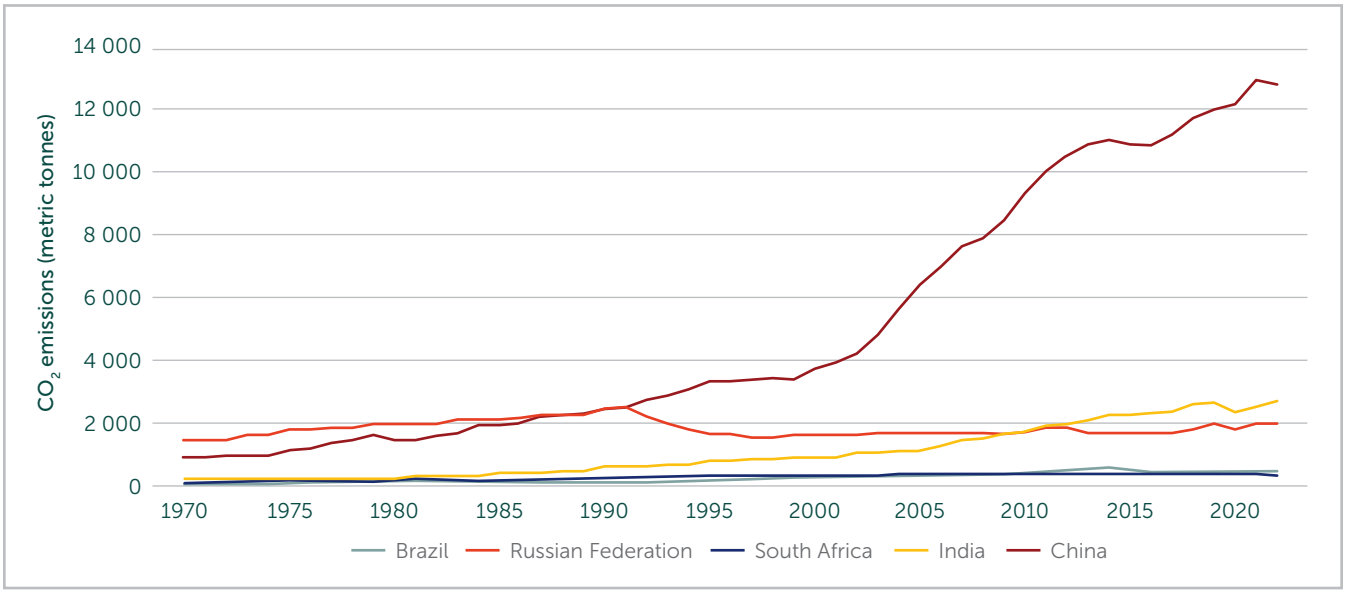


Source: Emergency Events Database and World Bank (2025)

Note: The temperature change in degrees Celsius is measured as the increase in temperature relative to the baseline, which is the average temperature recorded during 1951–1980.

Among Brazil, Russia, India, China, South Africa (BRICS) economies, the growth in CO_2 emissions shows significant disparities. Measured in metric tonnes, Figure 1.6 shows the distribution of CO_2 emissions between 1970 and 2022, illustrating that China's CO_2 emissions far exceed those of other BRICS countries. The volume of China's emissions appears to have started increasing at a faster pace since 2003. South Africa and Brazil have the lowest CO_2 emissions, and levels have remained relatively stable since the 1970s, while India's appear to have been on a steady increase, as shown in the figure. Russia's CO_2 emission levels have fluctuated marginally, but have remained relatively lower over the past 50 years.

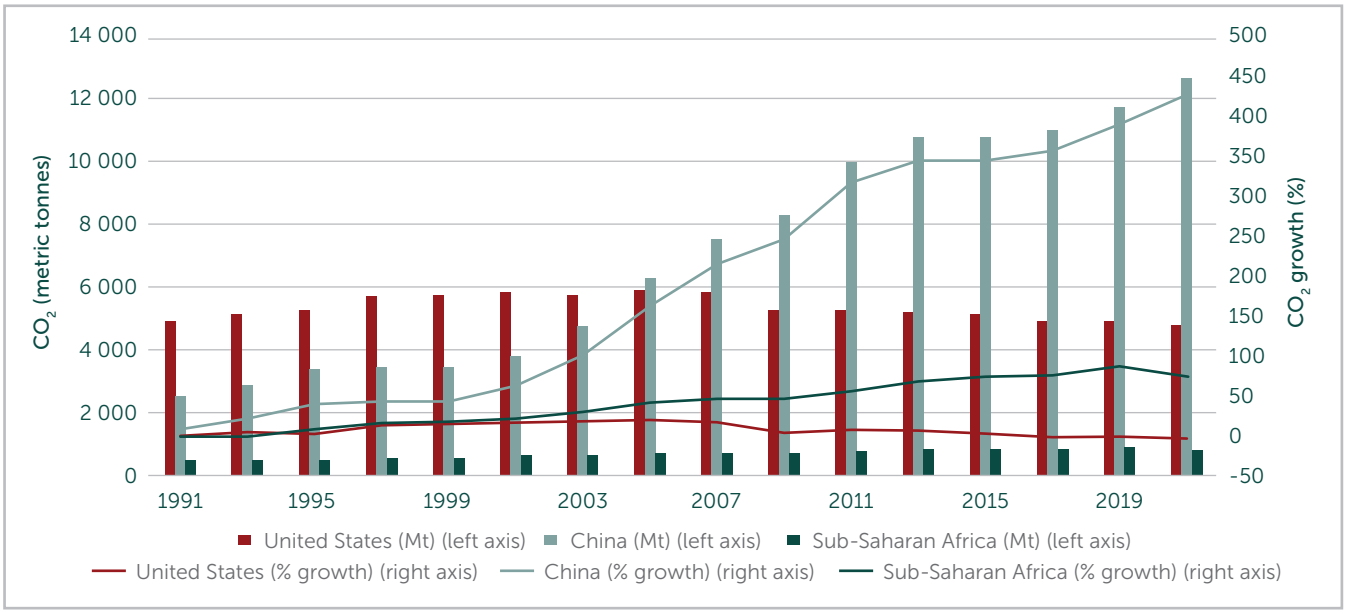
Figure 1.6: Distribution of carbon emissions by BRICS countries (1970–2022)



Source: World Bank Indicators

Considering China and the USA more closely, Figure 1.7 provides the growth trends in carbon emissions since 1991. Between 1991 and 2021, China's CO_2 emissions grew by approximately 428 per cent – a markedly higher rate than those of the USA, which appear to have stayed relatively stable and been in marginal decline since 2007. While growth in CO_2 emissions since 1990 in sub-Saharan Africa is higher than that of the USA, in absolute terms, sub-Saharan Africa emits much smaller volumes of CO_2, as shown in the figure.

Figure 1.7: CO_2 emissions and emissions growth in selected regions and countries since 1991



Source: World Bank Indicators

The industrial growth of China has been well documented since the country started to reform its economy in 1978 (World Bank, 2024). Since implementing free-market reforms and opening the economy up to foreign trade and investment, China's GDP growth averaged above 9 per cent annually over a span of three decades (Morrison, 2019; Roland, 2019). Studies have shown that economic growth is positively correlated with CO_2 emissions in the short term, after which CO_2 emissions reach a peak and then decline with increasing economic growth – providing evidence supporting the inverted U-shaped Environmental Kuznets Curve hypothesis (Yang, Cai, Lu & Zang, 2022). However, there is also evidence that the development and growth of the secondary sector, in particular the manufacturing industry, contributes to a rise in CO_2 emissions in both the short and long term (Yang et al., 2022), which may explain the sharp rise in CO_2 emissions seen in the data for China in Figure 1.7.

The countries with the highest carbon emissions are ranked in Table 1.1 according to different economic sectors: manufacturing, industry and construction, and energy. Following China, which has the highest CO_2 emissions across all three sectors, India trails relatively far behind in terms of the manufacturing and construction sectors. The USA, India and Russia are among the top five countries with the most carbon emissions. Across the different sectors, the top ten include Japan, Saudi Arabia, Germany, Korea and Iran.

Table 1.1: Top ten highest CO_2 emissions by country and economic sector (2018)

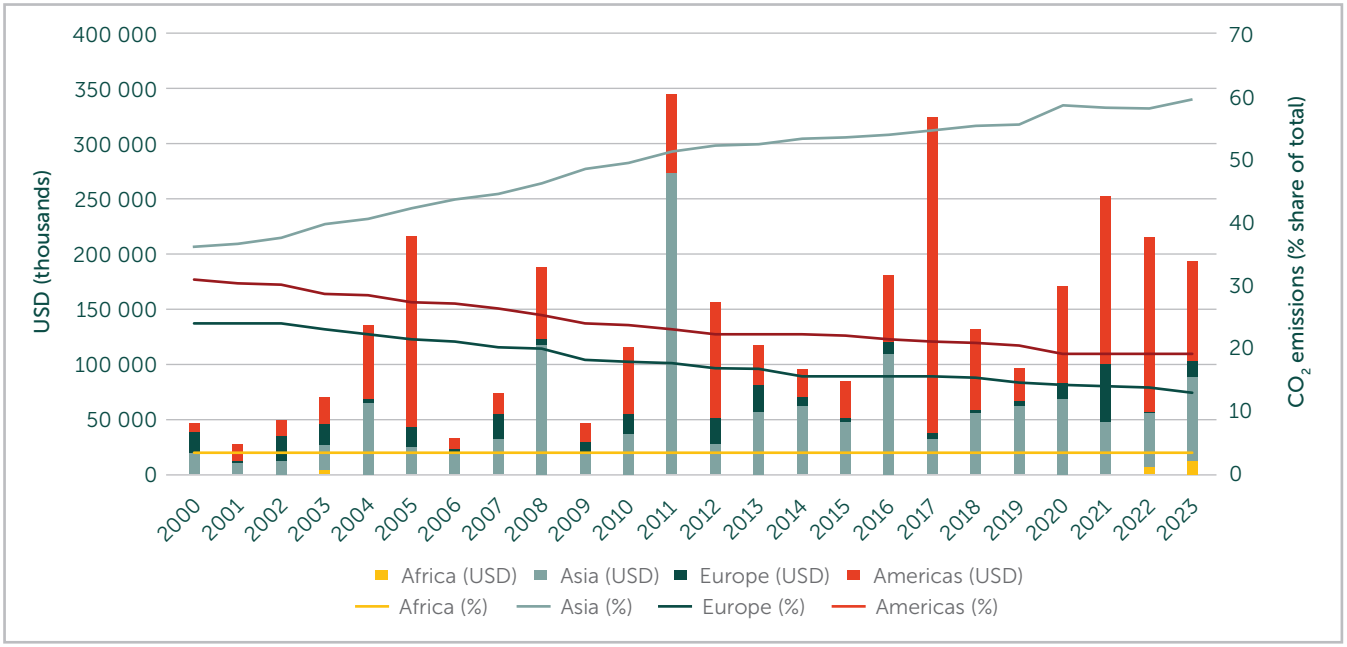
Rank	Manufacturing (Mt)		Industry / Construction (Mt)		Energy (Mt)	
1.	China	2 667	China	782	China	9 531
2.	India	571	India	125	United States	4 940
3.	United States	459	United States	41	India	23 09
4.	Russia	251	Turkiye	39	Russia	1 587
5.	Japan	192	Indonesia	31	Japan	1 081
6.	Saudi Arabia	125	Vietnam	30	Germany	696
7.	Indonesia	114	Japan	25	Iran	611
8.	Germany	99	Korea	25	Korea	606
9.	Iran	99	Saudi Arabia	23	Canada	568
10.	Brazil	87	Egypt	21	Indonesia	552

Source: World Bank, 2025

Climate change may pose significant costs in different regions due to its effect on domestic conditions, for example, with respect to infrastructure. Regions that invest in climate-resilient infrastructure can significantly reduce the long-term costs associated with climate change impacts, such as extreme weather events and rising sea levels. This proactive approach helps mitigate damage and enhances recovery efforts (Lau, Rivadeneir & Mager, 2023). The effective planning and design of climate-resilient infrastructure are essential for minimising costs. By integrating climate risk assessments into infrastructure development, regions can better prepare for potential climate-related disruptions, leading to lower overall expenditure. Over two decades, and driven mostly by China, Asia's share of total global carbon emissions grew from approximately 36 per cent to almost 60 per cent, as shown in Figure 1.8, while Europe's and the Americas' share has decreased. Africa's share has remained low and unchanged in comparison.

Figure 1.8 also shows the economic costs incurred from natural disasters across the four regions – Africa, Asia, Europe and the Americas. The costs associated with natural disasters have generally been high, with Asia peaking in 2011 at 273.7 million US dollars. While the Americas' share of global CO_2 emissions is significantly less than Asia's, fluctuating at around 20 per cent in recent years, the costs of natural disasters appear to have exceeded those of Asia, particularly since 2017, when they peaked at 283.9 million US dollars.

Figure 1.8: Estimated cost of natural disasters (USD thousands) across regions and their share of total annual global CO_2 emissions



Source: Emergency Events Database

Climate change costs are determined by the efficiency of mitigation programmes in each country, which can result in varied levels of commitment and costs. For example, China's lower labour costs may allow for cheaper pollution abatement than those of the USA, lowering overall mitigation costs. Domestic conditions tend to influence the appropriate policy mix for country mitigation plans, with differentiated levels of emission reductions and associated cost of mitigation (Van den Bergh & Gilligan, 2015).

According to the carbon price equivalent approach, countries should incur the societal cost of GHG emissions. This theory implies that, as major emitters, China and the USA should bear the costs proportionate to their emissions, although real commitments and efficacy can vary greatly (Weil, 2020). Ultimately, while there may be a correlation between the costs of climate change and the commitments to mitigate it, the impact of those commitments on emissions and costs can vary due to the distinct national circumstances and policy effectiveness of different countries.

Climate change susceptibility can be decreased, and investment can be mobilised by strengthening the financial mechanisms that support climate-resilient infrastructure. This investment can result in long-term benefits by avoiding infrastructure failures (Lau et al., 2023). This suggests that infrastructure coverage in national climate risk assessments may be crucial for identifying vulnerabilities and prioritising investments in climate-resilience.

Empirical analysis

The following analysis runs a PVAR model for African economies from 1990 to 2022 to assess the impact of extreme weather and climate change on macroeconomic outcomes. Table 1.2 provides descriptive statistics, indicating 924 observations from 28 African countries over the period 1990–2022.

Table 1.2: Descriptive statistics for the PVAR model

	GDP	CAB	TMP	WEV
Mean	5.08E+10	-3.129625	0.891579	0.945887
Median	1.17E+10	-3.870707	0.892500	1.000000
Maximum	5.35E+11	41.90659	2.500000	9.000000
Minimum	3.14E+08	-44.84100	-0.698000	0.000000
Standard deviation	9.26E+10	8.539655	0.488757	1.243529
Observations	924	924	924	924

Source: Financial and Fiscal Commission's calculations

The approaches in Levin et al. (2002) and Im et al. (2003) were used for panel unit roots tests. Unit roots tests indicate that logGDP, CAB, TMP and WEV are stationary at 1 per cent significance at level form, as presented in Table 1.3. Numerus studies have estimated PVAR models using I(0) variables in their level form (Anakpo & Kollamparambil, 2022; Caraiani, Gupta, Nel & Nielsen, 2023; Makhoba & Kaseeram, 2022; Nene, Ilesanmi & Sekome, 2022; Saidi, Ochi & Maktouf, 2023). The lag selection of the PVAR model was indeterminate; hence, lag one was selected according to the Bayesian Information Criterion (BIC) to avoid overparameterisation of the model.

Table 1.3: Panel unit roots tests for the PVAR model

	Levin, Lin and Chu (2002)	Im, Pesaran and Shin (2003)	
Variables	Levels	Levels	Conclusion
logGDP	-23.1740***	-7.2757***	I(0)
CAB	-21.7883***	-5.6964***	I(0)
TMP	-28.1228***	-5.6219***	I(0)
WEV	-24.4940***	-5.0465***	I(0)

Source: Financial and Fiscal Commission's calculations

*Note: *** denotes the statistical level of significance at 1 per cent*

Table 1.4 documents the results from the PVAR model estimation. The results show that a 1 per cent increase in weather events in African countries causes a 0.19 per cent decrease in economic growth. This is consistent with findings in the literature documenting the detrimental effects of harsh weather events on economic growth (Adjei-Mantey & Adusah-Poku, 2019; Insaidoo, Kunawotor & Ahiabor, 2025). However, the impact on economic growth is ambiguous as a 1 °C increase in temperature was estimated to have a significant positive impact of 1.2 per cent on economic growth, which is inconsistent with the empirical literature, pointing to a negative impact (Abidoye & Odusola, 2015). The PVAR estimation of the impact of climate change on economic growth thus reveals ambiguity in the relationship between climate change and economic growth in African countries.

To avoid contradicting results for the impact of temperature shocks on economic growth, future research may consider estimating two distinct panel groups: North African countries, which experience high temperatures, and Southern African countries, which are assumed to have lower temperatures. Analysing these groups separately will enhance the robustness of the estimation results.

The results further indicate that both average temperature change and extreme weather events have a detrimental effect on the constrained fiscal balance of African countries. Table 1.4 demonstrates that a 1 °C up-trend in temperature change negatively impacts the budget balance by 2.24 per cent, while a 1 per cent change in extreme weather events induces a decline of 0.93 in the budget balance. Hence, the results provide empirical evidence that climate change has a detrimental impact on the fiscal balance of African countries. The fiscal policy response based on these findings is that governments in Africa should be proactive in devising robust adaptive capacities to combat climate change ramifications to economic growth and fiscal balance. Moreover, African governments must strengthen their fiscal space to be effective in mitigating climate change ramifications. Lastly, climate-resilient infrastructure should be established to mitigate climate change consequences.

Table 1.4: The PVAR model

	$logGDP_{i,t}$	$CAB_{i,t}$	$TMP_{i,t}$	$WEV_{i,t}$
$logGDP_{i,t-1}$	-0.1598***	-0.7253***	0.0291***	0.0255
$CAB_{i,t-1}$	-0.0389***	-0.0039	0.0025	-0.0007
$TMP_{i,t-1}$	1.2029***	-2.2375***	0.2025***	0.2818**
$WEV_{i,t-1}$	-0.1915***	-0.9341***	0.0071	0.2231***

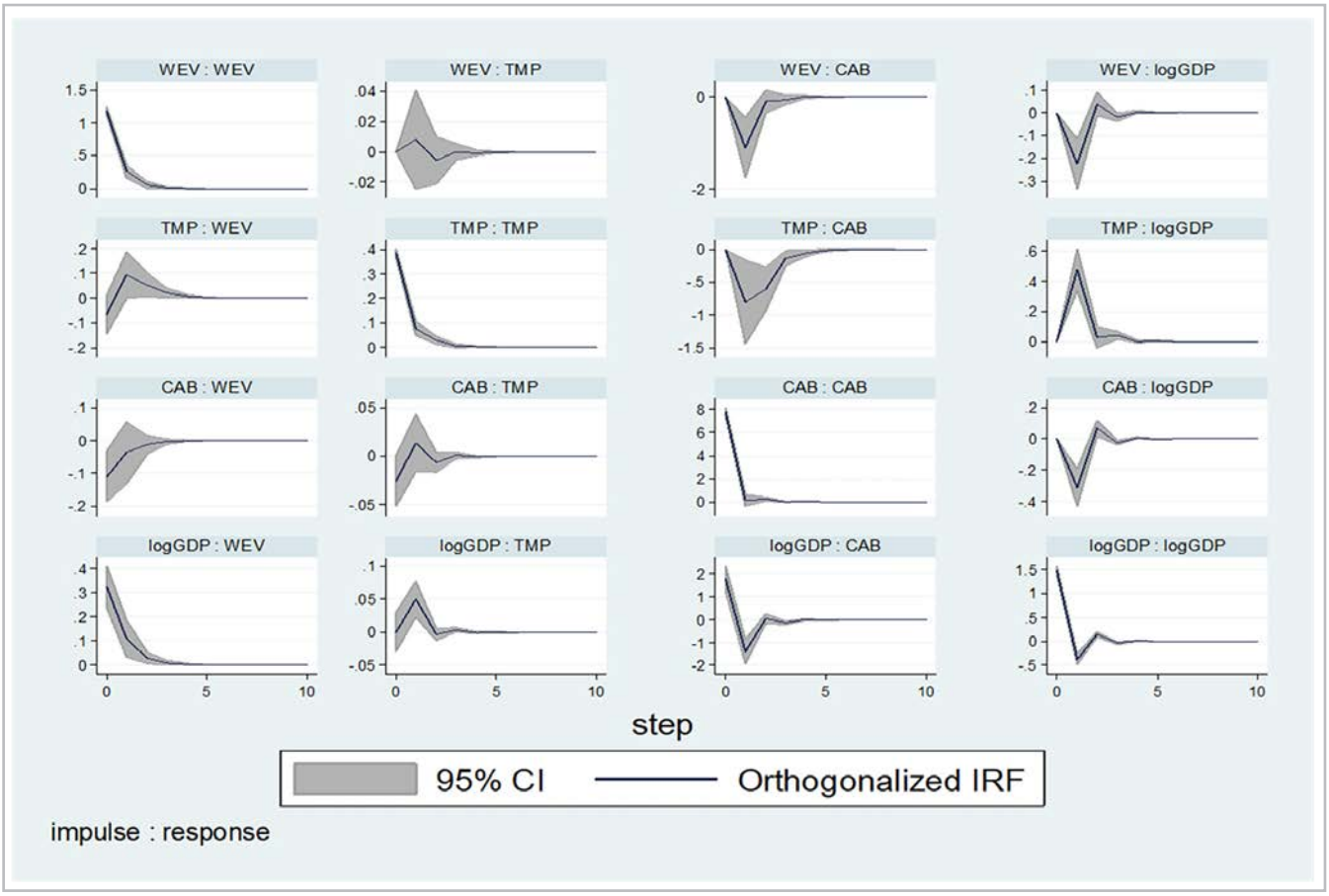
*Note: ***, **, represent 1 per cent and 5 per cent significance levels, respectively*

The climate change shocks to economic activity and budget balance are further examined through the impulse response function in Figure 1.10.[2] Impulse response functions study how African budget balances and real economic growth react to climate change and weather shocks. Figure 1.10 shows how extreme weather events (WEV) hurt the budget balance. After a weather event shock, the budget balance falls below equilibrium and stabilises in the second phase. The budget balance drops 0.93 per cent for every 1 per cent increase in weather events. Budget balance responses to extreme weather events match empirical literature (Bachner, Bednar-Friedl, & Knittel, 2019; Lis & Nickel, 2010; Kunawotor et al., 2022). Kunawotor et al. (2022) assert that extreme weather events can spread directly or indirectly. The direct implications include immediate relief support to surviving victim alleviation and public catastrophe response costs. It can indirectly lower production, wealth and tax revenues, and necessitate social support payments. The PVAR model in Appendix A shows that temperature change (TMP), a proxy variable for climate change, reduces the budget balance by 2.24 per cent.

Figure 1.9 shows that a positive temperature shock lowers the budget balance below equilibrium in the negative region, but stabilises after the second period. Climate change shocks hurt the budget balance due to adaptation and mitigation costs (Gassebner et al., 2010).

2 The PVAR stability condition was specified before calculating the impulse response function and prediction error variance decomposition (Abrigo & Love, 2016). The PVAR is stable since its modulus is less than 1, and its eigen value is within the circle. See Appendix A.

Figure 1.9: The impulse response function



Source: Financial and Fiscal Commission's calculations

A 1 per cent increase in logGDP deteriorated the budget balance in African nations, as illustrated in Figure 1.9. African economies encounter structural obstacles, including dependence on agriculture and commodities, resulting in unstable growth and heightened state expenditure. Inefficient tax structures constrain income production, while external borrowing for infrastructure projects intensifies debt servicing expenses. Consequently, despite economic expansion, these variables lead to persistent budget deficits.

The fourth column in Figure 1.9 illustrates that 1 standard deviation shock from weather occurrences adversely impacts real economic growth in Africa. Furthermore, the PVAR model in Appendix A indicates that a 1 per cent rise in weather occurrences results in a 0.19 per cent decrease in economic growth. These empirical findings align with those of Dell, Jones and Olken (2008), who determined that meteorological occurrences negatively impacted the economic growth of less developed countries by 0.6 to 2.9 percentage points. Multiple studies endorse implementing stringent measures to gain private funding (Buchner et al., 2019; Hascic, Rodriguez, Jachnik, Silva & Johnstone, 2015). Some studies advocate that expenditures related to climate change should be incorporated into the annual budgeting process.

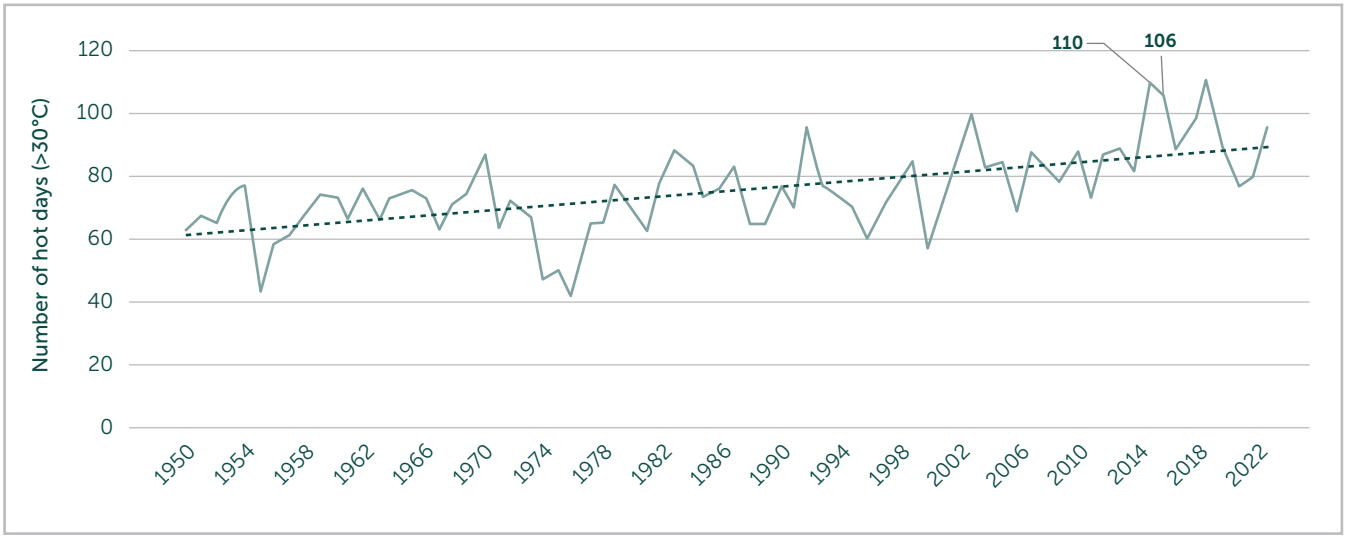
Kulenthiran and Stanley (2018) contend that governments can only mitigate climate change's economic, social and environmental repercussions if incorporated into national planning frameworks and budgetary procedures, owing to its multifaceted nature.

1.4.4 Investigating sectoral interdependencies and the impact of a climate-induced shock in South Africa

Agricultural output and sensitivity to drought conditions

Figure 1.10 shows that, in 2015, South Africa experienced the hottest year since 1950, with approximately 110 days where daily temperatures exceeded 30 °C. Drought conditions continued in the following year (2016), with a higher-than-average number of hot days (defined as temperature exceeding 30 °C). Prior to 2015, the historical average for the number of hot days was approximately 73. The temperature data allows us to visualise the gradual rise in daily temperatures over the long term, as shown by the positive trend line. It also provides a rationale for using 2015 and 2016 as the 'drought period' for the input-output analysis below.

Figure 1.10: Increasing daily temperature in South Africa, 1950–2022



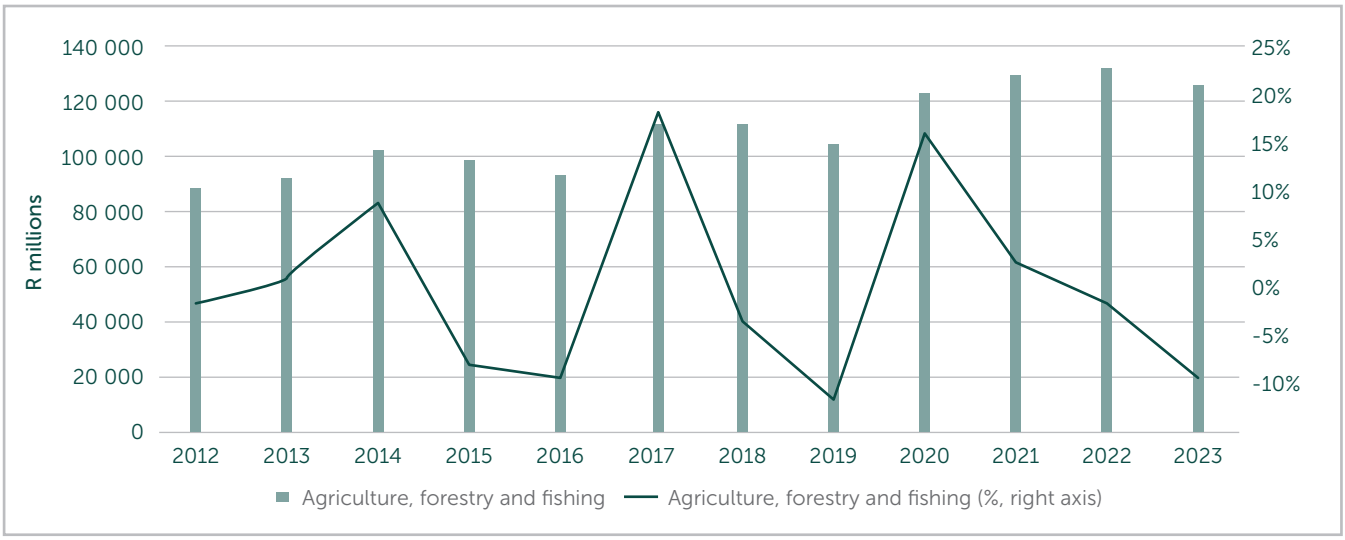
Source: World Bank 2024

Frequent heat waves and droughts can lead to less suitable land for crops and livestock (i.e. less agricultural production) with potentially detrimental consequences for food security (Mnkeni et al., 2020). Drought is considered to be one of the most severe forms of climate-related disasters for South Africans and the economy (World Bank, 2022). Droughts have been estimated to incur losses of R9.7 billion, taking into account productivity decline, damages to infrastructure and costs to livelihoods (World Bank, 2022). Extreme weather shocks, particularly in the case of severe droughts and flooding, may thus lead to substantial economic and social losses.

South Africa, particularly the Western Cape, experienced a severe drought in 2017 that lasted roughly between 2015 and mid-2018, with severe implications for the government and economic sectors that are vulnerable to shocks in agricultural output (World Bank, 2022). In terms of agricultural production, field crops are especially vulnerable to drier weather conditions, and saw the worst declines during 2015 and 2016. However, fruit production is also highly sensitive to changing weather conditions.

It is reported that, during the dry spell in 2018 and 2019, the production of apricots, peaches and plums declined substantially by 36 per cent, 24 per cent and 44 per cent, respectively (AgriSA, 2019), demonstrating the variety of risks the agricultural sector faces when weather conditions fluctuate drastically.

Figure 1.11: Growth in value added in agriculture, 2012–2023



Source: Stats SA, 2024

Figure 1.11 shows sharp declines in the growth of agricultural production between 2015 and 2016, as well as between 2018 and 2019. This coincides with periods of higher-than-average temperatures in South Africa, resulting in dry spells during rainy periods. In terms of crop and maize production, the area for maize plantation was reported to be 25 per cent lower in 2016/17 than in the previous year due to the extreme temperatures. Similarly, cane production declined from an annual norm of 19 million tons to approximately 14 million tons, resulting in job losses for seasonal workers (Schreiner, Mungatana & Baleta, 2018). Drought can cause natural grazing areas to become depleted, with serious implications for the livestock sector.

While a direct causal relationship is not established here between drought conditions and loss of agricultural output, given that other factors that may have impacted on output losses, such as seasonality and unrelated supply chain disruptions, are unaccounted for, the reports documenting lower agricultural yields and the trend showing declines in annual agricultural value added during the drought period provide some indication of a correlation between extreme temperature variability and agricultural output in South Africa. This finding is supported by previous findings summarised in the literature review above, as well as by the World Health Organisation (2020) and Sachs et al. (2019), which emphasise the vulnerability of food systems and agricultural production to extreme weather conditions, including droughts.

Investigating sectoral vulnerabilities to drought-induced shock

In this part of the analysis, the sectoral vulnerabilities to climate change are quantitatively investigated using an input-output (IO) model. The analysis provides estimates of the production inducement effect, which measures the change in agricultural production that occurs due to drought-like conditions.

More specifically, the production inducement effect, which essentially encompasses the demand-side impact of a shock in agricultural output, aims to uncover the downstream ripple effects in other industries that supply goods and services to the agricultural sector (Song et al., 2024).

The results from Table 1.5 summarise the production inducement coefficients for 20 industries that obtained the highest production inducement values, thereby indicating their stronger linkages to the agricultural sector relative to other industries. Although agriculture contributes only approximately 3 per cent of South Africa's GDP, the sector is considered an important driver of growth for the rest of the economy due to backward and forward linkages with other economic sectors (Mnkeni et al., 2020). Higher production inducement values indicate that a sector is more closely linked to agricultural production, and thus more sensitive to shocks to agricultural production. The agricultural sector relies on numerous inputs, including petroleum products as a source of fuel for machinery in agricultural production, as well as for transporting agricultural products to market. The results from the IO analysis in Table 1.5 show that petroleum products have the highest production inducement effects, with a coefficient of 0.12421608, indicating that it is closely linked to agricultural production compared to all other sectors. This is consistent with findings from Song et al. (2024), who uncovered very strong linkages between the agricultural sector and petroleum products.

According to this model, the results suggest that a R1 decrease in agricultural sector production will lead to petroleum production decreasing by R0.12. Due to the importance of fuel as an input in driving agricultural production, the demand for petroleum products can be expected to have strong linkages to the agricultural sector. This finding suggests that climate change-induced drought conditions, which contribute to a drop in agricultural production, would adversely impact the demand for fuel, making the sector vulnerable to climate change. Fuel accounts for approximately 8.1 per cent of total expenditure on intermediate inputs in the South Africa's agricultural sector (Department of Agriculture, Land Reform and Rural Development, 2024).

Table 1.5: Input-output modelled production inducement coefficients

Rank	Industry	Values	Rank	Industry	Values
1.	Petroleum	0.124	11.	Electricity and gas	0.026
2.	Fertilizer products	0.087	12.	Pharmaceutical	0.025
3.	Freight and transport	0.070	13.	Fabricated metals	0.024
4.	Financial services	0.062	14.	Special machinery	0.019
5.	Minerals	0.057	15.	Insurance products	0.018
6.	Animal feed	0.048	16.	Business services	0.016
7.	Vehicle parts	0.029	17.	Textile products	0.014
8.	Basic chemicals	0.029	18.	Iron and steel	0.013
9.	Other financial	0.027	19.	Other services	0.012
10.	Social services	0.027	20.	Food and beverages	0.012

Source: Financial and Fiscal Commission's calculations

Other key industries with relatively high production inducement effects include fertilizer (0.087), freight and transport (0.070), financial services (0.062) and minerals (0.057). Fertilizer products are expected to have a relatively high production inducement effect as they are an intermediate input in the agricultural production process. Thus, a reduction in agricultural output may have a significant adverse impact on the demand for fertilizer.

The results from the IO model suggest that a R1 drop in agriculture results in an approximate R0.09 decline in fertilizer production. Expenditure on fertilizer makes up approximately 11.6 per cent of total expenditure on intermediate goods and services (Department of Agriculture, Land Reform and Rural Development, 2024).

The results also provide evidence that the transport sector in South Africa has strong linkages to the agricultural sector. The model results suggest that, if a drought-induced shock caused agricultural production to decline by R1, output in the freight and transport sector would see a decline of approximately R0.07. Due to the relatively high coefficient for the freight and transport industries, the production inducement effects of a shock in agricultural production are expected to have a significant impact on the demand for freight and transport. These industries are key role players in the transportation of agricultural products to market for domestic consumption and international trade. If the volume of agricultural output is lower, fewer goods will need to be transported, thus causing the demand for transport and logistical services to decline. This production inducement effect highlights the vulnerability of the transport industry to sectoral shocks in agriculture, primarily due to supply chain disruptions.

The model results show a relatively high production inducement effect for the financial services industry. The estimated coefficient suggests that a R1 decrease in agricultural output will result in a decline of approximately R0.06 in the financial services industry, highlighting significant indirect linkages between the financial and agricultural sectors.

Financial services and financial instruments can be indirectly linked to the agricultural sector when agricultural businesses are reliant on loans, investment or insurance products. In the South African agricultural sector, interest paid by farmers to banks and financiers between 1 July 2022 and 30 June 2023 amounted to approximately R14.7 billion (or 4 per cent of total farming costs), which may explain why the financial sector is sensitive to agricultural production (Department of Agriculture, Land Reform and Rural Development, 2024).

The model results suggest that, while climate change-induced weather shocks will not have a direct impact on the financial sector; indirectly, the financial sector may be vulnerable to climate change-induced shocks that impact agricultural output. The results further suggest that the greater the farming industry's dependence on various instruments to conduct their business activities, the more vulnerable the financial services sector may be to disruptions in agricultural output caused by climate change. According to Stats SA's figure for the country's GDP in 2024, compared to the third quarter in 2024, the South African financial sector contributes approximately 23.8 per cent to South Africa's GDP and is thus a vital sector for economic growth in the country.

The relatively high coefficient for minerals suggests an interconnectedness between the agricultural and mining sectors. Minerals or chemicals that enrich the soil or are utilised as inputs to produce fertilizer products have downstream production linkages to the agricultural sector. The model results thus indicate a degree of sensitivity of the mineral sector to a decline in agricultural production. According to the model results, a R1 decline in agricultural production could decrease mineral production by approximately R0.06. The findings from the model are expected to indicate that the animal feed industry has a relatively strong production inducement effect.

Animal feed is a critical input in the agricultural sector, particularly when livestock farming is prominent, as is the case in South Africa. According to the Department of Agriculture, Land Reform and Rural Development (2024), animal products contribute approximately 42.8 per cent to the total gross value of agricultural production. The results suggest that a drought-induced reduction in agricultural output of R1 would lead to an approximately R0.05 decrease in the production of animal feed due to lower demand.

The lesser degree of vulnerability of the food and beverages industry (indicated by the smaller production inducement coefficient) is somewhat unexpected, given that food is directly dependent on agricultural production (Song et al., 2024). However, the lower production inducement effect may be explained by terms of trade and the reliance on agricultural imports for consumption, rather than domestic production. In this case, the import of food and beverages presents as an opportunity to mitigate the adverse consequences resulting from a decline in domestic agricultural production.

Overall, the IO analysis and demand-side approach adopted reveals the numerous sensitivities to output shocks across the economy, with notable downstream effects, which provides some indication of which sectors are vulnerable to climate change-induced agricultural shocks in the South African economy.

An estimated drought-induced agricultural output shock in rand value is simulated in Table 1.6. This table provides the descriptive statistics underpinning the analysis.

Table 1.6: Descriptive statistics of an agricultural output shock

Descriptive statistics	R billion
Historical output (2004–2014)	83.5809
Output shock	-6.2719
Standard deviation	9.7651
90% confidence interval (z = 1.64)	
Lower bound	-22.2867
Upper bound	9.7430

Source: Financial and Fiscal Commission's calculations

The shock was calculated based on the difference between the average of historical output (spanning 2004 to 2014) compared to the average output recorded during the worst drought years (2015 and 2016).

The decline in agricultural output amounted to approximately R6.76 billion. Following this approach, the assumption is that the entire drop in agricultural production during 2015 and 2016 is due to the drought conditions. Thus, other variables that may have contributed to the decline in agricultural output have not been controlled for and caution should be exercised when interpreting the results given in the table. Given this limitation, which may bias the shock estimate, a 90% confidence was constructed to produce more robust results. The standard deviation was estimated at R9.76 billion, with a lower bound interval of -R22.28 billion and an upper bound interval of R9.74 billion. The change in sectoral output – measured in million rands – resulting from simulated drought-induced shock in agricultural production is provided in Table 1.7.

The analysis is once more confined to the 20 industries that scored the highest production inducement coefficients, and the discussion of the results will focus on select industries from the table (petroleum, fertilizer and transport).

Table 1.7: Change in sectoral output (R million) from simulated shock in agricultural output

Rank	Industry	Coefficients	Impact (R million)	Lower bound (R million)	Upper bound (R million)
1.	Petroleum	0.124	-779.1	-2768.4	1210.2
2.	Fertilizer products	0.087	-544.5	-1935.0	845.9
3.	Freight and transport	0.070	-439.4	-1561.5	682.6
4.	Financial services	0.062	-387.8	-1377.9	602.4
5.	Minerals	0.057	-354.9	-1261.1	551.3
6.	Animal feed	0.048	-301.3	-1070.6	468.0
7.	Vehicle parts	0.029	-183.5	-652.2	285.1
8.	Basic chemicals	0.029	-181.9	-646.4	282.6
9.	Other financial	0.027	-170.0	-604.1	264.1
10.	Social services	0.027	-169.8	-603.5	263.8
11.	Electricity and gas	0.026	-160.0	-568.5	248.5
12.	Pharmaceutical	0.025	-156.9	-557.5	243.7
13.	Fabricated metals	0.024	-152.7	-542.7	237.3
14.	Special machinery	0.019	-118.9	-422.4	184.7
15.	Insurance products	0.018	-115.7	-411.1	179.7
16.	Business services	0.016	-97.4	-346.0	151.3
17.	Textile products	0.014	-87.1	-309.4	135.3
18.	Iron and steel	0.013	-81.7	-290.5	127.0
19.	Other services	0.012	-75.8	-269.4	117.8
20.	Food and beverages	0.012	-73.1	-259.7	113.5

Source: Financial and Fiscal Commission's calculations

According to the results from the simulation, the petroleum sector, which was found to be the most sensitive to output fluctuations in the agricultural sector, sustains an approximate loss of R779 million from an output shock of -R6.7 billion in agricultural output. However, given the large standard deviation, the potential impact could range from approximately -R2.76 billion to R1.22 billion. Imposing the same shock on agricultural production, estimates for the fertilizer industry indicate a potential decline of R544 million, which could extend further to a R1.9 billion loss. For the freight and transport sector, the loss is estimated at approximately R439 million, with a lower-bound estimate of approximately R1.5 billion if agricultural production declines by R6.7 billion from a drought-induced shock.

While caution should be exercised when making inferences from these estimations due to potential biases, the results from the IO model and the production-side shock simulations provide numerous insights in terms of understanding sector-specific vulnerabilities to climate change. The results confirm the presence of sector-specific sensitivities to fluctuations in agricultural production, confirming the finding in the literature that there are a variety of transmission mechanisms through which climate change can adversely impact productivity, the economy and living standards (Acevedo et al., 2020). Given that the agricultural sector is one of the sectors of the South African economy that is directly dependent on weather fluctuations for production, the presence of global warming, culminating in disruptions in weather patterns, makes the agricultural sector vulnerable to climate change.

1.5 CONCLUSION

Comparisons from the trend analysis reveal that CO_2 emissions are highly concentrated in specific regions and countries, yet the costs of natural disasters, which may be associated with climate change, are felt widely. The empirical results of the impact of climate change on economic growth reveal some ambiguity. The detrimental fiscal impact of climate change across African countries appears more robust than the impact on economic growth. As a fiscal policy response, African countries should be proactive in devising robust adaptive capacities to combat climate change ramifications to economic growth and the fiscal balance.

In the South African context, mitigating the impact that weather disruptions associated with climate change can have on the economy will be crucial for fostering inclusive and sustained growth over the long term. However, given South Africa's unsustainable fiscal position, leveraging financial support to build resilience and meet climate targets will be required to support a just transition without aggravating fiscal pressures.

Investing in climate-resilient infrastructure presents as a useful and proactive adaptation mechanism that can assist in mitigating climate-related damages, while furthering South Africa's commitments to strengthening infrastructure-led growth. In this instance, the effective planning and design of climate-resilient infrastructure will be an essential precursor to ensure the mitigation of long-term costs associated with climate change. By integrating climate risk assessments into infrastructure development, regions can be better positioned for potential climate-related disruptions, reducing expenditure pressures and alleviating fiscal pressures.

The empirical estimations from the IO model revealed significant sectoral interdependencies in the South African economy, which should inform the effective design of targeted mitigation strategies. The agricultural sector was found to be closely linked to other key sectors driving growth in South Africa. A climate-induced agricultural shock was estimated to have significant ripple effects in the economy through forward and backward sectoral linkages. Key industries that the research suggests exhibit vulnerabilities to climate change-induced agricultural production shocks include fertilizer, freight and transport, financial services and minerals, highlighting the importance of policy to be tailored to build resilience, especially because they make a major contribution to economic growth in South Africa.

1.6 RECOMMENDATIONS

The Commission makes the following recommendations:

1. ***The Minister of Forestry, Fisheries and the Environment, in conjunction with the Minister of Finance and the Presidential Climate Commission, headed under the Presidency, should make coordinated efforts to partner with international role players to strengthen international climate funding based on the principle of fairness, proportionate to nations' carbon emissions.***

   The distribution of carbon emissions across regions is concentrated among a few countries, yet the rise in global temperature and associated climate-induced economic disruptions are felt at a global scale. To ensure fairness and mitigate additional fiscal pressures in South Africa, the costs in implementing adaptation strategies should be proportional to their contribution to global CO_2 emissions. Thus, an international response is required through the creation of a Climate Fund to provide support for countries such as South Africa, whose global contribution to CO_2 emissions is marginal compared to that of other more advanced economies, but who still experience the economic costs associated with extreme weather events.

2. ***The Minister of Finance must restore fiscal credibility in South Africa to build budget resilience as buffers against the adverse impacts of climate change and, in doing so, should strengthen measures to enhance spending productivity in climate-adaptive infrastructure in an integrative manner to ensure efficient, sustainable infrastructure development in South Africa.***

   There is empirical evidence of an adverse relationship between rising temperature and extreme weather, and the stability of a country's fiscal position, meaning that extreme weather shocks associated with climate change could erode South Africa's fiscal credibility further. Revenue losses amid rising public debt levels and the high cost of debt in South Africa would deepen the fiscal crisis South Africa currently faces.

   It is thus critical that, in executing South Africa's commitments to implement mitigation measures, the government should enhance the efficiency of its infrastructure investment. Rather than redirecting funds towards climate initiatives, an integrated approach should be adopted where investing in climate-resilient infrastructure and improving infrastructure maintenance are incorporated into government's policy commitment for infrastructure-led growth. In doing so, government will need to prioritise climate-resilient infrastructure development in productive economic areas, which are essential for inclusive growth and enhancing efficiency, such as improving the resilience of basic services infrastructure for water and optimising transport networks.

3. *The Minister of Forestry, Fisheries and the Environment, in conjunction with the Minister of Agriculture, the Minister of Trade, Industry and Competition, the Minister of Transport and the Minister of Mineral and Petroleum Resources, should consider deregulation in those sectors where supply chain inefficiencies due to overregulation could exacerbate the knock-on effects on related sector economies.*

   It is crucial that the climate change mitigation and adaptation policy framework, and accompanying regulatory efforts, are responsive to sector-specific vulnerabilities and sectors with close direct and indirect linkages to one another, which impact economic growth. While there is ambiguity in the research findings on the precise quantity in output losses that may occur due to extreme temperature variability, the input-output estimations established numerous sensitivities between the agricultural sector and many other key economic sectors in the South African economy.

   The agricultural industry is closely linked to multiple other industries with a differentiated effect on some sectors. Some industries, which exhibit close sectoral interdependencies with agricultural production, include the petroleum, minerals, transport and financial industries, all of which are critical for sustained long-term economic growth in South Africa. While numerous sectors exhibit sensitivities to fluctuations in agricultural output, the transport and financial sectors were found to have the most significant linkages to the agricultural sector, making them more vulnerable to climate change-induced droughts that hinder agricultural production. This is particularly concerning given that the financial and transport industries are key contributors to South Africa's GDP.

   Improving supply chain efficiencies and reducing regulatory bottlenecks across sectors that exhibit strong interdependencies will be critical to strengthen economic resilience and avoid the potentially negative consequences that extreme climate variability could have on agriculture. The expansive policy framework concerning climate change, adaptation and mitigation strategies, as well as associated regulatory instruments, which cut across numerous government departments, will need to be carefully considered to ensure that regulatory efforts across sectors with strong sectoral linkages do not undermine productivity and economic growth.

4. *The Minister of Forestry, Fisheries and the Environment, in collaboration with the Presidential Climate Commission, headed by The Presidency, should be charged to spearhead climate change policy goals aimed at implementing mitigation and adaptation responses. Furthermore, climate change policy objectives need to have clearly defined and measurable criteria to ensure that implementation progress can be effectively monitored.*

   South Africa has made extensive commitments to transition to a low-carbon, climate-resilient economy. The policy framework identifies a wide range of mitigation and adaptation measures that must be implemented within envisioned time frames. However, progress in implementing these measures is difficult to monitor due to the lack of clarity regarding the specific measurable outcomes.

   Especially provided that climate change mitigation and adaptation initiatives cut across numerous economic sectors, including energy, agriculture and infrastructure development more broadly, streamlining government's climate change policy commitments are paramount to ensuring that

the transition is not only practically implementable, but also that it can improve efficiency, which would be more conducive to economic growth. In line with efforts to streamline functions and improve efficiency in mitigating the potential detrimental consequence of weather shocks, focus should also be placed on improving the efficiency of rapid disaster management funding.

5. ***The Minister of Forestry, Fisheries and the Environment, in conjunction with the Minister of Public Works and Infrastructure, and Trade and Industry, must devise a clear approach on implementing climate change adaptation strategies aimed at the development of climate-resilient infrastructure.***

   The policy framework identifies numerous responsible actors and strategies that are envisioned to play active roles in implementing adaptation measures, including various government departments, the private sector and public intermediaries. The convoluted functions and duplication of responsibilities creates challenges in the effective execution of policies. Delineating functions across various actors are necessary to mitigate the duplication of functions, as well as to monitor progress and strengthen accountability. It is crucial to determine whether funding allocations to the Department of Forestry, Fisheries and the Environment that are specifically geared towards climate change are being productively utilised and are fostering the intended results.

   The government, through the Department of Forestry, Fisheries and the Environment, who is the primary custodian of climate change policies, should act as an implementor to effectively engage with the relevant stakeholders. This will be essential, particularly given that the National Climate Change Adaptation Strategy envisages funding to be sourced from public intermediaries, such as the Global Environmental Facility, the Development Bank of Southern Africa and the World Bank, as well as other funds such as the Green Climate Fund and the Adaptation Fund. The policy framework also acknowledges that investments in climate-resilient infrastructure will require support from the private sector, which is envisaged to play a core strategic function in both the funding and implementation of climate change adaptation measures.

1.7 REFERENCES

Abidoye, B.O. & Odusola, A.F. (2015). Climate change and economic growth in Africa: An econometric analysis. *Journal of African Economies*.

Abrigo, M.R. & Love, I. (2016). Estimation of panel vector autoregression in Stata. *The Stata Journal*.

Acevedo, S., Mrkaic, M., Novta, N., Pugacheva, E. & Topalova, P. (2020). The effects of weather shocks on economic activity: What are the channels of impact? *Journal of Macroeconomics*.

Adjei-Mantey, K. & Adusah-Poku, F. (2019). Natural disasters and economic growth in Africa. Munich Personal RePEc Archive (MPRA) Paper 95588, University Library of Munich, Germany.

Anakpo, G. & Kollamparambil, U. (2022). Artificial intelligence and average wages in Southern Africa: A panel VAR approach. *Development Southern Africa, 39*(4), 575–588.

Arent, D.J., Tol, R.S., Faust, E., Hella, J.P., Kumar, S., Strzepek, K.M. & Toth, F.L. (2014). Key economic sectors and services: Impacts, adaptation and vulnerability. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change.

Arezki, R. & Belhaj, F. (2019). Investing in climate, investing in growth. IMF Working Papers.

Asafu-Adjaye, J., Ndung'u, N. & Shimeles, A. (2022). Macroeconomic consequences of climate change in Africa and policy implications. International Monetary Fund.

Bachner, G., Bednar-Friedl, B. & Knittel, N. (2019). How does climate change adaptation affect public budgets? *Mitigation and adaptation strategies for global change*.

Batten, S. (2018). Climate change and the macro-economy: A critical review. Bank of England Working Paper.

Brenner, T. & Lee, D. (2014). Weather conditions and economic growth – Is productivity hampered by climate change? Working Papers on Innovation and Space.

Buchner, B., Stadelmann, M., Wilkinson, J., Mazza, F., Rosenberg, A. & Abramskiehn, D. (2019). Global landscape of climate finance. Climate Policy Initiative.

Burke, M., Hsiang, S.M. & Miguel, E. (2015). Global nonlinear effect of temperature on economic production. *Nature*.

Caraiani, P., Gupta, R, Nel, J. & Nielsen, J. (2023). Monetary policy and bubbles in G7 economies using a panel VAR approach: Implications for sustainable development. *Economic Analysis and Policy 78*, 133–155.

Dell, M., Jones, B.F. & Olken, B.A. (2008). Climate change and economic growth: Evidence from the last half century. National Bureau of Economic Research.

Dell, M., Jones, B.F. & Olken, B.A. (2012). Temperature shocks and economic growth: Evidence from the last half century. *Amercian Economic Journal: Macroeconomics*.

Dell, M., Jones, B.F. & Olken, B.A. (2014). What do we learn from the weather? The new climate-economy literature. *Journal of Economic Literature*.

Department of Agriculture, Land Reform and Rural Development (2024). *Trends in the agricultural sector.* Department of Agriculture Land Reform and Rural Development.

Department for Environment, Food and Rural Affairs (DEFRA) (2012). Climate resilient infrastructure: Preparing for climate change. Department for Environment, Food and Rural Affairs.

Department of Environment, Forestry and Fisheries (2019). National Climate Change Adaptation Strategy. Available at: https://www.dffe.gov.za/sites/default/files/docs/nationalclimatechange_adaptationstrategy_ue10november2019.pdf.

Department of Environmental Affairs (2011). National Climate Change Response White Paper.

Fay, M., Hallegatte, S., Vogt-Schilb, A., Rozenberg, J., Narloch, U. & Kerr, T. (2015). *Decarbonising development: Three steps to a zero-carbon future*. World Bank.

Food and Agricultural Organisation (FAO) (2024). *Temperature change statistics 1961–2023 – Global, regional and country trends.* United Nations Food and Agricultural Organisation.

FoodBev SETA (2022). *Food and Beverages Manufacturing SETA Sector Skills and Plan 2023/24.* FoodBev SETA.

FoodBev SETA (2023). *The effects of the KwaZulu-Natal flooding on the food and beverages manufacturing sector.* FoodBev SETA.

Frame, D.J., Rosier, S.M., Noy, I., Harrington, L J., Carey-Smith, T., Sparrow, S.N., . . . Dean, S.M. (2020). Climate change attribution and the economic costs of extreme weather events: A study on extreme rainfall and drought damages. *Climate Change*.

Füssel, H. & Klein, R. (2006). Climate change vulnerability assessments: An evolution of conceptual thinking. *Climatic Change*.

Gassebner, M., Keck, A. & Teh, R. (2010). Shaken, not stirred: The impact of disasters on international trade. *Review of International Economics*.

Geda, A., Yimer, A., Demissie, T., Radeny, M., Kassie, G., Tesfaye, A., Belay, B. & Solomon, D. (2023). Unravelling the climate-macro conundrum: The macroeconomic impact of climate change in Eastern Africa. *AICCRA Working Paper: Accelerating impacts of CGIAR climate research in Africa.*

Gbetibouo, G.A., Ringler, C. & Hassan, R. (2010). Vulnerability of the South African farming sector to climate change and variability: An indicator approach. United Nations Natural Resources Forum.

Gray, H.B., Taraz, V. & Halliday, S.D. (2021). The impact of weather shocks on employment outcomes: Evidence from South Africa. *Discussion Paper 21/752.* University of Bristol.

Guzman, J.M., Martine, G., McGranaham, G., Schensul, D. & Tacoli, C. (2009). Population dynamics and climate change. UNFPA International Institute for Environment and Development.

Hascic, I., Rodriguez, M.C., Jachnik, R., Silva, J. & Johnstone, N. (2015). Public interventions and private climate finance flows: Empirical evidence from renewable energy financing. OECD Environment Working Papers.

Heitzmann, K., Canagarajah, R.S. & Siegel, P.B. (2002). Guidelines for assessing the sources of risk and vulnerability. Social Protection Discussion Paper Series. World Bank.

Hill, T.D., Davis, A.P., Roos, M.J. & French, M.T. (2020). Limitations of fixed-effects models for panel data. *Sociological Perspective 63*(3), 357–369.

Holtz-Eakin, D., Newey, W. & Rosen, H.S. (1988). Estimating vector autoregressions with panel data. *Econometrica*.

Im, K.S., Pesaran, M.H. & Shin, Y. (2003). Testing for unit roots in heterogeneous panels. *Journal of Econometrics*.

Insaidoo, M., Kunawotor, M.E. & Ahiabor, G. (2025). Extreme weather events and economic growth: Empirical evidence from Africa. *African Journal of Economic and Management Studies*.

International Monetary Fund (2023). *Fiscal Monitor: Climate crossroads: Fiscal policies in a warming world.* International Monetary Fund.

International Trade Administration (2023). *South Africa – country commercial guide: Agricultural sector.*

Jahn, M. (2015). Economics of extreme weather events: Terminology and regional impact models. *Weather and Climate Extremes*.

Johnson, P., Egbebiyi, T.S., Zvobgo, L., Omar, S.A., Cartwright, A. & Hewitson, B. (2024). *Climate change impacts in South Africa: What climate change means for a country and its people*. University of Cape Town.

Kotz, M., Wenz, L., Stechemesser, A., Kalkuhl, M. & Levermann, A. (2022). Day-to-day temperature variability reduces economic growth. *Nature Climate Change*.

Krogstrup, S. & Oman, W. (2019). Macroeconomic and financial policies for climate change mitigation. IMF Working Paper.

Kulenthiran, K. & Stanley, A. (2018). *A critical assessment of the United Nations Development Programme: Enhancing climate resilience of the vulnerable communities and ecosystems in Somalia*.

Kunawotor, M.E., Bokpin, G.A., Asuming, P.O. & Amoateng, K.A. (2022). The implications of climate change and extreme weather events for fiscal balance and fiscal policy in Africa. *Journal of Social and Economic Development*.

Lau, E., Rivadeneira, A.M.R. & Mager, L. (2023). Infrastructure governance for environmentally sustainable and climate-resilient infrastructure. *Improving the landscape for sustainable infrastructure financing*.

Levin, A., Lin, C.F. & Chu, C.S. (2002). Unit root tests in panel data: Asymptotic and finite-sample properties. *Journal of Econometrics*.

Lis, E.M. & Nickel, C. (2010). The impact of extreme weather evens on budget balances. *International Tax and Public Finance*.

Love, I. & Zocchino, L. (2006). Financial development and dynamic investment behaviour. *The Quarterly Review of Economics and Finance*.

Lukey, P. (2020). *The South African National Climate Change Response Policy – an evidence-based policy-making case study.* Department of Forestry, Fisheries and the Environment.

Makhoba, B.P. & Kaseeram, I. (2022). Fiscal policy, sovereign debt and economic growth in ADC economies:A panel vector autoregression analysis. *Cogent Economics and Finance 10*(1), 2107149.

Markkanen, S. & Anfer-Kraavi, A. (2019). Social impacts of climate change mitigation policies and their implications for inequality. *Climate Policy*.

Mnkeni, P., Mutengwa, C., Chiduza, C., Beyene S., Araya, T., Mnkeni, A., Eiasu, B. & Hadebe, T. (2019). Actionable guidelines for the implementation of climate smart agriculture in South Africa. *Volume 2: Climate-smart agriculture practices*. Department of Forestry, Fisheries and the Environment.

Morrison, W.M. (2019). *China's economic rise: History, trends, challenges, and implications for the United States.* Congressional Research Services.
Naidenova, I. & Parshakov, P. (2013). Intellectual capital investments: evidence from panel VAR analysis. *Journal of Intellectual Capital 14*(4), 634–660.
Nath, I., Ray, S. & Iyer, G. (2023). The role of climate risk in driving economic volatility. *Journal of Economic Perspectives*.
National Planning Commission (2012). National Development Plan: Vision for 2030: 179–193. Available at: https://www.nationalplanningcommission.org.za/assets/Documents/NDP_Chapters/devplan_ch5_0.pdf.
Nene, S.T., Ilesanmi, K.D. & Sekome, M. (2022). Fiscal policy, sovereign debt and economic growth in SADC economies: A panel vector autoregression analysis. *Economies 10*(2), 37.
Pallottini, A. (2019). The impacts of weather, weather fluctuations and natural disasters on economic growth.
Park, J., Bangalore, M., Hallegatte, S. & Sandhoefner, E. (2018). Households and heat stress: Estimating the distributional consequences of climate change. *Environment and Development Economics*.
Presidential Climate Commission (n.d.). Just Transition Framework. Available at: https://www.climatecommission.org.za/just-transition-framework.
Presidential Climate Commission (2022). A framework for a just transition in South Africa. Available at: https://pccommissionflow.imgix.net/uploads/images/A-Just-Transition-Framework-for-South-Africa-2022.pdf.
Pritchett, L., Suryahadi, A. & Sumarto, S. (2000). Quantifying vulnerability to poverty: A proposed measure with application to Indonesia SMERU Working Paper. Social Monitoring and Early Response Unit Research Institute.
Roland, G. (2019). Coexisting with China in the 21st century. *Acta Oeconomica*.
Sachs, J.D., Schmidt-Traub, G., Mazzucato, M., Messner, D., Nakicenovic, N. & Rockström, J. (2019). Six transformations to achieve the Sustainable Development Goals. *Nature Sustainability*.
Saidi, Y., Ochi, A. & Maktouf, S. (2023). FDI inflows, economic growth, and governance quality trilogy in developing countries: A panel VAR analysis. *Bulletin of Economic Research 75*(2), 426–449.
Saura, J.R., Ribeiro-Navarrete, S., Palacios-Marques, D. & Mardani, A. (2023). Impact of extreme weather in production economics: Extracting evidence from user-generated content. *International Journal of Production Economics*.
Schimelpfennig, D. & Yohe, G. (1999). Vulnerability of crops to climate change: A practical method of indexing. In: G. Frisvold, & B. Kuhn. *Global environmental change and agriculture.* Edward Elgar Publishing.
Schlenker, W. & Lobell, D.B. (2010). Robust negative impacts of climate change on African agriculture. *Environmental Research*.
Schreiner, B.G., Mungatana, E.D. & Baleta, H. (2018). Impacts of drought induced water shortages in South Africa: Economic analysis. Pegasys Institute.
Song, Y., Park, M., Kim, S. & Kim, S.Y. (2024). Analysis of economic ripple effects in the agricultural field using input-output analysis: Drought damage in Korea in 2018. *Agronomy*.
Statistics South Africa (Stats SA) (2024). Gross Domestic Product (GDP) 2nd Quarter 2024 Statistical Release. Statistics South Africa.
Van den Bergh, M.P. & Gilligan, J.A. (2015). Beyond gridlock. *Columbia Journal of Environmental Law* 40, 217.
Weil, G. (2020). The carbon price equivalent: A metric for comparing climate change mitigation efforts across jurisdictions. *Dickinson Law Review* 125, 475.
Welch, J., Vincent, J.R., Auffhammer, M., Moya, P.F., Dobermann, A. & Dawe, D. (2010). Rice yields in tropical/sub-tropical Asia exhibit large but opposing sensitivities to minimum and maximum temperatures. *Proceedings of the National Academy of Sciences*.

Winsemius, H.C., Jongman, B., Veldkamp, T.I., Hallegatte, S., Bangalore, M. & Ward, P.J. (2018). Disaster risk, climate change, and poverty: Assessing the global exposure of poor people to floods and droughts. *Environment and Development Economics*.
World Bank (2021). World Bank Development Indicators. World Bank Group.
World Bank (2022). Disaster Risk Finance Diagnostic. World Bank and National Treasury.
World Bank (2024). The World Bank in China. Available at: https://www.worldbank.org/en/country/china/overview.
World Bank (2025). World Bank Development Indicators. World Bank Group.
World Health Organisation (2020). Climate change: Land degradation and desertification. Available at: https://www.who.int/news-room/questions-and-answers/item/climate-change-land-degradation-and-desertification#:~:text=What%20is%20land%20degradation%3F,of%20soi
Xie, V.W. (2021). Labour-market adjustment under extreme heat shocks: Evidence from Brazil. Available at: https://drive.google.com/file/d/1lZv1O0SAA0qpAnVpkH3Vv7MSZ8KDea4s/view.
Yang, Z., Cai, J., Lu, Y. & Zang, B. (2022). The impact of economic growth, industrial transition and energy intensity on carbon dioxide emissions in China. *Sustainability*.
Zhao, X., Gerety, M. & Kuminoff, N.V. (2018). Revisiting the temperature-economic growth relationship using global subnational data. *Journal of Environmental Management*.
Zhao, Y. & Liu, S. (2023). Effects of climate change on economic growth: A perspective of heterogenous climate regions in Africa. *Sustainability*.
Zivin, J.G. & Neidell, M. (2014). Temperature and the allocation of time: Implications for climate change. *Journal of Labour Economics*.
Zlotnik, H. (2009). Does population matter for climate change? In: J.M. Guzman, G. Martine, G. McGranahan, D. Schensul & C. Tacoli, *Population dynamics and climate change*. International Institute for Environment and Development.

1.8 APPENDICES

Appendix A: Model panel VAR for African countries

Table A1: List of countries in the PVAR framework

African countries
Algeria, Benin, Botswana, Cabo Verde, Cameroon, DRC, Congo Republic, Egypt, Eswatini, Gabon, Gambia, Ghana, Kenya, Lesotho, Libya, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Niger, Nigeria, Senegal, South Africa, Tanzania, Togo, Tunisia, and Zambia.

Table A2: Lag selection criterion for PVAR

Selection order criteria

Sample: 5–27 Number of obs = 759
Number of panels = 33
Average number of T = 23.000

lag	CD	J	J pvalue	MBIC	MAIC	MQIC
1	0.5689366	252.0802	1.77e-29	-66.25586	156.0802	70.45719
2	0.6703298	115.7244	2.08e-11	-96.4997	51.72436	-5.35767
3	0.694012	46.87081	0.0000713	-59.24122	14.87081	-13.6702

Table A3: The panel VAR-Granger causality Wald test

Panel VAR-Granger causality Wald test

Ho: Excluded variable does not Granger-cause Equation variable

Ha: Excluded variable Granger-causes Equation variable

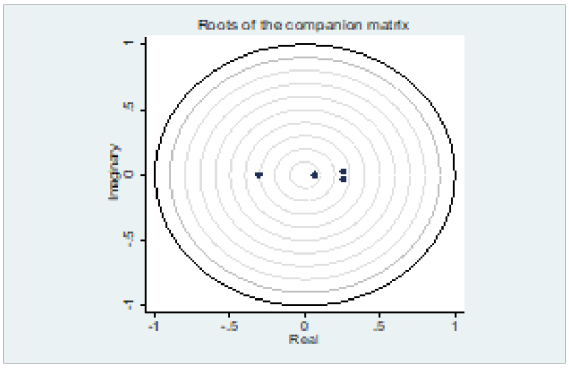
Equation \ Excluded	chi2	df	Prob > chi2
logGDP			
CAB	22.554	1	0.000
TMP	40.074	1	0.000
WEV	18.200	1	0.000
ALL	88.944	3	0.000
CAB			
logGDP	13.495	1	0.000
TMP	7.419	1	0.006
WEV	10.034	1	0.002
ALL	32.703	3	0.000
TMP			
logGDP	9.511	1	0.002
CAB	1.895	1	0.169
WEV	0.260	1	0.610
ALL	16.651	3	0.001
WEV			
logGDP	1.053	1	0.305
CAB	0.012	1	0.911
TMP	5.537	1	0.019
ALL	7.711	3	0.052

Table A4: Stability tests for the PVAR model

Modulus

Real	Imaginary	Modulus
0.1902	-0.2781	0.3369
0.1902	0.2481	0.3369
0.3054	0.0000	0.3054
-0.1922	0.0784	0.2076
-0.1922	-0.0784	0.2076
-0.0164	0.0000	0.0164

Roots of the companion matrix



Source: Financial and Fiscal Commission's calculations.

Section 2: National appropriation

Chapter 2: *Optimising the contribution of infrastructure towards economic growth and the role of public-private partnerships*

Chapter 3: *Strengthening subnational governments' contribution to infrastructure-led growth in South Africa*

CHAPTER 2
Optimising the contribution of infrastructure towards economic growth and the role of public-private partnerships

Neo Malungane and Fabrice Gatwabuyege

2.1 INTRODUCTION

Infrastructure plays an important role in the performance of a country's economy by facilitating trade, productivity and overall economic activity (Kumo, 2012; Omarjee. 2019). However, the country faces significant infrastructure deficit due to historic underinvestment, inefficiencies in project delivery, urbanisation and an increase in informal settlements, as well as growing population and growing demand. The South African government's ability to address these infrastructure needs has been hampered by fiscal constraints, exacerbated by a weak economy, elevated public debt, rising spending pressures and bailouts to state-owned entities (SOEs). These factors have hindered efforts to finance large-scale infrastructure projects through traditional public sector means (National Treasury, 2024a).

Across the globe, the public-private partnership (PPP) model has been used as a solution for governments under financial constraints to develop infrastructure. This is because PPPs help governments access addition resources in the form of private sector technical expertise and skills, as well as capital. The public entity's role in a PPP typically encompasses identifying long-term service needs, planning and structuring projects, managing procurement and contracts (including the provision of financial contributions like grants, subsidies or guarantees to ensure project viability) and monitoring performance to ensure that agreed standards and value for money are met (Gerrard, 2001; World Bank, 2017). The overall objective of a PPP is to leverage the efficiencies, expertise and financial resources of the private sector to help enhance the delivery of public services, ensuring value for money and the achievement of shared public-interest goals.

The concept of a PPP differs from traditional procurement practices in terms of risk allocation, financing and project lifecycle involvement. In traditional procurement, the public sector retains the primary responsibility for the design, financing and construction of infrastructure projects. Financing is typically sourced from available national fiscal resources or through public borrowing, and the public entity covers the operating costs. The PPP model often involves a series of separate contracts, leaving the public sector to bear most of the project risks, such as cost overruns and delays (Hoppe, Kusterer & Schmitz; Lee & Kim, 2018; National Treasury, 2024a).

In South Africa, PPPs have been embraced as a strategic tool for infrastructure development since the late 1990s. The PPP model has been integrated into key national strategies like the National Development Plan (NDP) and the National Infrastructure Plan (NIP) 2050. National Treasury's 2024 Budget Review document outlines government's expectation of increased capital investment in the

medium term, driven – in part – by greater utilisation of PPPs to crowd-in the private funding needed for public infrastructure development (National Treasury, 2024a).

That being said, National Treasury data shows a decline in the number of new PPP transactions, with the value of projects dropping from an estimated R10.7 billion in the 2011/12 financial year to R7.1 billion in 2022/23 (National Treasury, 2024b). To ensure South Africa's socio-economic development, it is crucial to optimise infrastructure development for sustainable economic growth and to evaluate the contribution of PPPs in meeting the country's infrastructure needs.

2.2 PROBLEM STATEMENT AND RESEARCH QUESTIONS

South Africa's economic growth has been significantly constrained by substantial infrastructure needs in the form of inadequate health, energy, water, and information and education systems. Despite recognising infrastructure's critical role in economic development and seeking to meet the NDP's targets, investment remains insufficient. Traditional public sector financing mechanisms have proven inadequate in addressing this gap, particularly in the context of fiscal constraints, rising public debt, competing demands on government resources and limited private sector engagement. To help overcome these challenges, the South African government is looking to reignite private sector involvement and investment in infrastructure development. Against this backdrop, this research aims to quantify the role of infrastructure in economic development and understand the contribution of PPPs to South Africa's infrastructure development.

The research questions underpinning this chapter are as follows:

1. Infrastructure and economic growth
    - How does the development of infrastructure contribute to the patterns of economic growth and transformation in South Africa?
    - Which infrastructure sectors have the most significant influence on promoting sustainable economic growth?
2. Contribution of PPPs to public infrastructure delivery
    - What are the classifications of PPP models, and what are the overarching advantages and disadvantages of PPPs in public infrastructure development?
    - How do trends in gross fixed capital formation (used as a proxy for infrastructure investment) and private sector participation in infrastructure investment in South Africa compare to those of its Brazil, Russia, India, China, South Africa (BRICS) counterparts?
    - What insights can be drawn from South Africa's past experiences with PPP infrastructure projects, and which countries with a proven track record in using PPPs for infrastructure can offer valuable lessons for South Africa?

2.3 METHODOLOGY

This study employed a mixed-methods approach, combining quantitative and qualitative techniques to examine the contribution of infrastructure towards economic growth and the contribution of PPPs to public infrastructure delivery.

Quantitative analysis

- **Comparative analysis:** A quantitative analysis was used to compare and contrast South Africa's infrastructure spending trends (both public and private investment) with those of the BRICS nations. Capital flows were analysed as PPPs primarily represent financial flows toward infrastructure rather than direct additions to capital stock. Gross fixed capital formation (GFCF) was chosen as a measure, as it captures investment flows into fixed assets (such as roads, railways and buildings) over time (World Bank, 2025). That being said, GFCF has limitations as it does not account for existing infrastructure stock and includes all fixed asset investments, making it an imprecise measure of infrastructure development. The BRICS countries were selected due to their shared emerging market characteristics and development challenges. Data was sourced from South Africa's National Treasury, the South African Reserve Bank (SARB), Statistics South Africa (Stats SA) and the World Bank.
- **Econometric analysis:** To assess the contribution of infrastructure towards economic growth, the study employed the unit root test to determine if the variables to be used in the model are stationary or non-stationary. Then, the Hausman test was conducted to determine the applicability of the fixed effects (FE) or random effects (RE) estimators in a regression model. Lastly, the order of the FE model was employed to observe the relationship between economic growth and the selected infrastructure variables in South Africa.. The chosen techniques were based on a review of studies by Kumo (2012) and Nugraha, Prayitno, Situmorang and Nasution (2020), which assessed the role of infrastructure development investments on economic growth, and highlighted the appropriateness of these techniques.

Qualitative analysis

- **Literature review:** A literature review was conducted to provide an overview of the types, objectives, benefits, challenges and critical success factors of PPPs, as well as an examination of South Africa's experience with PPPs. It was also used to assess National Treasury Regulation 16, the key legislation governing PPPs for national and provincial governments in South Africa, to unpack the concept of PPPs in the South African context and evaluate recent amendments to the regulation. Additionally, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework was used for international case study selection to identify countries with proven experience in using PPPs for public infrastructure delivery.

2.3.1 Estimation techniques

Unit root test

In order to determine the stationary properties of the variables, the study employed two panel unit root tests. These are of the first-generation test, proposed by Levin, Lin and Chu (LLC) (2002), and the Im, Pesaran and Shin (IPS) (2003) test, which is used to identify the order of integration of the variables to be used in a proposed model. Overall, the objective is thus to decide which of the considered variables should be used in the empirical model. Firstly, Levin et al. (2002) provided new dynamics of the traditional panel unit tests, with the structure of their analysis specified as follows:

$$\Delta y_{it} = \rho y_{it-1} + \alpha_{0i} + \alpha_{1i} t + \mu_{it}, \; i = 1,2,\ldots,N, \; t = 1,2,\ldots,T$$

Whereby a time trend ($\alpha_{1i}t$) and individual effects (α_i) are incorporated; μ_{it} is assumed to be independently distributed across individuals and follows a stationary invertible autoregressive moving average (ARMA) process for each individual:

$$u_{it} = \sum_{j=1}^{\infty} \theta_{ij} u_{it-j} + \varepsilon_{it}$$

Thereafter, Im et al. (2003) suggested a new, more flexible and computationally simple unit root testing procedure for panels that allows for simultaneous stationary and non-stationary series. This test allows for the residual serial correlation and heterogeneity of the dynamics and error variances across groups. The structure is specified as follows:

$$\Delta y_{it} = \alpha_{0i} = \rho_i yit\text{-}1 + \sum_{j=1}^{\rho_i} \varphi_{ij} \Delta y_{it-j} + \varepsilon_{it}$$

Where, $i = 1,2,...,N$, $t = 1,2,..., T$. The null hypothesis of the above two unit root tests state that a unit root exists and that all variables are non-stationary, whereas the alternative hypothesis states that no unit root exists in the series and supposes the stationarity of all variables. The acceptance or rejection of the null hypothesis is based on the level of the p-value (Barbieri, 2009).

Hausman test

According to Baltagi (2005), the Hausman test is a statistical test that evaluates the relationship between individual effects and the independent variables to decide whether to use the FE or RE estimator in a regression model. This test is utilised when two compared models yield consistent and efficient results under the null hypothesis, and inconsistent, but efficient results under the alternative hypothesis (Sheytanova, 2015). The general form test statistics is specified as follows:

$$H = (\hat{\beta}^1 - \hat{\beta}^{11})' \, [Var(\hat{\beta}^1) - Var(\hat{\beta}^{11})]^{-1} \, (\hat{\beta}^1 - \hat{\beta}^{11})$$

Whereby, under the null hypothesis, it is $\chi^2(k)$ distributed, and k is the exact number of parameters. With the test applicable in comparing the estimates of the FE and RE models, three hypothesis tests are used to choose the correct model. In terms of the model selection process, Sheytanova (2015) ascertains that the FE model would be preferred over the RE model in the event that there is a correlation between the independent variables and the RE model's error term, as this would result in inconsistent estimates. It is also important to note that the RE model provides the best linear unbiased estimates (BLUE) when used properly, which are unbiased, efficient and consistent. Although the estimates from the FE model are consistently accurate, they are not as efficient as those from the RE model. Hence, the Hausman test is employed to decide between the two models, with the statistics calculated from the formula below:

$$H = (\hat{\beta}^{RE} - \hat{\beta}^{FE})' \, [Var(\hat{\beta}^{RE}) - Var(\hat{\beta}^{FE})]^{-1} \, (\hat{\beta}^{RE} - \hat{\beta}^{FE})$$

With $\hat{\beta}^{RE}$ and $\hat{\beta}^{FE}$ as vectors of coefficient estimates for RE and FE models, respectively. In this case, the statistics $\chi^2(k)$ is distributed under the null hypothesis, and k, which is the degrees of freedom equal to the number of factors.

Fixed effects model

The FE model is a statistical model that, instead of assuming stochastic conditions, posits that each unit has a fixed intercept. This model conditionalises on intercept differences between units, which is essentially how it varies from the RE model (Kelejian & Piras, 2017). Consider the FE model presented below:

$$y_t = X_t\beta_1 + \rho_1 W y_t + Y_t\beta_2 + \mu + u_t,$$
$$u_t = \rho_2 W u_t + v_t,\ t = 1,\ldots, \mathrm{T}$$

Whereby t, y_t is an N x 1 vector of observations on the dependent variable; X_t is an $N\ x\ k$ matrix of observations on the k exogenous variables with values that exceed both the cross-sectional units and time; Y_t is an $N\ x\ h$ matrix of additional endogenous variables; β_1 is a $k\ x\ 1$ parameter vector; β_2 is an $h\ x\ 1$ parameter vector; W is an $N\ x\ N$ exogenous weighting matrix; ρ_1 and ρ_2 are scalar parameters; μ is an $N\ x\ 1$ vector of fixed effects; u_t is the disturbance term; and v_t is an $N\ x\ 1$ vector of stochastic innovations. Rather than assuming stochastic conditions for the elements, the FE model implies that the elements of a vector, like μ, are fixed constants, meaning that each unit has a fixed intercept. Therefore, without any additional assumptions, the FE vector is a model parameter vector (Kelejian & Piras, 2017).

2.4 LITERATURE REVIEW

2.4.1 Unpacking the PPP concept in the South African context

The central legislation governing PPPs for national and provincial government is National Treasury Regulation 16, issued under the Public Finance Management Act, 1999 (PFMA). Under National Treasury Regulation 16, PPPs are defined as follows (National Treasury, 2005:43):

> *"a commercial transaction between an institution and a private party in terms of which the private party (a) performs an institutional function[1] on behalf of the institution; and/or (b) acquires the use of state property[2] for its own commercial purposes; and (c) assumes substantial financial, technical and operational risks in connection with the performance of the institutional function and/or use of state property; and (d) receives a benefit for performing the institutional function or from utilising the state property, either by way of: (i) consideration to be paid by the institution which derives from a revenue fund or, where the institution is a national government business enterprise or a provincial government business enterprise, from the revenues of such institution; or (ii) charges or fees to be collected by the private party from users or customers of a service provided to them; or (iii) a combination of such consideration and such charges or fees;"*

PPPs at a local government level are defined in a similar fashion under the Municipal Finance Management Act, 2003 (MFMA). Its Municipal Public-private Partnership Regulations define a PPP as an agreement with a private party performing a function that would otherwise have been undertaken by a municipality (Republic of South Africa, 2005).

Overall, the definition of a PPP in South Africa implies a capital flow rather than capital stock as it emphasises the provision of services, risk transfer and financial transactions over time rather than the outright transfer of ownership of capital assets (i.e. capital stock).

1 An "institutional function" means (a) a service, task, assignment or other function that an institution is entitled or obliged to perform: (i) in the public interest; or (ii) on behalf of the public service generally; (b) or any part or component of or any service, task, assignment or other function performed or to be performed in support of such a service, task, assignment or other function; (National Treasury, 2005:43)

2 According to National Treasury Regulation 16 issued in terms of the Public Finance Management Act, 1999 (PFMA), the term property, in relation to a PPP agreement, includes all movable and immovable property belonging to the state, as well as intellectual property rights vested in the state (National Treasury, 2005:43)

However, the definition of PPPs presents several ambiguities and structural weaknesses that hinder the effectiveness of infrastructure development through private sector involvement. While the regulation provides a general framework for PPPs, there is a lack of distinction between PPPs, traditional procurement contracts and other public-private financing models. The definition also states that a private party performs a function on behalf of a government institution and assumes "substantial financial risk". However, this definition does not specify the thresholds or criteria for this "substantial financial risk" that differentiate a PPP from other forms of public procurement agreements.

This lack of clear distinction leads to a situation where the public sector, through traditional procurement mechanisms, effectively bears a greater financial risk than intended. This occurs because the ambiguity between PPPs and procurement contracts results in the government paying more than is necessary, inadvertently retaining the "substantial financial risk" that PPPs are designed to transfer. Consequently, the intended risk transfer to the private sector is compromised, undermining the core principle of a PPP and hindering their potential for efficient infrastructure delivery.

2.4.2 South Africa's experience and policy environment with infrastructure PPPs

According to South Africa's National Treasury 2019 Budget Review document, government has demonstrated a successful track record in PPP implementation, completing 34 projects since 1998, totalling nearly R90 billion across sectors such as transport, health, water and sanitation, and tourism (National Treasury, 2019). High-profile examples of successful PPP projects include the Kutama-Sinthumule Correctional Centre, the Gautrain Rapid Rail Link and the Renewable Energy Independent Power Producers Programme (REIPPP) (Feris and Seleka, 2024). Research by Mashwama, Thwala and Aigbabvoa (2018) found that PPPs in South Africa have contributed to improved service delivery and reduced infrastructure backlogs, with projects generally being of high quality and well maintained.

However, despite these successes, the PPP model in South Africa has faced significant challenges over time. National Treasury data shows a decline in the number of new PPP transactions, with the value of projects dropping from an estimated R10.7 billion in the 2011/12 financial year to R7.1 billion in 2022/23 (National Treasury, 2024b). Furthermore, some PPP projects, particularly in infrastructure development, have yielded disappointing results. Dlamini and Botes (2022) note that many projects face delays, incomplete delivery, financial mismanagement and corruption. These issues often stem from inefficiencies and unforeseen challenges during the design and implementation phases of PPP agreements.

This disparity between literature that points to success and what identifies significant challenges highlights a measurement issue when it comes to determining what constitutes the successful use of PPPs in infrastructure delivery in South Africa. This shows a need to develop more robust and consistent metrics to accurately evaluate the impact and effectiveness of these projects.

Sebitlo, Mbara and Luke (2022), through interviews with transport PPP experts, found that the politicisation of infrastructure through party politics, political risk and state dominance in strategic infrastructure delivery was perceived to be a significant factor in the low adoption of transport-related PPPs in South Africa. That being said, the extent to which this politicisation directly affects procurement processes for PPP infrastructure projects was not addressed in the study and remains uncertain.

Mutize, Mugobo and Iwu (2018) found that a lack of fiscal clarity (i.e. transparency around the allocation of financial resources) often leads government to overestimate the extent to which PPPs generate additional resources for infrastructure funding. Their study revealed that PPP projects are sometimes over-budgeted and overspent due to political pressures to deliver results. This, again, provides evidence that there is a measurement issue when it comes to PPPs in South Africa.

Other studies point to governance and regulatory constraints. Castalia (2007) highlighted the lack of integration of PPPs into broader sector planning and the overly stringent regulations imposed by South Africa's PPP Unit as significant barriers.

Fombad (2015) further identified governance challenges such as weak accountability, institutional weaknesses, corruption, a lack of transparency, unfavourable regulatory environments, power imbalances between public and private partners, limited political commitment and insufficient capacity within government agencies to manage PPPs effectively. Mashwama et al. (2018) found that limited trust between public and private sector professionals was another key challenge to using PPPs for infrastructure delivery.

National Development Plan

The NDP 2030 explicitly recognises the importance of improving the country's economic infrastructure (electricity, water, transport and telecommunications infrastructure) to drive inclusive economic growth and development (National Planning Commission, 2013). The plan aims to increase public infrastructure investment to 10 per cent of the country's gross domestic product (GDP). To achieve this ambitious goal, the NDP proposes exploring various funding mechanisms, including PPPs. Key areas highlighted in the NDP for PPP involvement include investment in renewable energy, agriculture, health (with an emphasis on national health insurance), transport and water (National Planning Commission, 2013).

The NDP also outlines the need to rectify any constraints that hinder the implementation of PPPs. These constraints encompass institutional frameworks for regulating and executing such partnerships, as well as the requisite capacity across the different spheres of government and within government departments (National Planning Commission, 2013). The NDP posits that increased utilisation of PPPs can potentially lead to more informed decision making, enhanced spending discipline and better stakeholder accountability and reporting (National Planning Commission, 2013). These factors are seen as helping to facilitate access to capital.

While the NDP acknowledges the importance of PPPs, it lacks clarity on what qualifies as one. Furthermore, it provides no actionable targets for PPP contributions to public infrastructure investments, nor does it specify any interventions required to address the country's infrastructure needs and the interventions required to create an enabling environment for PPPs to thrive.

National Infrastructure Plan 2050

The NIP 2050 provides a broad plan for infrastructure development in South Africa, with the aim of improving public infrastructure delivery and achieving the NDP's objectives. The NIP is divided into two phases. The first phase is focused on energy, water, freight transport and digital infrastructure

(Department of Public Works and Infrastructure, 2022). The second phase focuses on distributed infrastructure and related municipal services (Department of Public Works and Infrastructure, 2022). The NIP underscores the pivotal role that the private sector can play in infrastructure investment. The plan envisions building government-wide capabilities to design and initiate partnerships with the private sector, including PPPs that are characterised as an "underutilised opportunity" to attract private investment in public infrastructure (Department of Public Works and Infrastructure, 2022). Moreover, the NIP asserts that the public sector will collaborate with the private sector and development financing agencies to secure approximately one-third of the necessary funding required to meet the country's infrastructure investment needs by 2050 (Department of Public Works and Infrastructure, 2022).

The NIP also outlined that the PPP Regulations (National Treasury Regulation 16) should be revised to simplify approval processes, standardise models for certain types of infrastructure and speed up the time from initiation to the procurement of PPPs (Department of Public Works and Infrastructure, 2022). A significant achievement in relation to interventions outlined in the NIP has been the conclusion of the reforms to National Treasury Regulation 16 to create a more business-friendly PPP environment.

National Treasury Regulation 16 issued in terms of the Public Finance Management Act, 1999

National Treasury Regulation 16 defines PPPs, outlines the PPP process, requirements and necessary approvals, and establishes institutional responsibilities (National Treasury, 2005). The regulation evaluates PPPs based on affordability, value for money and appropriate risk transfer. The PPP project cycle, as defined in National Treasury Regulation 16, means that national and provincial PPPs require approval from National Treasury in four phases: the feasibility study, procurement, value for money and final PPP agreement (National Treasury, 2005).

Faced with a notable decline in PPP activity in recent years, National Treasury has instituted reforms that seek to address bottlenecks in the preparation and marketing of PPP projects. As a result of this review, in February 2024, the South African Minister of Finance gazetted proposed amendments to National Treasury Regulation 16 and the Municipal Public-private Partnership Regulations to simplify and expedite the regulatory process for establishing PPPs (National Treasury, 2024b). In February 2025, National Treasury released the final amendments to National Treasury Regulation 16. These amendments, effective from 1 June 2025, include the following key amendments (National Treasury, 2025):

- Smaller PPP projects, defined as those with a value of R2 billion or less, are now exempt from Treasury Approvals IIA and IIB during feasibility and procurement. That being said, the procurement documents for these PPP projects must still be submitted to the PPP Advisory Unit for its view and recommendations before being finalised.
- The PPP Advisory Unit's role has been clarified to provide more effective support to institutions in planning and procuring PPPs, aiming for projects to reach financial closure faster.
- The amendments provide a clear delineation of institutional roles and responsibilities in terms of the PPP advisory function and the regulatory function.
- National departments can now establish dedicated units to support PPPs within their sectors, working closely with the PPP Advisory Unit for coordination.

- Enhanced reporting mechanisms have been introduced to track and manage fiscal commitments and contingent liabilities (FCCL) throughout the PPP project's lifecycle.
- Provision has been made for a clearer framework to handle unsolicited proposals, including incentives, to encourage private sector participation.

The amendments to National Treasury Regulation 16 represent a positive step towards addressing barriers to PPP investment in South Africa's public infrastructure. By streamlining approval processes, clarifying the roles and responsibilities of the PPP Advisory Unit and allowing for a more decentralised approach to PPPs, the amendments aim to improve efficiency.

Furthermore, the provision for unsolicited proposals is a positive development as it encourages innovation by inviting private sector stakeholders to submit ideas and recommendations that public sector partners may not have considered.

However, these amendments also raise several critical concerns regarding process, oversight and accountability. Assigning the PPP Advisory Unit responsibility to review procurement documents for projects valued at R2 billion or less, while exempting these projects from Treasury Approvals IIA and IIB, raises questions about the Unit's capacity, and grants it substantial discretionary power. Moreover, there is a lack of clarity regarding the measures of success that justify empowering national departments to establish dedicated units tasked with adopting a programmatic approach to support PPPs on behalf of other state organs within their strategic sectors.

Furthermore, the continued dominance of National Treasury as the central authority for PPPs necessitates scrutiny. It is unclear why collaboration with the Ministry of Public Works and Infrastructure, or another relevant authority, is not emphasised. The handling of unsolicited bids under the amended regulations may also be problematic. Placing the government's primary point of interaction at the feasibility study stage could potentially lead to biased project selection and a lack of competitive bidding. A more transparent and accountable process would involve a mandatory permission application permit, requiring collaboration with relevant municipal councils on PPP infrastructure projects.

2.4.3 Case study analysis

International case studies

Different PPPs have been successfully implemented in various countries, offering valuable insights into effective models and strategies. By examining international case studies, South Africa can identify key success factors and challenges in PPP implementation. This section explores lessons learnt from Canada, Chile and Kenya, highlighting their distinct approaches to PPP governance, financing and execution. These case studies provide practical insights into strengthening South Africa's PPP framework for improved infrastructure delivery. To ensure a systematic and transparent selection of international case studies, this research employed the PRISMA framework. This framework guided the identification, screening, eligibility assessment and inclusion of case studies that provided relevant insights into PPP best practices. Sources included academic journals, reports from institutions such as the World Bank and International Monetary Fund, government publications, and industry analyses.

The selection criteria focused on countries with proven PPP frameworks, diverse infrastructure sector experiences and well-documented policy outcomes.

The select international case studies showcase diverse yet successful PPP models. Key learnings from these experiences include the following:

- **Establishing a robust and clear legal and regulatory contractual framework delineating the roles and responsibilities of the participating parties.** Canada's PPP model relies on well-defined laws emphasising transparency, fair risk allocation and clear dispute resolution processes. Similarly, Chile's Concessions Law (1991) ensures stability and predictable regulations, while Kenya's updated PPP Act (2021) expands the scope of PPPs, simplifies procurement processes, and empowers county governments to implement projects independently.
- **Strengthening institutional capacity and governance.** Dedicated institutions ensure effective PPP planning, execution and monitoring. Chile's Concessions Unit and Kenya's PPP Directorate support feasibility studies, project structuring and procurement processes, while Canada's Canadian Council for Public-private Partnerships (CCPPP) has helped to educate stakeholders and promote best practices. These institutions can help enhance efficiency, reduce delays and build public trust.
- **Decentralisation can work.** Canada and Kenya demonstrate how empowering subnational governments can lead to broader participation in infrastructure delivery. This can allow for better alignment with local development needs, a reduction in bottlenecks at the national level, and can encourage subnational innovation in project delivery.
- **Exploring an innovative funding model.** Innovative funding mechanisms, such as Chile's asset recycling approach, can reduce reliance on public debt, stimulate infrastructure investment and transfer risk to the private sector.
- **Taking a proactive approach to addressing implementation challenges.** Each case study country has encountered obstacles such as bureaucratic delays, inadequate planning and high transaction costs. These were addressed by streamlining approval processes, ensuring thorough feasibility studies and implementing robust risk mitigation strategies.

South Africa case studies

This section delves into a selection of case studies of PPPs implemented in South Africa across different sectors to provide a nuanced understanding of their practical application and impact. The aim is to identify key factors that contribute to the success or failure of PPPs in delivering public infrastructure within the South African context. The case studies reviewed include the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP), the N4 Toll Road and the Prison PPPs. Each provides insights into different infrastructure sectors and partnership models.

Lessons learnt

The REIPPPP has been one of the most successful PPP initiatives, attracting significant private investment and contributing to the diversification of South Africa's energy mix. The programme's competitive bidding process and clear risk allocation have driven down energy costs, while ensuring financial sustainability. However, early implementation challenges, such as high administrative costs and regulatory uncertainties, underscore the need for strong government facilitation and streamlined approval processes.

The N4 Toll Road project illustrates how cross-border PPPs can enhance regional economic integration and trade. Structured as a build-operate-transfer (BOT) model, the project successfully transferred construction and operational risks to the private sector. However, initial public resistance to tolling and limited early stakeholder engagement highlighted the importance of transparent communication and public buy-in for PPP success.

South Africa's Prison PPPs, while successful in improving prison infrastructure and operational standards, faced significant cost overruns and long-term affordability concerns. The projects were hampered by overly ambitious design specifications and limited pre-procurement feasibility assessments. This underscores the need for thorough financial modelling, realistic project scope definition and enhanced government oversight in structuring PPP agreements.

Overall, these case studies reinforce the necessity of strong institutional frameworks, competitive procurement processes, clear risk-sharing mechanisms and proactive stakeholder engagement. These lessons should inform future PPPs to ensure improved infrastructure delivery and sustainable investment outcomes.

2.5 FINDINGS

2.5.1 Infrastructure's contribution to economic growth

Descriptive analysis

The infrastructure referred to in this study includes access to water, electricity generated and distributed, health facilities, compulsory education facilities and the total size of the labour force. Therefore, infrastructure development in regions is anticipated to be a significant contributor to economic development.

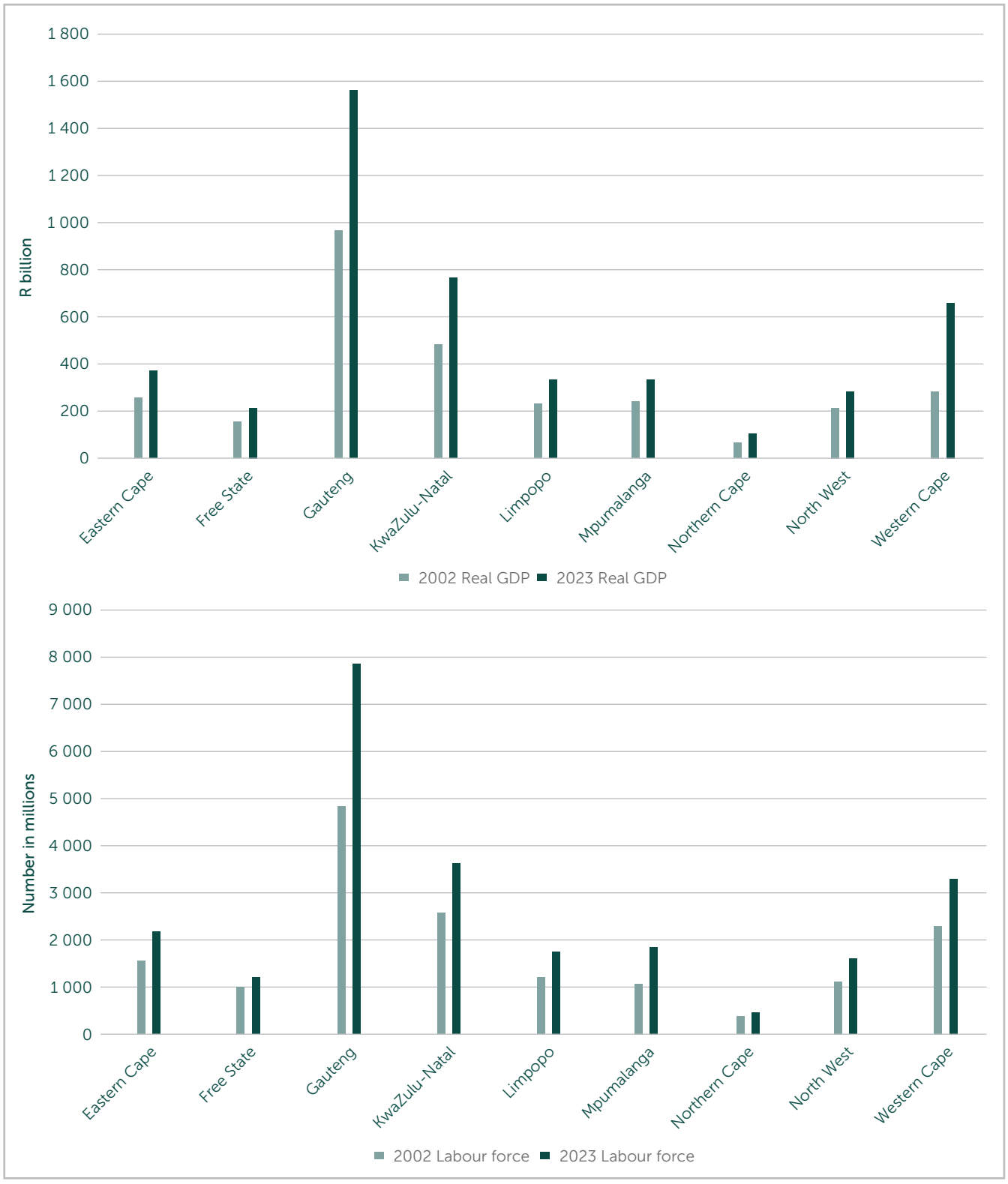
Economic growth and labour force

Figure 2.1 illustrates the distribution of real gross domestic product (RGDP) and the labour force. The results show an overall increase in GDP across all provinces between 2002 and 2023, highlighting significant economic growth. Although growth levels vary, Gauteng, KwaZulu-Natal and the Western Cape remain the largest contributors to national growth, reflecting their roles as the country's economic hubs. Economic growth in Gauteng was driven by the finance, manufacturing and services sectors, while KwaZulu-Natal and the Western Cape strongly benefitted from the trade and logistics, tourism and agriculture sectors (Stats SA, 2023a). Moreover, the Free State and Northern Cape demonstrated moderate growth, with the Free State relying on the mining and agriculture sectors, while growth in the Northern Cape was driven by the expansion of mining activities and investments in renewable energy projects. Overall, the trend reflects that broader structural shifts, including rising urbanisation, industrialisation and sectoral composition and diversification in each province, has influenced growth patterns (Stats SA, 2023a).

For the labour force, the general trend is that expansion is concentrated in the urban provinces, showing significant trends in population growth, urbanisation, economic migration and structural changes in the labour market. With notable changes across all provinces, and most substantial increases in Gauteng, KwaZulu-Natal and the Western Cape, primarily driven by better employment opportunities, infrastructure and services, job seekers are attracted from the rural and less economically developed provinces

(Stats SA, 2023b). In contrast, provinces like North West, Free State and the Northern Cape show smaller increases in comparison. These provinces are characterised by limited industrial development, slow economic diversification and lower investment levels. Additionally, economic restructuring, particularly in mining and agriculture, has led to job losses or slower employment growth in certain areas (Stats SA, 2023b).

Figure 2.1: Real gross domestic product and the labour force (economically active)



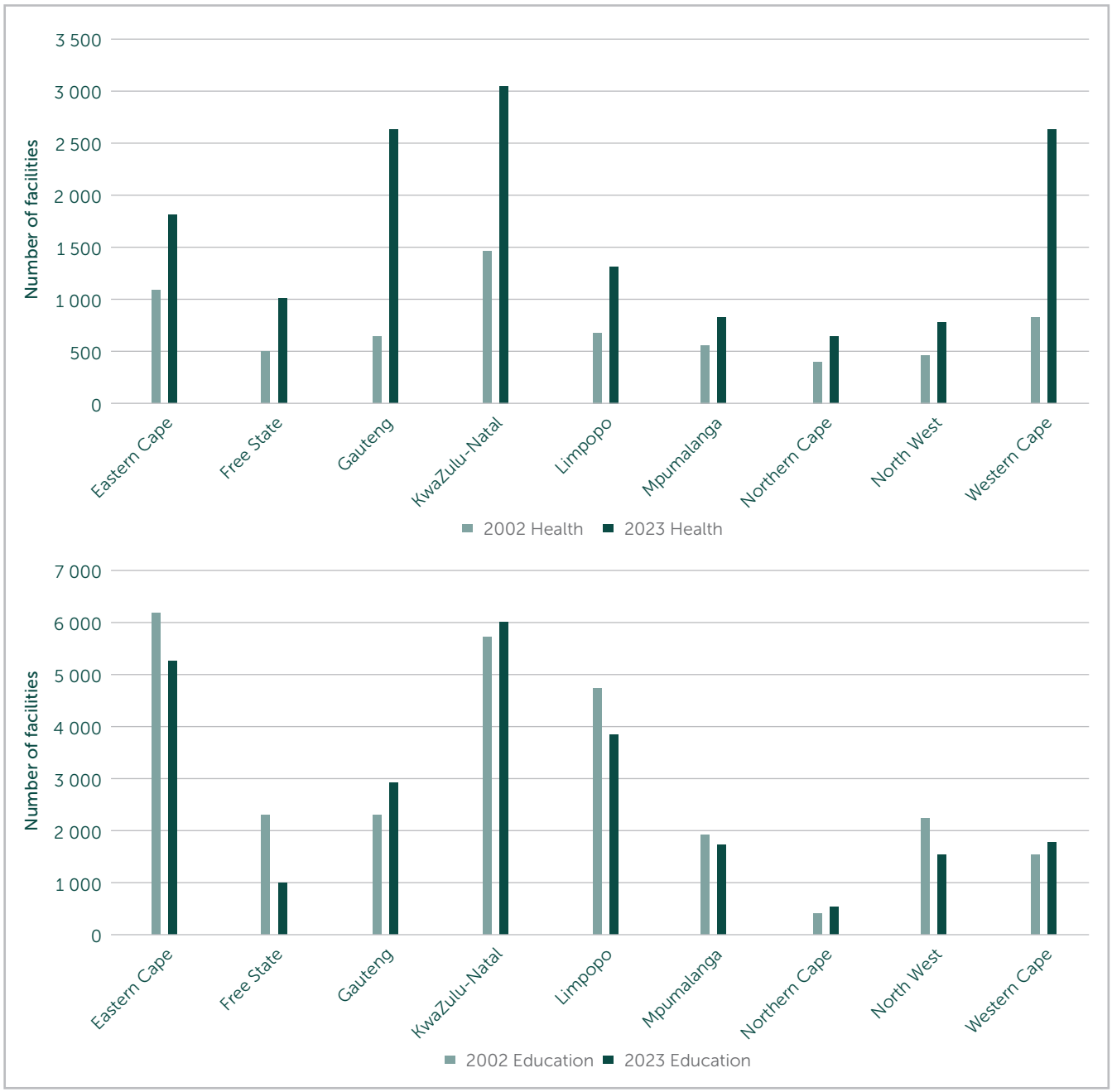
Source: Financial and Fiscal Commission's calculations

Health and education facilities

Figure 2.2 demonstrates trends in health and education facilities across all provinces in 2002 and 2023. The figure shows a significant increase in health facilities, with Gauteng, KwaZulu-Natal and the Western Cape recording the highest increases in health facilities between the years in analysis as a result of the increasing population and urbanisation that have driven the increased demand for health infrastructure. Moreover, government investment in health care has also played a pivotal role, with efforts to improve access to medical facilities, especially in the rural and underserved areas. The expansion of health care services aligns with national policies aimed at improving public health, reducing disease burdens and addressing historical inequalities in health care access (Malakoane, Heunis, Chikobvu, Kigozi & Kruger, 2020). In contrast, Mpumalanga, the Northern Cape and North West experienced slight increments in the number of health facilities compared to other provinces, mainly because of challenges in resource allocation and the maintenance of existing infrastructure. Generally, the increase in health facilities across provinces reflects positive progress in improving health infrastructure, driven by government investment, population demands and policy initiatives.

For education, the trend shows that some provinces experienced growth in health facilities, while others saw a decline. The most notable declines were observed in the Eastern Cape, Limpopo and Free State, whereas Gauteng and KwaZulu-Natal experienced a marginally increased number of facilities. The reduction in education facilities can be attributed to government's initiative to consolidate schools for efficiency, which may have contributed to fewer institutions despite an overall growing population. On the other hand, increases in education facilities are likely due to persistent investments in education infrastructure to meet the increasing demand from a growing urban population (Voldby Beuchert et al., 2016). Overall, the trend demonstrates that urban provinces remained stable or saw increasing numbers of education facilities, while rural provinces experienced declines due to demographic shifts and government's school consolidation policies.

Figure 2.2: Health and education facilities



Source: Financial and Fiscal Commission's calculations

Electricity and water access

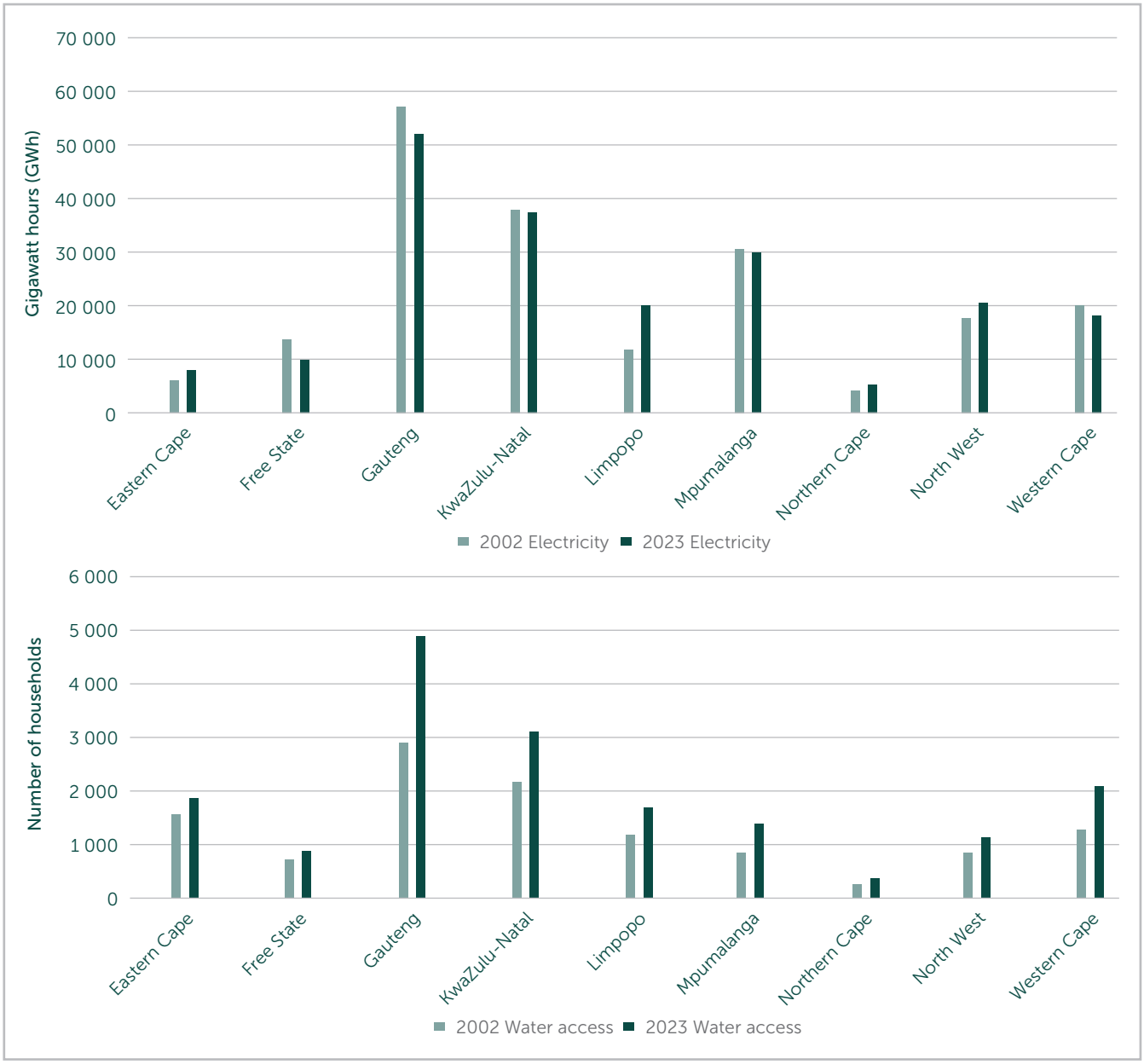
Figure 2.3 looks into electricity generated and distributed in gigawatt hours (GWh) and the number of households with access to water between 2002 and 2023 across different provinces. The results show a decline in electricity consumption across most provinces, with some experiencing significant reductions. For instance, Gauteng experienced a notable reduction in electricity consumption, although it remained the largest consumer. Similarly, KwaZulu-Natal, Mpumalanga and the Western Cape also exhibit reduction, although to varying degrees.

The reduction in electricity consumption was largely due to the ongoing energy crisis, characterised by Eskom's reduced electricity generation capacity, load shedding and rising electricity costs, which have forced businesses and households to cut back on consumption or seek alternative energy sources (Stats

SA, 2023c). However, provinces like Limpopo, North West and the Northern Cape show marginally positive changes in electricity consumption, suggesting either the use of alternative energy sources like solar and wind power or improved energy resiliency.

In terms of water access, the figure exhibits an upward trend across all provinces, although some changes are relatively small compared to others. Notable improvements have been observed in Gauteng, KwaZulu-Natal and the Western Cape, where the number of households with access to water has more than doubled. The general positive trend can be attributed to government's efforts to upgrade water infrastructure and ensure water security, especially in rural and marginalised communities. Moreover, the growth may have been facilitated by larger investments in pipelines, reservoirs and boreholes, as well as extensive water supply projects and municipal service expansions (Department of Water and Sanitation, 2023). Despite the general increase, the Northern Cape and Free State experienced smaller changes compared to other provinces, perhaps as a result of enduring difficulties like droughts, water scarcity and infrastructure maintenance issues.

Figure 2.3: Electricity generated and distributed (GWh) and water access



Source: Financial and Fiscal Commission's calculations

Inferential analysis

Unit root test

The study employed the Levin et al. (2002) and Im et al. (2003) panel unit root tests. The results in Table 2.1 indicate that all variables (lnRGDP, lnLFEA, lnHEA, lnELE, lnWAT and lnEDU) are stationary at the 1 per cent level of significance, under both the LLC and IPS approaches, while lnHEA is stationary at the 5 per cent significance level under the IPS approach. Therefore, the null hypothesis of non-stationarity is rejected for all variables, and the FE model is estimated subject to the outcomes of the Hausman tests. Subsequently, the lag length was determined according to the Bayesian Information Criterion (BIC), which gave the minimum lag length.

Table 2.1: Summary of unit root test results

Variables	Levin-Lin-Chu	Im-Pesaran-Shin	Conclusion
lnRGDP	-20.0906***	-2.0317***	I(0)
lnLFEA	-18.7084***	-1.9732***	I(0)
lnHEA	-19.9591***	-1.6611**	I(0)
lnELE	-22.0339***	-2.5809***	I(0)
lnWAT	19.5231***	-2.0003***	I(0)
lnEDU	-24.0407***	-2.2298***	I(0)

*Asterisks: ***, ** and * denote significance levels at 1, 5 and 10%, respectively.*

Source: Financial and Fiscal Commission's calculations

Hausman specification test

The results in Table 2.2 indicate that the prob>Chi^2 is less than the 5 per cent level of significance, which is a significant result under the Hausman test. Based on the results, the null hypothesis stating that "difference in coefficients not systematic" is not supported, suggesting that the FE model is more appropriate.

Table 2.2: Summary results of the Hausman test

	(b)	(B)	(b-B)	Sqrt (diag (V_B))
	Fixed	Random	Difference	S.E.
lnLFEA	.5012	.6215	-.1203	.0349
lnHEA	.1460	.0868	-.0592	.0133
lnELE	.1231	.1229	-.0003	.0016
lnWAT	.4359	.3054	-.1305	.0346
lnEDU	-.1317	-.0759	-.0558	.0113
Chi2(6) = 57.73	Prob > chi2 = 0.0000			

Source: Financial and Fiscal Commission's calculations

Fixed effects model

Table 2.3 provides a summary of the results of the FE model. The model utilised logged variables of RGDP as a dependent variable, and infrastructure components (LFEA, ELE, HEA, WAT, ICT, EDU) as independent variables. The results show the magnitude and direction of the relationship between variables, as depicted by coefficients, t-statistics and p-values.

Table 2.3: Summary of the results of the fixed effects regression model (dependent variable = LnRGDP)

Independent variables	Coefficient	t-Statistic	p-values
Constant	-0.7766	-18.24	0.000
lnLFEA	0.5070	12.86	0.000
lnHEA	0.1470	8.15	0.000
lnELE	0.1230	11.77	0.000
lnWAT	0.4306	8.73	0.000
lnEDU	-0.1320	-8.23	0.000
R-squared = 0.8982	*Prob (F Statistic)* = 0.000		
F Statistic = 6976.84			

Source: Financial and Fiscal Commission's calculations

According to the FE regression results, the model output is as follows:

$$lnRGDP_{it} = -0.777 + 0.507lnLFEA_{it} + 0.147lnHEA_{it} + 0.123lnELE_{it} + 0.431\ln WAT_{it} - 0.132lnEDU_{it}$$

As observed in Table 2.3, the p-values, coefficients and t-statistics of the infrastructure variables provide the magnitude and direction of the relationship between infrastructure variables and economic growth variables. The analysis initially factored in employment instead of labour force, and the results revealed a negative contribution to economic growth, hence labour force was employed. Firstly, the results illustrate that labour force largely contributes to economic growth, as denoted by a significant p-value at the conventional significance level. This suggests that high labour absorption contributes significantly to growth, highlighting the important role of employment creation in promoting economic activity. A well-integrated labour force ensures that available human resources are effectively utilised, therefore, increasing aggregate demand and productivity. Altogether, the results underscore the importance of labour market participation to economic growth and development. Moreover, health infrastructure contributes positively to economic growth, with a significant p-value at a 1 per cent significance level. This finding emphasises the pivotal role of health infrastructure in promoting economic growth, since the economic dividends of the health sector are effectively realised through contributions from the labour market and economic activities.

In terms of electricity infrastructure, the model's results illustrate a positive contribution towards economic growth, reflected in the coefficient and significant p-value. This suggests that improved electricity infrastructure ensures expansion in electricity access, which contributes to growth through improvements in productivity and technological capacity.

Again, increased electricity access will lead to an efficient business environment, drive economic digitalisation and support energy-reliant economic activities. Additionally, the model demonstrates that water infrastructure contributes significantly to economic growth, as denoted by a significant p-value. Improved water infrastructure guarantees a reliable water source, which is vital for large economy-contributing sectors, such as agriculture, manufacturing and service. Lastly, an unorthodox result indicates that education infrastructure contributes negatively to economic growth. The negative contribution of education infrastructure towards economic growth raises concerns regarding the state of education infrastructure, possibly as a result of inefficiencies within the education sector.

Overall, the FE model's results suggest that health, electricity and water infrastructure, including the labour force, make a significant and positive contribution to economic growth. Hence, efforts should be towards developing sustainable infrastructure policies, particularly in these sectors, to support long-term economic development and yield more significant economic returns.

2.5.2 Investment trends and contribution of PPPs in public infrastructure delivery

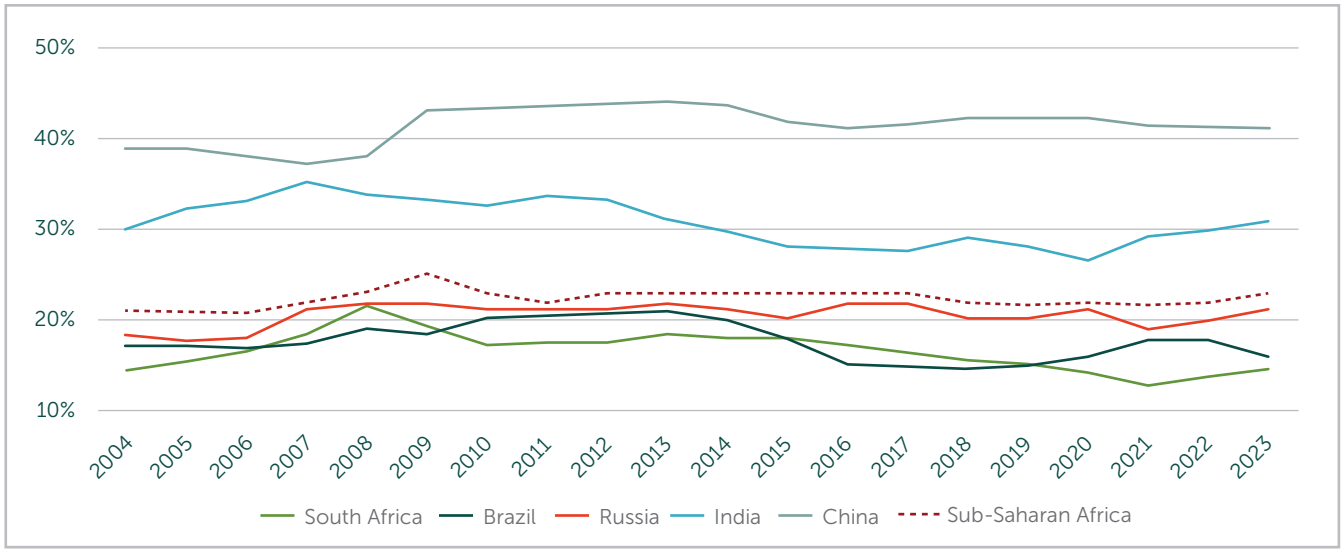
Analysing gross fixed capital formation (GFCF) trends

Gross fixed capital formation, as a percentage of GDP, provides valuable insights into a country's investment behaviour, including capital flows for infrastructure assets.

Figure 2.4 shows that South Africa's GFCF, as a percentage of GDP, has tended to trail behind that of China, India and the sub-Saharan Africa region, following a similar trajectory to Brazil and Russia. While South Africa experienced a peak in investment around 2008 at approximately 22 per cent of GDP, its GFCF has since declined, reaching a low point between 2020 and 2021 before showing some signs of recovery in 2022 and 2023. This deficiency in investment has directly hindered South Africa's economic growth, which has remained well below 2 per cent since 2014. Infrastructure constraints have acted as a bottleneck, limiting economic activity and impacting the country's national accounts. As outlined in the literature, factors contributing to this underperformance in capital investment include policy uncertainty, regulatory barriers, fiscal pressures and poor governance.

Consequently, borrowing has had to steadily increase due to the inability to generate sufficient tax revenue, leading to a spiralling effect on the government's debt-to-GDP ratio.

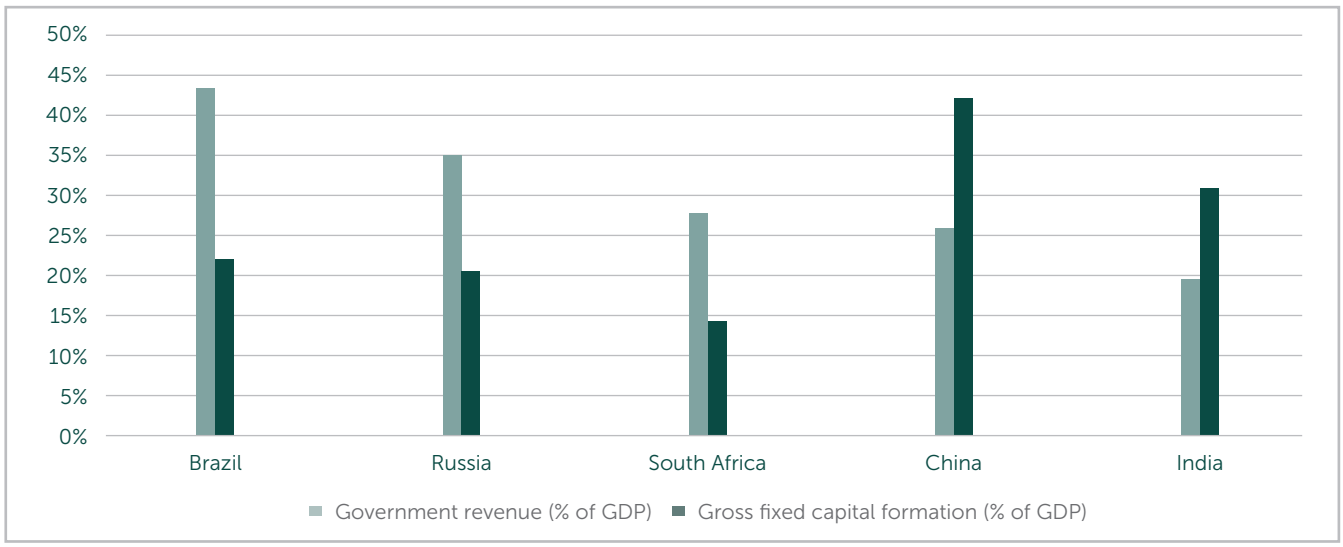
Figure 2.4: South Africa's GFCF as a percentage of GDP compared to developing market peers



Source: World Bank

Figure 2.5 shows that, in 2022, South Africa's infrastructure investment flow was the lowest among its BRICS peers, while it had the third-highest tax collection. The combination of a high tax-to-GDP ratio and a low GFCF-to-GDP ratio suggests that, despite potential for government funding of infrastructure projects, spending pressures have necessitated prioritising other areas, such as social welfare, over infrastructure development.

Figure 2.5: South Africa's investment and tax-to-GDP ratio compared to its BRICS peers in 2022



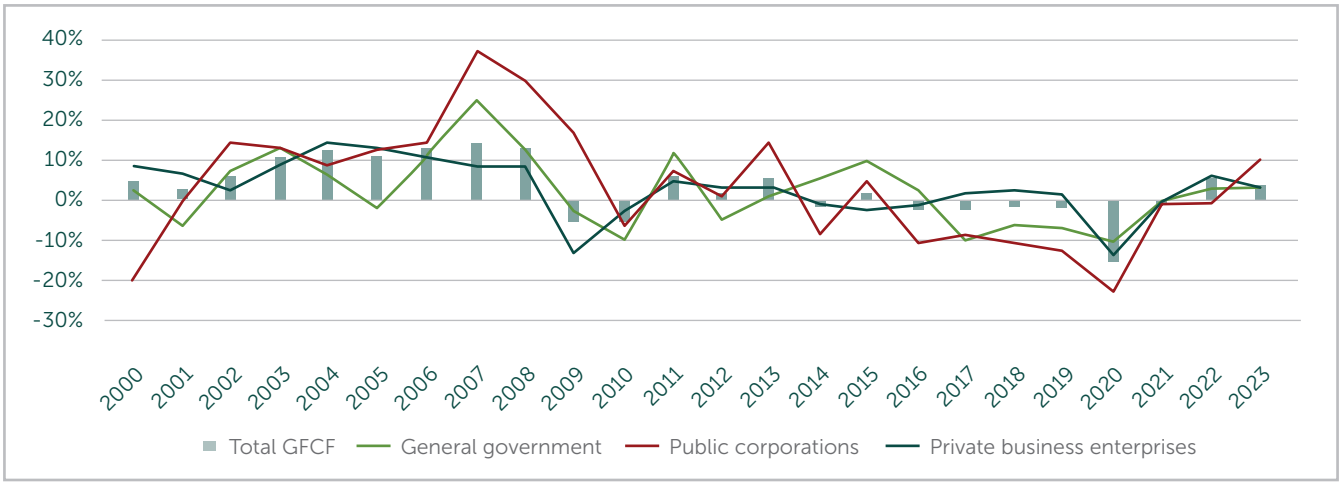
Sources: International Monetary Fund, World Bank

Real GFCF growth in South Africa has declined significantly since the global financial crisis, weakening across all three institutional sectors: general government, public corporations and private business enterprises, as shown in Figure 2.6. This is reflected in the average annual growth rates for the periods 2002–2012 and 2013–2023.

During 2002–2012, average annual GFCF growth rates were 6.3 per cent for general government, 13.4 per cent for public corporations, and 5.5 per cent for private business enterprises. However, from 2013 to 2023, these rates plummeted to -0.8 per cent and -4.1 per cent for general government and public corporations, respectively. Private business enterprises experienced muted growth of just 0.1 per cent.

Despite notable infrastructure projects like the Gautrain, Eskom's capacity expansion and private sector renewable energy investments, these weak investment levels indicate underinvestment in capital projects. This could be attributed to challenges such as delays in contract awards, project completion failures, a lack of financial sustainability for projects and adverse macroeconomic conditions in the form of high borrowing costs

Figure 2.6: Real growth in gross fixed capital formation by type of organisation



Source: Stats SA

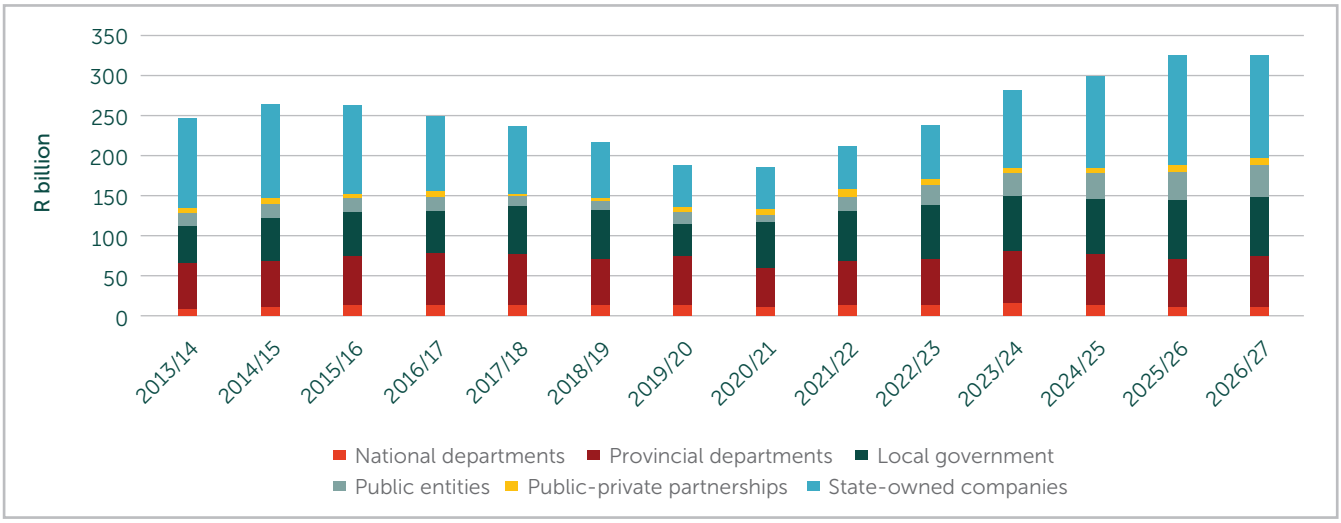
Trends in public sector infrastructure spending

Figure 2.7 reveals that, historically, subnational government (provincial and local government) has been the primary contributor to public sector infrastructure capital flows in South Africa. The flow of investment through spending plans, in turn, contributes to the development and maintenance of the nation's infrastructure capital stock.

Over the 2013/14 to 2022/23 financial years, subnational government spent R1.1 trillion on infrastructure, which represented 50 per cent of the total R2.3 trillion spent on public sector infrastructure over the period. The figure also highlights that, despite government policies like the NDP emphasising the use of PPPs for infrastructure development, public sector infrastructure spending through PPPs amounted to close to R50 billion, or just 2.2 per cent, over the 2013/14 to 2022/23 period. This indicates a lack of significant progress in utilising PPPs for infrastructure projects, as well as how tightly regulated and managed PPPs can be.

During the 2024 Medium-term Expenditure Framework (MTEF) period, public sector infrastructure spending is estimated to reach R943.8 billion. Subnational government is projected to continue its dominant role, contributing R397.5 billion (or 42 per cent of total spending).

Figure 2.7: Public sector infrastructure expenditure contributions by type of institution



Note: Public entities are financed by capital transfers from the fiscus, and state-owned companies are financed from a combination of own revenue and borrowings.

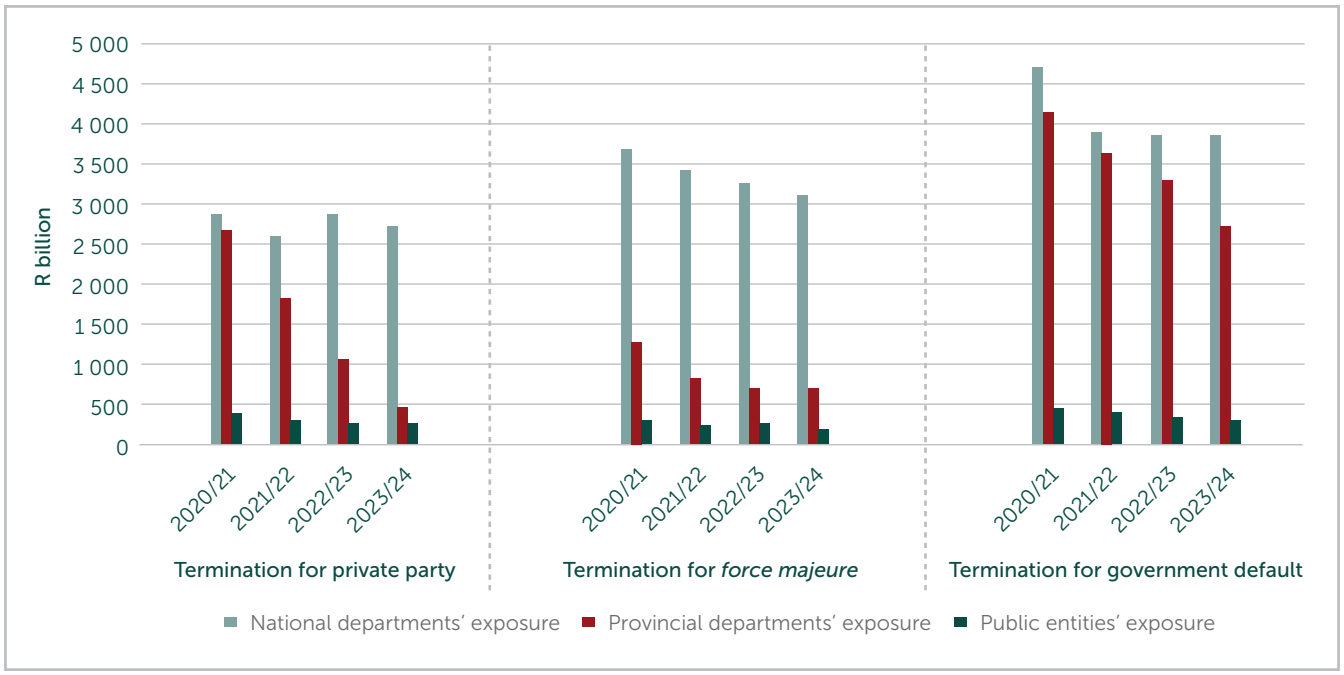
Source: National Treasury, 2024a

Figure 2.8 presents contingent liabilities by category for the South African government, specifically related to PPPs. In the context of PPPs, these liabilities represent government's potential financial exposure, depending on whether the termination of the PPP is the result of private sector default, government default or *force majeure*. The figure shows that, across all termination categories, there has been a noticeable decline in total estimated contingent liabilities from the 2020/21 financial year to 2023/24. For example, liabilities for private party termination decreased from an estimated R5.8 billion to an estimated R3.4 billion, while those for government default dropped from an estimated R9.3 billion to an estimated R6.8 billion.

This downward trend may indicate improved management of existing PPPs or a reduction in new project agreements, which could be influenced by challenges such as fiscal constraints and regulatory inefficiencies. However, a significant concern remains in that there is a lack of fiscal transparency regarding the specific infrastructure projects associated with these contingent liabilities.

Figure 2.8 also reveals that national and provincial government departments are highly exposed to the risk of termination of PPPs due to government default. This can be attributed to the fact that national and provincial departments are the primary contracting parties in PPP agreements due to their involvement in large-scale infrastructure projects. As a result, when the government defaults – whether due to non-payment or failure to meet contractual obligations – the financial burden falls directly on these departments. This high default risk suggests that many infrastructure projects, while labelled as PPPs, may not fully adhere to the risk-sharing principles inherent in true PPPs. Instead, they appear to align more closely with traditional procurement processes, where the government assumes a disproportionate share of the financial risk. This underscores the critical need for a clearer distinction between genuine PPPs and standard government procurement practices. Furthermore, the high exposure to default could be attributed to potential flaws in the initial feasibility study phase of the project lifecycle. There is a concern that projects may be initiated based on misaligned priorities or driven by financial incentives rather than genuine public need. This leads to resource misallocation and unrealistic financial projections, ultimately jeopardising the successful delivery of PPP infrastructure projects.

Figure 2.8: Contingent liabilities related by category



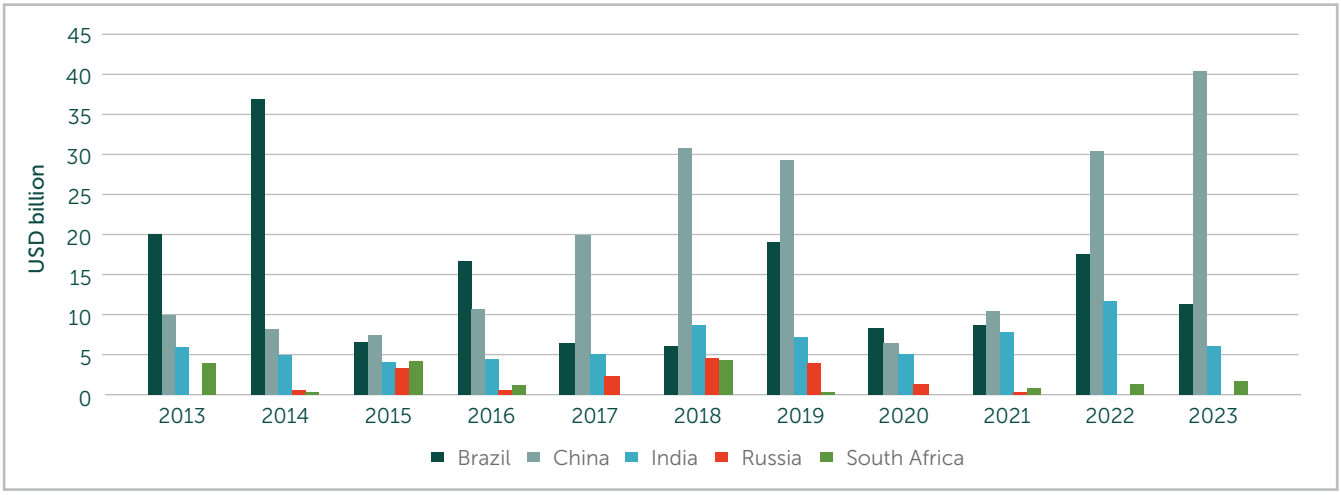
Note: Municipalities are an autonomous sphere of government, so their liabilities are not part of the fiscus.

Source: National Treasury, 2024a

Private participation in infrastructure trends

Figure 2.9 illustrates the value of private sector infrastructure investments that reached financial closure between 2013 and 2023 in BRICS countries. Between 2013 and 2023, private participation in infrastructure (PPI)[3] in South Africa has lagged behind its peers. While China consistently outperformed the group, reaching a peak of 40.38 billion US dollars in 2023, South Africa's investments were notably subdued throughout the period, with its highest value being 4.32 billion US dollars in 2018. This is in stark contrast to Brazil and India, which displayed stronger, albeit fluctuating, investment patterns. Brazil saw its highest investment in 2014 with 36.9 billion US dollars, while India peaked at 1.7 billion US dollars in 2022, showcasing steady growth and a consistent ability to attract private sector participation. South Africa has recorded minimal activity, often falling below 1.5 billion US dollars annually, except for 2015 and 2018. This limited activity underscores South Africa's ongoing challenges in creating an enabling environment for private sector investment in infrastructure compared to its BRICS counterparts.

Figure 2.9: Private participation in infrastructure in BRICS



Source: World Bank Private Participation in Infrastructure Database

2.6 CONCLUSION

This chapter explored channels for optimising the contribution of infrastructure towards economic growth by looking at sector-specific contributions, as well as highlighting the critical role PPPs can play in addressing South Africa's public infrastructure backlog, which can support economic growth and development. The analysis has shown that infrastructure related to water, electricity and health should remain the primary focus, as it yields significant returns on economic growth, while information and communication technology (ICT) and education infrastructures needs to be precisely coordinated with economic demands and the development of complementary infrastructure to maximise the potential contributions towards economic growth and development. While the PPP model has shown success in sectors such as transport and energy, there has been a declining number of PPP transactions in South Africa, with National Treasury data showing a notable drop in new projects over the past decade.

3 The World Bank describes the term "investment" as referring to private investment commitments at the time of financial close in energy, transport, water and sanitation, municipal solid waste, and ICT-backbone projects aimed at serving the public.

Despite numerous policy initiatives such as the National Infrastructure Plan 2050, Infrastructure Investment Plan, Smart Cities Development, Economic Reconstruction and Recovery Plan (ERRP), and the Strategic Integrated Projects (SIPs) in place, the state of infrastructure in the country is slowly deteriorating, and necessitate addressing the existing challenges of funding, regulations and corruption in order to maximise its contribution to economic growth. Alternatively, while government has committed to leveraging PPPs for infrastructure development across various policy documents, the share of PPPs in public sector investment remains marginal, reflecting limited project initiation by the government. Several barriers, including regulatory complexity, limited institutional capacity and unclear risk allocation, have played a role in hindering the implementation of PPPs for public infrastructure delivery.

Compared to its BRICS counterparts, South Africa lags significantly in private sector participation in infrastructure, with lower levels of investment and fewer successful projects reaching financial closure. This underperformance underscores the urgent need for policy reforms to revive investor confidence and accelerate project implementation. The experiences of peer countries such as Canada, Chile and Kenya demonstrate that well-structured legal frameworks, transparent procurement processes and institutional capacity building are essential for successful PPP implementation.

Therefore, to unlock the full potential of PPPs in South Africa, government reforms should focus on streamlining regulatory approvals, strengthening feasibility studies and enhancing private sector engagement. With targeted policy adjustments and institutional reforms, PPPs can contribute significantly to sustainable infrastructure development, economic growth and improved service delivery in the country. Maximising the contribution of infrastructure towards growth will demand that priority be given to strategic infrastructure projects that directly contribute to economic growth. In as much, a wide adoption of PPPs and improving the infrastructure funding vehicle can help reduce historical backlogs and ease the fiscal pressure, while guaranteeing sustainable funding.

2.7 RECOMMENDATIONS

The Commission makes the following recommendations relating to the contribution of selected aspects of infrastructure towards economic growth:

1. ***The Commission recommends that infrastructure development should be prioritised on projects that make a direct contribution towards sustainable development, particularly in sectors such as water and energy, which have the most significant impact on economic growth.***

   The analysis found that infrastructure projects in the energy, health and water sectors significantly contribute to economic growth. The Commission is of the view that prioritising projects in these sectors is a step towards the broader sustainable development path. In that, steering funds towards projects in these key economic sectors will enable the government to improve productivity and service delivery, and promote long-term sustainability. Moreover, prioritising investments in these strategic projects will guarantee an increase in employment opportunities, access to essential services, and resilience against current economic and environmental challenges. Therefore, ensuring that the division of revenue through conditional grants and direct transfers considers infrastructure priorities will enable effective resource utilisation, addressing both immediate

developmental needs and long-term growth objectives. However, the education infrastructure projects should not be neglected, as these will help realise maximum economic output. Prioritising infrastructure in these key economic sectors supports the broader sustainable development path by encouraging inclusive economic growth, minimising inequality and advancing the quality of life of South Africans.

The Commission makes the following recommendations relating to the role of public-private partnerships:

1. ***To enhance efficiency and clarity for the use of public-private partnerships for public infrastructure delivery, the Minister of Finance, and the Minister of Public Works and Infrastructure should create a framework for public-private partnerships to replace the current fragmented approach.***

   The research identifies bureaucratic inefficiencies as significant deterrents to PPP implementation for infrastructure delivery. Currently, PPP regulations are spread across multiple framework instruments (the Public Finance Management Act, Public Procurement Act and Supply Chain prescripts, and the Municipal Finance Management Act, 2003, and its Municipal Public-private Partnership Regulations), which lead to confusion over project classification and approval processes. Crucially, the lack of clarity in distinguishing PPPs from other procurement models, challenges in classifying financial obligations transparently, and no clear guidelines on how PPP contracts should be renegotiated or amended lead to post-contract inefficiencies, cost overruns and hidden liabilities. These factors combine to delays and inefficiencies in infrastructure development. Lessons from Canada illustrate that regulatory efficiency fosters greater private sector interest in PPPs by reducing uncertainties in project execution.

   Included in this framework could be provisions enabling private partners to directly engage municipal councils by submitting feasibility studies and bids for public infrastructure projects. Municipal councils would retain final decision-making authority. The Ministry of Finance would provide advisory guidance on the financial implications of private sector proposals, particularly when municipal financial commitments are involved, and ensure that councils maintain fiscal soundness throughout the project lifecycle. The benefits of this approach would be improved accountability surrounding PPP infrastructure projects and a more streamlined approach to project planning.

2. ***The Minister of Finance, and the Minister of Public Works and Infrastructure should collaboratively ensure contract enforcement and adopt robust risk-sharing mechanisms to improve and enhance the way infrastructure development projects that utilise public-private partnerships are monitored, managed and controlled.***

   The assessment of data from National Treasury revealed that national and provincial government departments are highly exposed to government default liabilities when it comes to PPPs, as these departments are the primary contracting entities in PPP agreements due to their involvement in large-scale infrastructure projects. Should these financial risks not be properly accounted for, they could exacerbate South Africa's fiscal challenges, especially given the country's rising public debt and revenue shortfalls.

National Treasury should replace any bureaucratic approvals with targeted advisory services, focusing on fiscal planning, contract enforcement and risk sharing. Municipal councils are prioritised due to their frontline service delivery responsibilities and limited capacity. These advisory services should include financial feasibility analyses to ensure sound fiscal planning through project viability and long-term cost evaluations, risk assessment guidance to identify and quantify risks, contractual guidance on strengthening contract enforcement, and fiscal impact analysis to identify debt implications. By providing these comprehensive advisory services, National Treasury would empower municipal councils to make informed decisions, accelerate project implementation and maximise PPP value.

2.8 REFERENCES

Baltagi, B. (2005). *Econometric analysis of panel data*. Wiley & Sons Ltd.

Banerjee, A., Duflo, E. & Qian, N. (2020). On the road: Access to transportation infrastructure and economic growth in China. *Journal of Development Economics 145*, 102442.

Barbieri, L. (2009). Panel unit root tests under cross-sectional dependence: An overview. *Journal of Statistics: Advances in Theory and Applications 1*(2), 117–158.

Bello, A.A. & Osinubi, T.S. (2016). *Infrastructure development and economic growth in sub-Saharan Africa*.

Burke, J.V., Lewis, A.S. & Overton, M.L. (2001). Optimal stability and eigenvalue multiplicity. *Foundations of Computational Mathematics 1*, 205–225.

Castalia (2007). Key challenges to public private partnerships in South Africa – Summary of interview findings, Report for the Support Programme for Accelerated Infrastructure Development (SPAID); an initiative of the Presidency of the Republic of South Africa and the Business Trust. Available at: https://www.btrust.org.za/library/assets/uploads/documents/0_SPAID_Key%20challenges%20to%20PPPs%20in%20SA_Castalia_2007.pdf.

Department of Public Works and Infrastructure (2022). South Africa's National Infrastructure Plan 2050. *Government Gazette*.

Department of Water and Sanitation (2023). *National State of Water Report 2023*. Available at: https://www.dws.gov.za/Projects/National%20State%20of%20Water%20Report/default.aspx. (Accessed 25 March 2025).

Dlamini, Z.H. & Botes, L. (2022). Challenges to effective and efficient infrastructure of public private partnerships in South Africa. *Administratio Publica*, 56–75.

Feris, J. & Seleka, K. (2024). Unlocking South Africa's infrastructure development and investment opportunities: Amendments to the PPP Regulations. Available at: https://www.cliffedekkerhofmeyr.com/news/publications/2024/Practice/Dispute/dispute-resolution-alert-18-march-2024-unlocking-south-africas-infrastructure-development-and-investment-opportunities-amendments-to-the-ppp-regulations-.

Fombad, M.C. (2015). Governance in public-private partnerships in South Africa: Some lessons from the Gautrain. *Journal of Southern African Studies 41*(6), 1199–1217. Available at: https://doi.org/10.1080/03057070.2015.1117240.

Gerrard, M.B. (2001). Public-private partnerships: What are public-private partnerships, and how do they differ from privatizations? Available at: https://www.imf.org/external/pubs/ft/fandd/2001/09/gerrard.htm.

Gujarati, D.N. & Porter, D.C. (2009). *Basic econometrics.* McGraw-Hill.

Hartwig, J. (2009). A panel Granger-causality test of endogenous vs. exogenous growth. *KOF Working Papers 231*. KOF Swiss Economic Institute. Available at: https://www.research-collection.ethz.ch/handle/20.500.11850/21807.

Hoppe, E.I., Kusterer, D.J. & Schmitz, P.W. (2013). Public-private partnerships versus traditional procurement: An experimental investigation. *Journal of Economic Behavior and Organization 89*(C), 145–166. Elsevier.

Im, K.S., Pesaran, M.H. & Shin, Y. (2003). Testing for unit roots in heterogeneous panels. *Journal of Econometrics 115*, 53–74.

Kelejian, H. & Piras, G. (2017). Panel data models. *Spatial Econometrics*, 307–341. Available at: https://sci-hub.se/https://doi.org/10.1016/B978-0-12-813387-3.00015-9.

Kumo, W.L. (2012). Infrastructure investment and economic growth in South Africa: A Granger causality analysis. *African Development Bank Group Working Paper Series 160*.

Lee, H. & Kim, K. (2018). Traditional procurement versus public-private partnership: A comparison of procurement modalities focusing on bundling contract effects. *Asian Development Bank Economics Working Paper No. 560*.

Levin, A., Lin, C.F. & Chu, C.S.J. (2002) Unit root tests in panel data: asymptotic and finite-sample properties. *Journal of Econometrics 108*, 1–24.

Malakoane, B., Heunis, J.C., Chikobvu, P., Kigozi, N.G. & Kruger, W.H. (2020). Public health system challenges in the Free State, South Africa: A situation appraisal to inform health system strengthening. *BMC Health Services Research 20*, 1–14.

Mashwama, N., Thwala, W.D. & Aigbavboa, C. (2018). The role of public private partnership in improving service delivery in South Africa. Available at: https://ujcontent.uj.ac.za/esploro/outputs/conferencePaper/The-role-of-public-private-partnership/9912008707691#file-0.

Mutize, M., Mugobo, V.V. & Iwu, C.G. (2018). Working the conundrum in public-private partnerships (PPPs) for community benefit in South Africa. *Demography and Social Economy 2*(33), 130–139. Available at: https://doi.org/10.15407/dse2018.02.130.

National Planning Commission (2013). National Development Plan 2030: Our future, make it work. National Planning Commission.

National Treasury (2005). Treasury Regulations for departments, trading entities, constitutional institutions and public entities issued in terms of the Public Finance Management Act, 1999. National Treasury.

National Treasury. 2019. Budget Review 2019. National Treasury.

National Treasury. 2024a. Budget Review 2024. National Treasury.

National Treasury. 2024b. Media Statement for the Notification on the Amendments to the National Treasury Regulations 16 and Municipal Public Private Partnership Regulations. Available at: https://www.treasury.gov.za/public%20comments/MPPP%20Regulations/Explanatory%20Note%20to%20published%20on%20the%20National%20Treasury%20Website%2019%2002%2024.pdf

National Treasury (2025). Strategic Plan: 2025–2030. National Treasury.

Nugraha, A.T., Prayitno, G., Situmorang, M.E. & Nasution, A. (2020). The role of infrastructure in economic growth and income inequality in Indonesia. *Economics and Sociology 13*(1), 102–115.

Omarjee, L. (2019). Mboweni: Does SA really need state-owned enterprises. Available at: https://www.news24.com/fin24/Budget/mboweni-does-sa-really-need-state-owned-enterprises-20190220 (Accessed 5 September 2024).

Republic of South Africa (2005). Local Government: Municipal Finance Management Act 2003 Municipal Public-Private Partnership Regulations. *Government Gazette*.

Rossi, B. & Wang, Y. (2019). Vector autoregressive-based Granger causality test in the presence of instabilities. *The Stata Journal 19*(4), 883–899.

Saidi, S., Shahbaz, M. & Akhtar, P. (2018). The long-run relationships between transport energy consumption, transport infrastructure, and economic growth in MENA countries. *Transportation Research Part A: Policy and Practice 111*, 78–95.

Sebitlo, O.K., Mbara, T. & Luke, R. (2022). The state of South Africa's public-private partnership practices in transport projects: Problems and potential. *Journal of Transport and Supply Chain Management 16*.

Sheytanova, T. (2015). The accuracy of the Hausman Test in panel data: A Monte Carlo study. Örebro University

Sirait, H., Rosalina, S.S. & Sari, E. (2023). The impact of digital innovation on economic growth. *International Journal of Professional Business Review 8(*6), 12.

South African Institution of Civil Engineering (2022). SAICE 2022 Infrastructure Report Card for South Africa. Available at: https://saice.org.za/downloads/SAICE-2022-Infrastructure-Report-Card.pdf [Accessed 15 October 2024].

Statistics South Africa (Stats SA) (2023a). Provincial gross domestic product. Stats SA.

Statistics South Africa (Stats SA) (2002). Labour force survey. Stats SA.

Statistics South Africa (Stats SA) (2023b). Quarterly labour force survey. Stats SA.

Statistics South Africa (Stats SA) (2023c). Electricity generated and available for distribution. Stats SA

Szalai, J. (2010). Use of eigenvalue analysis for different levels of stability Design. *Proceedings of the Rio 2010 Stability and Ductility of Steel Structures*.

Voldby Beuchert, L., Humlum, M.K., Nielsen, H.S. & Smith, N. (2016). The short-term effects of school consolidation on student achievement: Evidence of disruption? *IZA Discussion Paper 10195.* Institute for the Study of Labour.

Wooldridge, J.M. (2010). *Econometric analysis of cross section and panel data*. MIT Press.

World Bank and Development Bank of Southern Africa (2023). Going beyond the infrastructure funding gap – A South African perspective. World Bank Group.

World Bank (2017). Public-private partnerships: Reference Guide Version 3. World Bank. Available at: http://hdl.handle.net/10986/29052 License: CC BY 3.0 IGO.

World Bank (2025). Gross fixed capital formation (Annual % Growth). World Bank Open Data. Available at: https://data.worldbank.org/indicator/NE.GDI.FTOT.KD.ZG.

CHAPTER 3
Strengthening subnational governments' contribution to infrastructure-led growth in South Africa

Sasha Peters and Sanelisiwe Zulu

3.1 INTRODUCTION

The government has positioned infrastructure development as critical to achieving South Africa's economic and social goals (National Planning Commission, 2011; President of the Republic of South Africa, 2018, 2019, 2020, 2021). The prioritisation of infrastructure is justified, with research confirming the positive association between public infrastructure investment and growth; see, for example, Aschauer (1989), Abiad, Furceri and Topalova (2016) and Furceri and Li (2017). Public infrastructure investment can also yield developmental benefits such as reductions in inequality (Furceri & Li, 2017), poverty alleviation and environmental sustainability (World Bank, 1994). To unlock the full range of potential benefits associated with public infrastructure investments, research by Miyamoto, Baum, Gueorguiev, Honda and Walker (2020) emphasises the centrality of infrastructure governance, particularly, strong institutions.

The National Development Plan (NDP), which articulates South Africa's approach to eliminating poverty and inequality by 2030, recommends that, to facilitate more inclusive growth and employment, gross fixed capital formation (a measure of investment) should reach 30 per cent of gross domestic product (GDP) by 2030. Furthermore, public infrastructure investment should comprise 10 per cent of the 30 per cent target (National Planning Commission, 2011). Despite significant efforts by government to boost infrastructure spending, current levels of public infrastructure investment remain far from this target. Over the 28 years from 1994 to 2022, public investment, as a percentage of GDP, averaged a muted 5.1 per cent.

This analysis aims to investigate the delivery of public infrastructure in South Africa, with a particular emphasis on the contribution of subnational governments to the broader goal of infrastructure-led growth and whether, from an institutional perspective, some factors hamper the performance of provinces and municipalities.

3.2 CONTEXTUALISING PUBLIC INFRASTRUCTURE IN SOUTH AFRICA

3.2.1 An overview of the state of public infrastructure

The impact of public infrastructure funding and investment should be evident in data related to access to service delivery access. Table 3.1 provides a snapshot of household access to water, sanitation, electricity and refuse removal. The data tells a mixed picture of some provinces having made significant inroads, while much work remains to be done in others.

Table 3.1: Percentage of households with access to selected basic services (as a percentage)

Access indicator	EC	FS	GP	KZN	LP	MPU	NC	NW	WC	RSA
Percentage of households with piped water inside dwelling and the yard	67.1	92.2	94.2	77.1	61.2	79.1	81.9	74.5	93.1	82.4
Percentage of households reporting water interruptions	59.2	58.0	40.5	57.00	54.5	60.9	65.8	65.2	27.7	48.4
Percentage of households with a flush toilet	58.7	76.3	89.7	58.9	35.2	54.9	73.0	58.5	93.9	70.8
Percentage of households with a pit latrine without a ventilation pipe	10.4	10.6	4.2	13.3	36.8	27.9	8.9	21.8	0.2	12.5
Percentage of households using electricity as the main source of energy for lighting	94.5	94.6	93.2	96.7	95.5	93.7	92.5	93.9	96.5	94.7
Percentage of households whose refuse is removed at least once a week	53.3	63.5	85.0	57.7	32.0	51.1	64.4	53.5	88.7	66.3

EC: Eastern Cape; FS: Free State; GP: Gauteng; KZN: KwaZulu-Natal; LP: Limpopo; MPU: Mpumalanga; NC: Northern Cape; NW: North West; WC: Western Cape; RSA: South Africa

Source: Statistics South Africa, 2023

Table 3.2 drives home the point that focusing on access alone is insufficient, and that the quality of access to basic services is a critical consideration. The South African Institution of Civil Engineering (SAICE) produces an infrastructure report card on a periodic basis that assigns each major infrastructure type with a grading as follows (SAICE, 2022):

- A grade: Signifies infrastructure that is world-class and internationally comparable
- B grade: Denotes infrastructure that is fit for the future, properly maintained and in good condition
- C grade: Indicates infrastructure that is stressed during peak periods, but generally acceptable
- D grade: Conveys that infrastructure is at risk, unable to cope with demand and is poorly maintained
- E grade: Indicates that infrastructure is unfit for purpose and on the verge of failure

According to the 2022 SAICE report, 43.3 per cent of the aspects graded achieved a D grade, and 13 per cent scored an E grade. Sanitation in non-urban areas, branch and Passenger Rail Agency of South Africa (PRASA) passenger lines, and provincial and municipal unpaved roads all performed consistently poorly in 2022, 2017 and 2011.

Table 3.2: SAICE infrastructure grading

Infrastructure type	2022	2017	2011
Water			
Bulk water resources	D-	D-	D-
Supply in the major urban areas	C+	C+	C+
Supply for all other areas	D-	D-	D-
Sanitation, including wastewater			
Major urban areas	C-	C-	C-
All other areas	E	E	E-
Solid waste management			
Waste collection in major urban areas	C-	C	C
Waste collection in other areas	D-	D	D
Waste disposal in major urban areas/metros	C-	C+	C+
Waste disposal in other areas	D-	D-	D
Roads			
National roads	B+	B	B
Paved provincial roads	D	D	D-
Paved roads in the major urban areas/metro roads	D	C-	C-
Other municipalities' paved roads	D-	D-	D
Provincial and municipal unpaved roads	E	E	E-

Infrastructure type	2022	2017	2011
Rail			
Heavy haul freight lines	B-	B+	B+
General freight lines	C-	C	C+
Branch lines	E	D-	D
PRASA passenger lines	E	D+	C-
Gautrain	A-	A	
Electricity			
Eskom generating infrastructure	D-	C+	C+
Eskom transmission network	B	B-	B-
Local distribution	D	D	D
Health care			
Hospitals	D+	D+	D+
Clinics	D	D	D
Education			
Public ordinary schools	D	D+	D+
Universities	C+	C+	
Technical and vocational education and training (TVET) colleges	D+	D+	

A = World-class; B = Fit for the future; C = Satisfactory for now; D = At risk; E = Unfit for purpose

Sources: South African Institution of Civil Engineering, 2022; 2017; 2011; 2006

An assessment of the policy and regulatory environment in support of infrastructure-led growth

The development of infrastructure before 1994 reinforced the principles of the apartheid system, with healthy infrastructure developed and maintained for the benefit of the minority, while the majority of South Africans were largely without access to critical infrastructure. The roots of the democratic government's stance on infrastructure as a key lever for growth is evident as far back as the 1994 White Paper on Reconstruction and Development (Republic of South Africa, 1994). As highlighted in Table 3.3, reliance on public infrastructure investment as a lever for growth and development is evident across South Africa's major economic policies, from the Reconstruction and Development Programme (RDP) to the Growth, Employment and Redistribution (GEAR) policy, the Accelerated and Shared Growth Initiative for South Africa (ASGiSA), the New Growth Path (NGP) and the more recent Economic Reconstruction and Recovery Plan (ERRP). South Africa's long-term development plan, the NDP, similarly emphasises infrastructure.

Table 3.3: Policy emphasis on public infrastructure investment

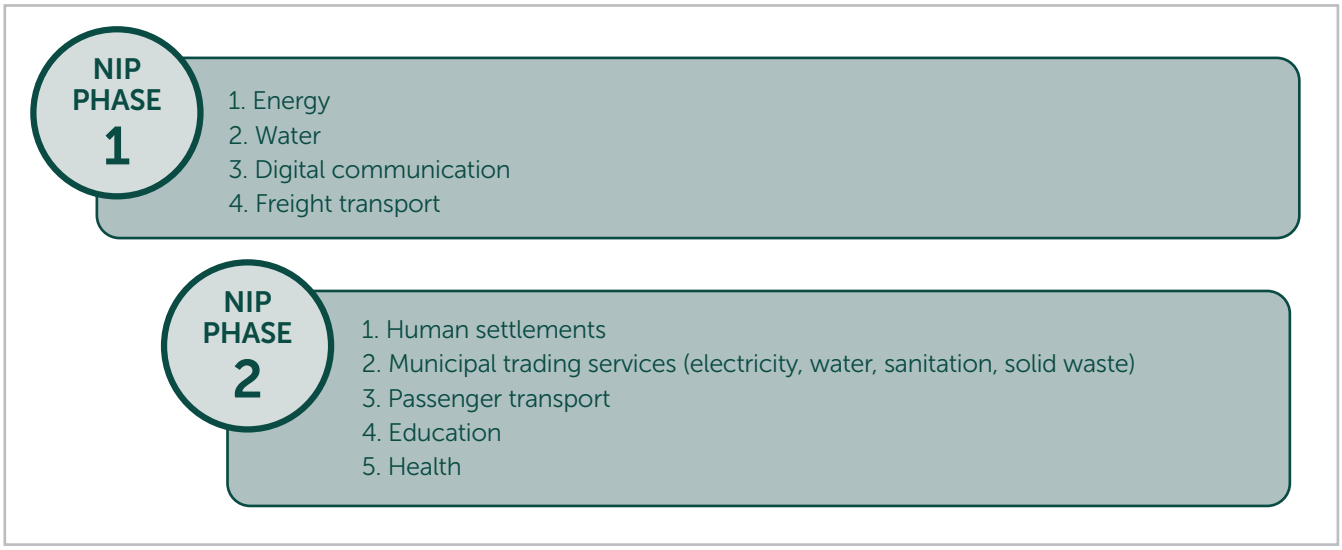
Policy	Year	Overall aim or target	View on infrastructure
Reconstruction and Development Programme (RDP)	1994	To implement the transformation of society through: • meeting basic needs • urban and rural development • human resource development • democratisation and institutional reform • economic restructuring	The RDP integrates growth, development, reconstruction, redistribution and reconciliation into a unified programme. The key to this link is an infrastructural programme that will provide access to modern and effective services such as electricity, water, telecommunications, transport, health, education and training for all our people.
Growth, Employment and Redistribution (GEAR)	1996	Improved growth (to 6%) and employment (400 000 jobs per annum) in the period up to 2000, while strengthening the competitive capacity of the economy in the long term	Investment in social and economic infrastructure will play an important role in increasing the productivity of labour and business, and thus the achievement of higher growth rates.
Accelerated and Shared Growth Initiative for South Africa (ASGiSA)	2006	Reduce unemployment and poverty, while increasing the country's GDP growth rate to a sustainable level of 6% by 2010	Public sector infrastructure spending has considerable potential spin-offs in terms of the generation or regeneration of domestic supply industries, small business development and empowerment. Government is seeking to maximise the positive impact of these spinoffs on the domestic economy.
New Growth Path (NGP)	2010	Address high levels of unemployment (create 5 million jobs by 2020) and foster sustainable economic growth	Public investment can create 250 000 jobs a year in energy, transport, water and communications infrastructure, and in housing through to 2015. The jobs are in four activities: construction of new infrastructure, operation of the new facilities, expanded maintenance, and the manufacture of components for the infrastructure programme. In addition to these four activities, the impact of the massive 11 infrastructure programmes on job creation across the economy (the 'multiplier effect') will be substantial.
National Development Plan (NDP)	2012	Eliminate poverty and reduce inequality by 2030	To achieve sustainable and inclusive growth by 2030, South Africa needs to invest in a strong network of economic infrastructure designed to support the country's medium- and long-term objectives. Achieving this vision is possible if there is targeted development of transport, energy, water resources, and information and communication technology (ICT) networks.
Economic Reconstruction and Recovery Plan (ERRP)	2020	Geared towards ensuring that, beyond just returning the economy to its pre-COVID-19 levels, it adds more GDP growth and jobs	Infrastructure investment, delivery and maintenance will play a leading role in South Africa's economic reconstruction and recovery. A large-scale infrastructure programme will boost aggregate demand, assist in reviving the construction industry and contribute to employment creation.

Development of infrastructure-specific policy and legislation in South Africa

In 2011, Cabinet approved the establishment the Presidential Infrastructure Coordinating Commission (PICC) to coordinate its long-term public infrastructure build programme.

The Commission conducted spatial mapping to identify infrastructure needs, identified 18 strategic integrated projects, and developed a single, centrally driven National Infrastructure Plan (NIP) in 2012. The NIP outlines South Africa's long-term infrastructure development goals. The plan is divided into two phases, each with different areas of emphasis (see Figure 3.1)

Figure 3.1: Focus areas of the two phases of the NIP



Phase 1 focuses on network infrastructure in the energy, water, digital communications and freight transport sectors, while Phase 2 seems to have a stronger focus on social infrastructure. Phase 2 is also set to hone in on the aspect of infrastructure governance and to achieve inter- and intra-sphere coordination. While the NIP was adopted by government in 2012, phases 1 and 2 were only gazetted for comment in 2022.

In addition to the 2012 NIP, which sets out the long-term infrastructure goals and aspirations of government, legislation, in the form of the Infrastructure Development Act, followed in 2014. The Infrastructure Development Act governs economic and social public infrastructure development in South Africa and was passed to give effect to the provisions contained in the 2012 NIP.

The overarching objective of the Act is to facilitate coherence in South Africa's public infrastructure programme and to make provision for statutory instruments to expedite the delivery of infrastructure. To this end, the Act gives legal effect to the establishment of the PICC and guides the PICC's composition and functions.

As indicated in Section 3 of the Act, the PICC is led by its Council, comprising the President and Deputy President of the Republic, ministers selected by the President, the premiers of the nine provinces, executive mayors of metropolitan municipalities, and the Chairperson of the South African Local Government Association (SALGA). The national, provincial and local spheres of government are represented on the PICC Council. Concerning local government, while metropolitan municipalities have direct representation on the PICC Council (through their executive mayors), local municipalities do not. Can SALGA adequately represent local municipalities and the infrastructure challenges they experience?

The Act, in Section 4, specifies the numerous functions the PICC Council must fulfil. These are outlined in Table 3.4. The bulk of the functions relate to identifying, coordinating and promoting aspects related to infrastructure development. The PICC Council tends to strongly prioritise the development and facilitate the implementation of strategic infrastructure projects (SIPs). While the PICC Council plays a pivotal role in coordinating South Africa's infrastructure priorities, monitoring the implementation of the NIP and developing strategies to mitigate impediments to infrastructure investment, it has no power to fund infrastructure development. In essence, the PICC is a planning and coordinating body that undertakes infrastructure monitoring for the executive arm of government. Importantly, the PICC does not provide funding for public infrastructure investment. Infrastructure programmes will continue to be funded via departmental budgets subject to the normal budgeting process. The PICC is also not an implementing agent involved in actual infrastructure delivery. Finally, the PICC does not account for the spending of funds in respect of infrastructure projects and has no control over the build programme or implementation process (PICC, 2017). Instead, accounting for infrastructure funds spent is the responsibility of the Accounting Officer of the relevant department or municipality.

Table 3.4: Functions of the PICC Council specified in the Infrastructure Development Act, 2014

COORDINATE:
• Development, maintenance, implementation and monitoring of the NIP • Determination of infrastructure priorities • Identification of strategic international partners
DESIGNATE:
• SIP projects • SIP chairpersons and coordinators
ENSURE:
• Priority of SIP projects • Cooperation among organs of state
IDENTIFY:
• Current and future infrastructure needs • Legislation and regulations that impede infrastructure development • Direct and indirect impact of SIPs on job creation, youth unemployment, economic inclusivity, equality and social cohesion • Financial matters that may impact infrastructure development • Social impact of SIPs
EVALUATE:
• Existing infrastructure with a view to improving planning, procurement, construction, operations and maintenance • Consider proposals for infrastructure development and maintenance
PROMOTE:
• Investment, and identify and develop strategies to remove impediments to investment • Creation of decent job opportunities and skills development connected with infrastructure or an SIP
ADDRESS:
• Blockages in the development and coordination of SIPs
DEVELOP and ISSUE:
• Guidelines to facilitate the implementation of SIPs
ENCOURAGE and FACILITATE:
• Economic and industrial development connected with infrastructure or an SIP

Source: Republic of South Africa, 2014

The Act also codifies the definition and qualifying criteria for an infrastructure project to be designated an SIP. According to Section 7 of the Act, projects designated as SIPs need to be of significant economic or social importance to the Republic; contribute substantially to any national strategy or policy relating to infrastructure development; or be above a certain monetary value determined by the PICC. Schedule 3 of the Act lists the 18 SIPs.

Overview of key interventions aimed at improving the delivery of public infrastructure

Over the years, numerous interventions have been implemented in an attempt to improve the coordination and ultimate delivery of public infrastructure in South Africa. Table 3.5 provides a sense of the key legislative, budget and infrastructure governance-related interventions that have been implemented to improve the delivery of public infrastructure.

Table 3.5: Summary of key interventions established to improve infrastructure delivery

Intervention	Initiated	Comment
Infrastructure Delivery Improvement Programme (IDIP)	2004	The aim of the IDIP is to build the capacity to support improvement in the planning, procurement and management of infrastructure delivery at the provincial level. It is led by National Treasury.
Infrastructure Delivery Management Toolkits	2004 2006 2010	The development of best practice toolkits was Phase 2 of the IDIP. The initiative is led by National Treasury.
Siyenza Manje	2006	This intervention focused on building sustainable capacity to manage the delivery of infrastructure. It deploys project managers, engineers and finance specialists to select municipalities. It is initiated by National Treasury, SALGA and the former Department of Provincial and Local Government (DPLG). It is rolled out by the Development Bank of Southern Africa (DBSA).
Presidential Infrastructure Coordinating Commission (PICC) and Strategic Integrated Projects (SIPs)	2011	Established by Cabinet. The PICC conducted a spatial mapping of infrastructure gaps and developed the SIPs, which are catalytic infrastructure projects. The SIPs and the establishment of the PICC were legislated in the Infrastructure Development Act, 2014
Municipal Infrastructure Support Agency (MISA)	2012	Provides technical advice and support to municipalities so as to optimise municipal infrastructure provisioning. It is an initiative of the Department of Cooperative Governance and Traditional Affairs.
National Infrastructure Plan (NIP)	2012	The NIP intends to transform South Africa's economic landscape, while simultaneously creating significant numbers of new jobs, and strengthening the delivery of basic services.
Infrastructure Development Act	2014	Developed to provide for the facilitation and coordination of infrastructure development and to legislate the establishment of the PICC and 18 SIPs.

Intervention	Initiated	Comment
Performance-based approach to infrastructure grants	2015	Announced in the 2013 Division of Revenue, the first incentive components, aimed at promoting better infrastructure planning and procurement, were introduced in 2015 to the Education Infrastructure Grant (EIG) and the Health Facilities Revitalisation Grant. In addition to these grants, as of 2024, incentive components have also been added to the Integrated Urban Development Grant (IUDG) and the Public Transport Network Grant
Cities Infrastructure Delivery and Management System (CIDMS)	2016	The CIDMS is an asset management system specifically designed for cities with large and varied immovable asset portfolios. It is spearheaded by National Treasury in collaboration with the metropolitan municipalities.
Budget Facility for Infrastructure (BFI)	2016	The BFI is a budget reform initiative aimed at supporting the execution of national priority projects and programmes by establishing specialised structures, procedures and criteria for committing fiscal resources to public infrastructure spending. It is geared at funding SIPs, very large projects (R1 billion for projects, R3 billion for programmes), which must have the support of the national sector department. The BFI is a funder of last resort – must show that all other avenues have been explored.
Infrastructure South Africa (ISA)	2020	The ISA is an agency of the Department of Public Works and Infrastructure that was established to coordinate and manage the development of a pipeline of priority infrastructure projects. It has a minimum project value threshold of R1 billion. It does not provide funding, but assists with project preparation to ensure that projects are bankable.
Infrastructure Fund (IF)	2020	The IF aims to use committed government funding to leverage much higher levels of private sector investment in public infrastructure. To be considered for approval, projects must meet the same criteria set for BFI approval. The IF is managed by ISA and is operationalised by the DBSA.
Infrastructure Investment Plan	2020	To determine and guide how funds can be best allocated.
Project Vumela	Announced in the 2024 Budget	This is a financing instrument, which blends municipal revenue sources with financing from development finance institutions and commercial finance. It aims to raise funds for bulk infrastructure in sectors such as water, sanitation, roads and stormwater, electricity and solid waste.

3.2.2 The use of incentives: Linking funding to performance

Incentives promote healthy investment and infrastructure management, and improve performance. The intergovernmental fiscal transfer system allows governments to design and activate incentives for subnational governments to fund national priorities and improve infrastructure spending and delivery performance. Performance-oriented grants, also known as performance-based or incentive grants, are an example of this approach (Dougherty, Nebreda & Mota, 2024). However, governments must ensure data availability to substantiate performance. Table 3.6 provides an overview of the main features of a selection of conditional grant types, including performance-based grants.

Table 3.6: Characteristics of different conditional grants

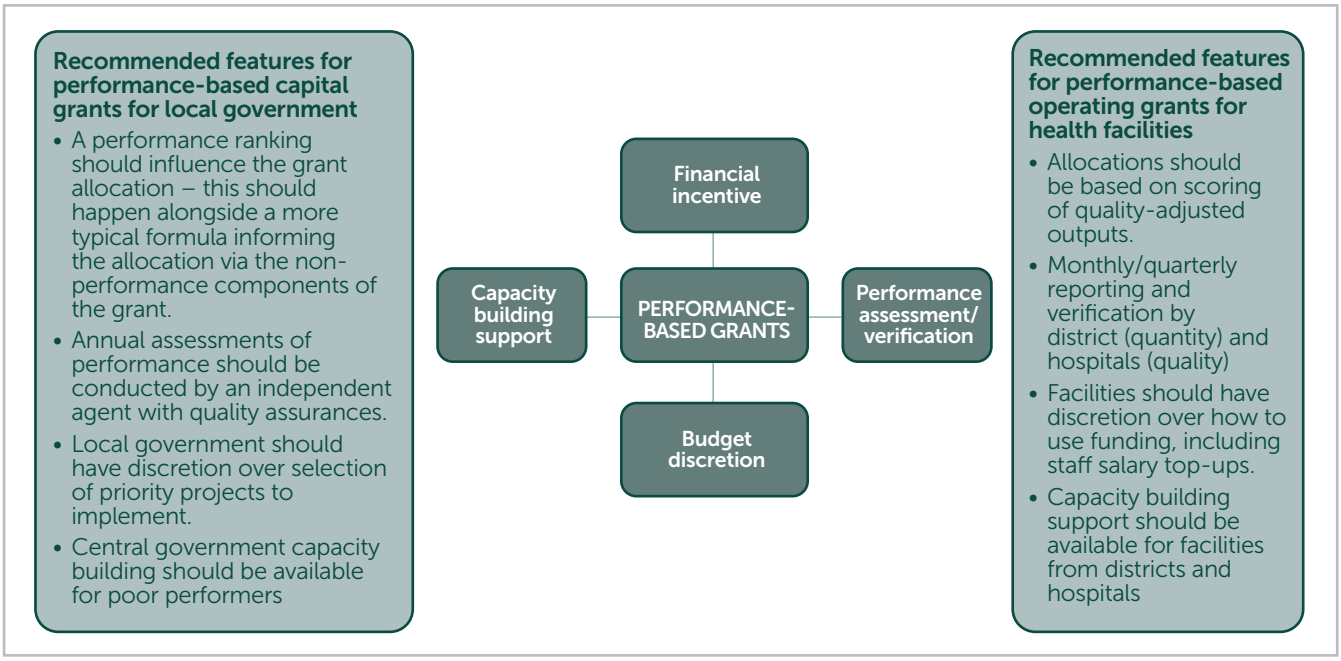
Type of conditional grant	Objective	Benefits	Disadvantages
Earmarked non-matching grants	(a) Provides financial resources for specific purposes without requiring matching funds; (b) Supports regions, especially those with limited fiscal capacities; (c) Aligns with broader, central government objectives	(a) Can ensure that funds are directed toward specific, high-priority areas; (b) Can ensure that regions with limited resources can undertake specific projects/programmes; (c) Reduces the financial burden on regions with limited fiscal capacity	(a) Can distort local priorities if conditions are too stringent or misaligned with local needs; (b) Can be viewed as central government overreach
Earmarked matching open-ended grants	(a) Provides funding for services with spillover benefits; (b) Encourages subnational governments to invest in specific areas; (c) Aligns with broader central government objectives	(a) Stimulates greater scrutiny and local ownership of projects; (b) Promotes shared responsibility between different levels of government	(a) The need to match funds can deter poorer regions, leading to disparities in the provision of services; (b) Can lead to inefficiencies and misallocation of resources due to income and substitution effects
Earmarked matching close-ended grants	(a) Provides subsidies with a limit on matching funds; (b) Encourages subnational governments to invest in specific areas; (c) Aligns with broader central government objectives	(a) Increases accountability and enhances cost transparency; (b) Allows better budget control for central government; (c) Promotes shared responsibility between different levels of government	(a) The need to match funds can deter poorer regions, leading to disparities in the provision of services; (b) May lead to overspending in targeted areas
Performance-oriented grants	(a) Rewards subnational governments that achieve specific benchmarks; (b) Emphasises results and outcomes; (c) Contractual platform with pre-specified targets	(a) Promotes efficiency, effectiveness, transparency and accountability in service delivery; (b) Ensures that funds are used for the intended purpose	(a) Conditions must be attached to outputs and not outcomes, as outcomes are subject to interferences beyond the control of policy makers; (b) Limited data availability to measure performance; (c) Potential for data manipulation

Source: Dougherty et al., 2024

There are two general models of performance-based grants that are increasingly used in low- and middle-income countries (World Bank, 2021). The first relates to performance-based capital grants to local governments, where funding is linked to the results of an annual assessment of institutional performance. The second is non-wage recurrent grants paid to health facilities based on the number and quality of outputs delivered. In both models, the grant conditions are structured to allow the recipient government a greater level of discretion. This is aimed at strengthening the financial incentive and enabling the recipient to perform better.

Lastly, to further help improve the recipient governments' performance, the incentive package is often enhanced with support for capacity building. These design features are anticipated to improve overall oversight and promote a more active system of performance learning, while encouraging improved behaviours from the recipients being evaluated (Soucat, Dale, Mathauer & Kutzin, 2017). The basic features of a performance-based grant are summarised in Figure 3.2.

Figure 3.2: Basic features of performance-based grants



Source: World Bank, 2021

Emphasis is placed on the following three key lessons drawn from implementing performance-based grants:

- The size of grants and performance incentives is critical for effectiveness. They should facilitate medium- to large-scale investments, and should comprise a significant share of funding for the service in question.
- The behaviour and results that the government/project aspires to must be explicitly related to the indicators used in the performance evaluation of recipients. To link changes in a score to recipient performance, the measures must be within the recipients' authority. Furthermore, it is important to ensure that participating subnational governments trust the assessment process. The process and the results must be considered fair to retain support for the system. The performance assessment should ideally be conducted by a trusted third party that does not have a direct stake in the allocation process. Additionally, external quality assurance of the performance results may help improve credibility.

- Building capacity is essential to a performance-based grant system's effectiveness. In general, capacity building needs to be directly linked to the findings of the annual performance evaluation and directed toward the subnational governments with the lowest ratings (World Bank, 2021).

3.3 PROBLEM STATEMENT AND RESEARCH QUESTIONS

The government has adopted an infrastructure-led approach to stimulating economic growth in South Africa. The NDP has set an investment-to-GDP target of 30 per cent by 2030, with public infrastructure investment meant to comprise 10 per cent of this total. As of 2024, South Africa remains far from this target. Implementing this plan involves various levels of government, including the national government, subnational governments, state-owned companies (SOCs) and public entities, which increases the risk of contradictory plans and priorities, and uncoordinated implementation, all of which increase the potential of cost overruns and development-dampening effects. Against this backdrop, the analysis seeks to determine if this infrastructure-led growth is reflected at the subnational level of government. The analysis in this chapter will be guided by the following research questions:

- To what extent does spending at the subnational level support the national priority attached to infrastructure?
- What incentives have the government put in place to encourage better infrastructure planning and management, and what has been the outcome of such interventions?

3.4 RESEARCH METHODOLOGY AND DATA

This study analysed South Africa's macroeconomic policies and public infrastructure investment through a mixed-methods approach. Key legislation included the National Infrastructure Plan of 2012 and the 2014 Infrastructure Development Act. The study also analysed provincial and local government-related budget and spending trends on infrastructure. Four conditional grants were selected: the Health Facilities Revitalisation Grant, the Education Infrastructure Grant, the Public Transport Network Grant and the Integrated Urban Development Grant. These grants include an incentive component, covering both provincial and local government spheres. The analysis spanned the period 2015/16 to 2024/25, with the public transport and urban development-related grants covering 2019/20 to 2024/25. Non-financial performance of the sector related to each grant was assessed using data from the Department of Basic Education, the Office of Health Standards Compliance and the South African Institution of Civil Engineering.

3.5 ANALYSIS

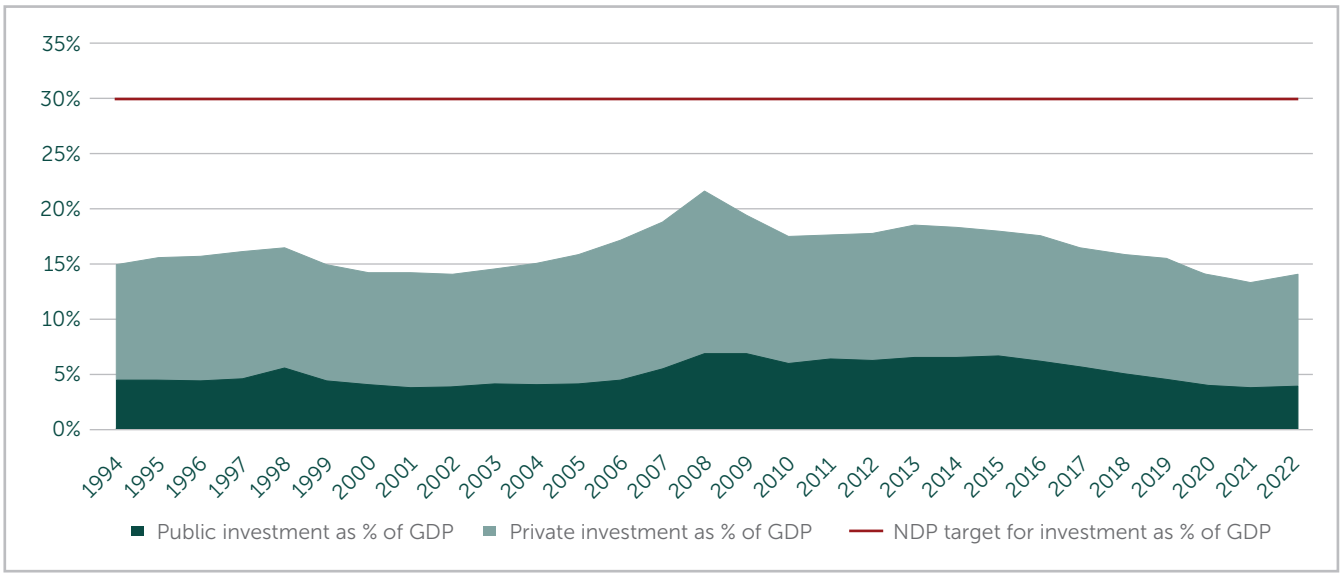
3.5.1 Assessment of budget and spending on public infrastructure investment

To assess the contribution of the subnational government to infrastructure-led growth, this section analyses the public infrastructure budget and spending trends from 2011/12 until 2026/27, which is the end of the 2024 Medium-term Expenditure Framework (MTEF) period.

According to South Africa's long-term development plan (the NDP), the goal in respect of gross fixed capital formation is for investment in infrastructure to reach 30 per cent of GDP. Figure 3.3 illustrates public and private infrastructure investment since 1994.

Apart from 2008 when private investment in infrastructure reached 14.7 per cent of GDP, and public investment was 5.7 per cent of GDP, total infrastructure investment has not breached the 20 per cent mark. Based on Figure 3.3, current performance is unlikely to support attaining the NDP's 30 per cent investment-to-GDP target by 2030.

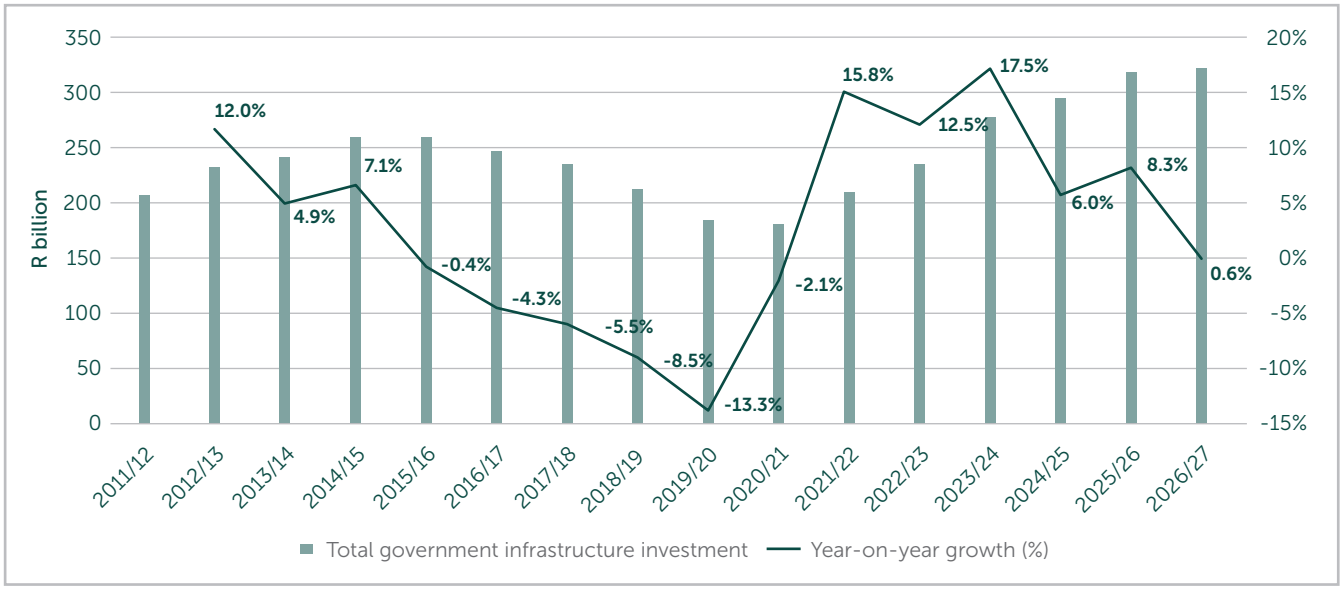
Figure 3.3: Public and private investment as a percentage of GDP, 1994 to 2022



Source: National Treasury, 2024b

Figure 3.4 illustrates the total public infrastructure spending outcomes between 2011/12 and 2022/23, and estimates for the period 2023/24 to 2026/27. Over the period 2011/12–2022/23, spending on total public infrastructure was R2.7 trillion. This is estimated to reach R4 trillion by the end of the 2024 MTEF period (2026/27). Following six years of consecutive reductions in public infrastructure investment between 2015/16 and 2020/21, growth, although slowing down significantly, is projected to stay positive until 2026/27.

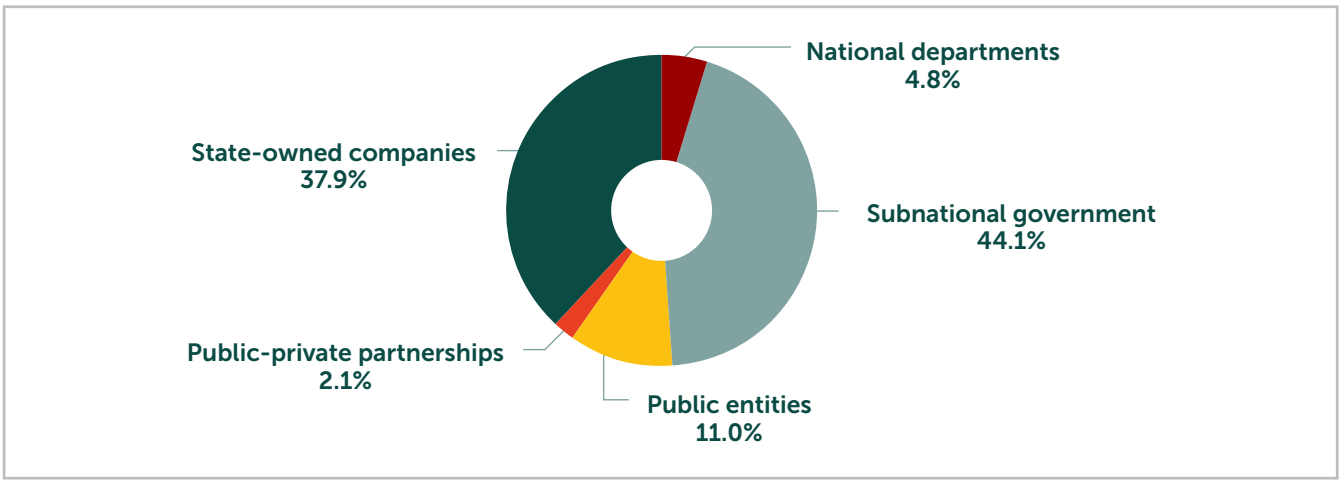
Figure 3.4: Growth in total public infrastructure expenditure, 2011/12–2026/27



Source: National Treasury, 2024b

As highlighted in Figure 3.5, public infrastructure spending can be undertaken by national departments, subnational governments (provinces and municipalities), state-owned companies, public entities and public-private partnerships (PPPs). Taken together, subnational government is responsible for the bulk of public infrastructure spending at 44.1 per cent of the total in 2024/25. This is followed by SOCs at 37.9 per cent. The PPP is the least used avenue for public infrastructure spending, accounting for only 2.1 per cent of the total in 2024/25.

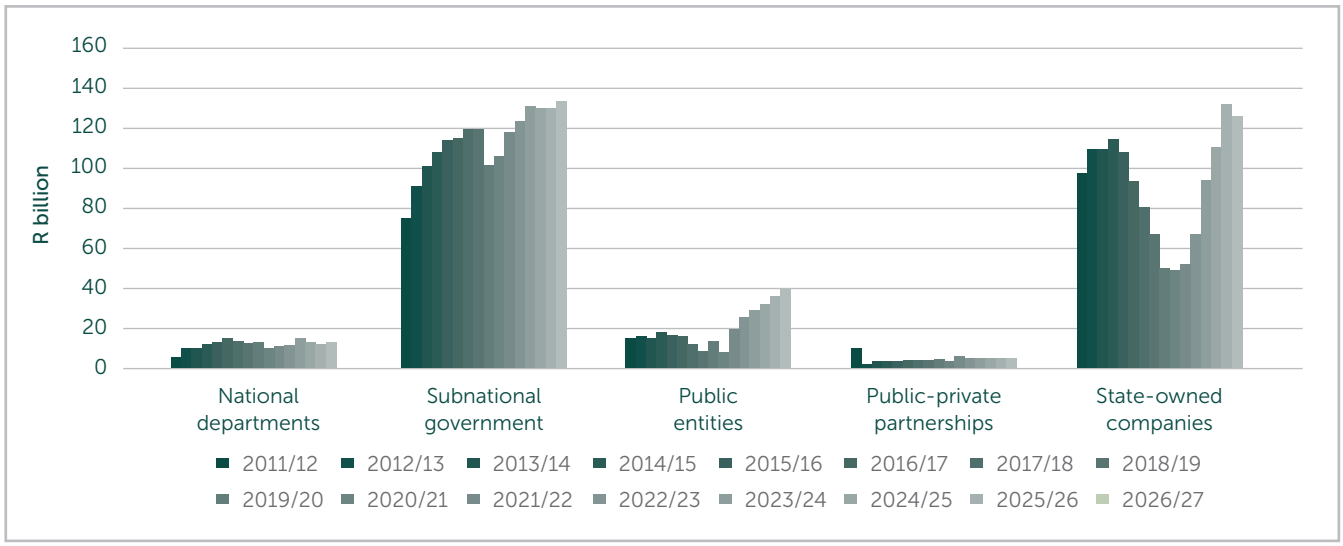
Figure 3.5: Responsibility for public infrastructure spending, 2024/25 (as a percentage)



Source: National Treasury, 2024b

Figure 3.6 reiterates the dominance in public infrastructure spending by subnational governments and SOCs, which are projected to spend an aggregate of R1.8 trillion and R1.5 trillion, respectively, over the period 2011/12–2026/27.

Figure 3.6: Public infrastructure spending by source, 2011/12–2026/27

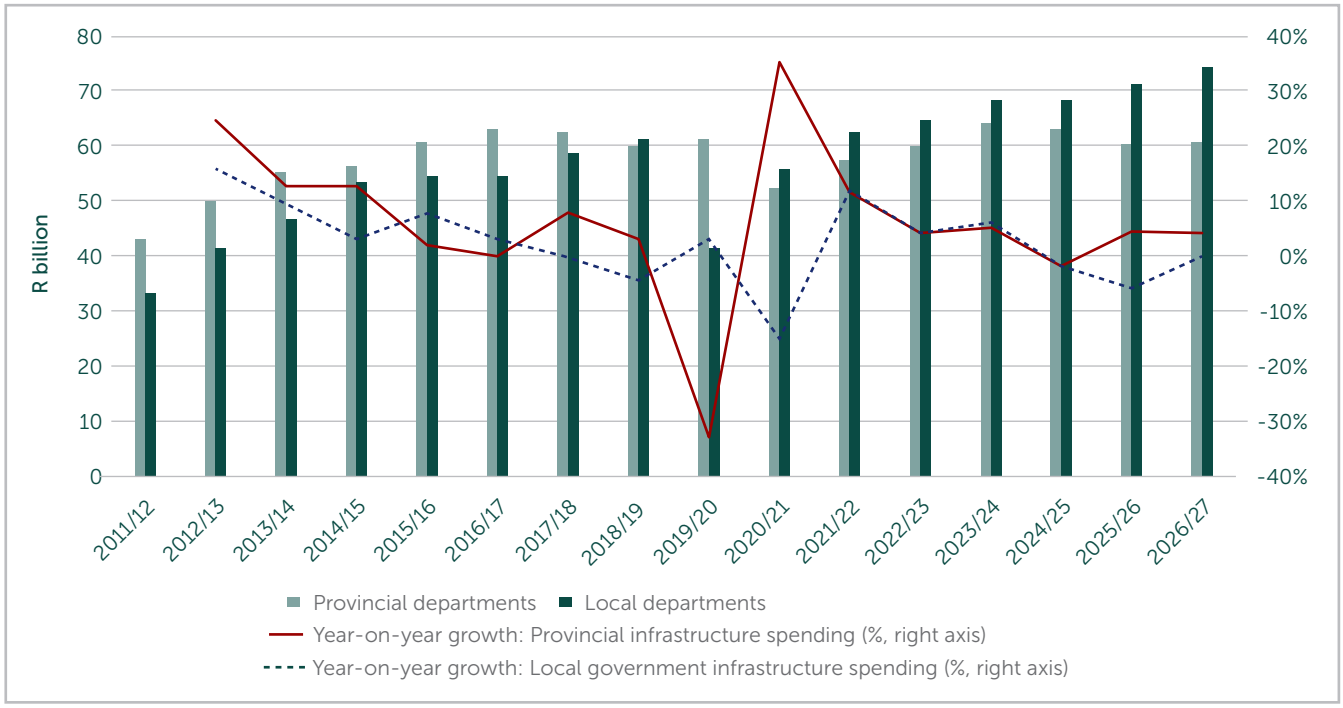


Source: National Treasury, 2024b

Figure 3.7 disaggregates total subnational infrastructure spending to show the contribution of provinces relative to municipalities. It also reflects year-on-year growth for each. While spending by provinces dominated in the period 2011/12–2017/18, there has been a reversal, with spending by municipalities starting to outstrip that of provinces from 2020/21 onwards.

As at 2024/25, public infrastructure spending by provinces is R63.4 billion, while that of municipalities is R67.9 billion. By the end of the 2024 MTEF period (2026/27), infrastructure spending by municipalities is projected to increase, reaching R74.5 billion, while that of provinces is set to decline to R60.4 billion. In terms of growth, between 2011/12 and 2023/24, provincial infrastructure spending illustrated an annual average growth of 3.3 per cent per annum, while local government registered just under double that level of growth, at an annual average of 6.2 per cent per annum. Although declining slightly (by 0.7 per cent) in 2024/25, projections over the two outer years of the 2024 MTEF period show relative protection of infrastructure allocations to the local government sphere.

Figure 3.7: Infrastructure spending and growth by type of subnational government



Source: National Treasury, 2024b

The next three tables assess budgeting for public infrastructure across successive MTEF periods. Table 3.7 illustrates the total public infrastructure allocations over a five-year period, from 2020/21 to 2024/25. The budgeted amounts are always more optimistic (higher) than the amounts allocated in the year thereafter. In total, over the five years, total public infrastructure budgets have been reduced by R77 billion relative to what was anticipated to have been allocated. Notably, the extent of the reductions has become smaller over the years, with the difference for 2024/25 being 1.9 per cent.

Table 3.7: Budgeting across MTEF periods: Total public infrastructure investment

Year	R'billion						Change between MTEF periods	
	2019 MTEF	2020 MTEF	2021 MTEF	2022 MTEF	2023 MTEF	2024 MTEF	R'billion	Percentage
2020/21	284	267					-17	-5.9%
2021/22		276	250				-26	-9.5%
2022/23			266	250			-16	-6.1%
2023/24				275	264		-12	-4.3%
2024/25					303	298	-6	-1.9%

Source: National Treasury, 2024b

Based on Table 3.8, the following comments can be made regarding the sectors in which the reductions in the aggregate public infrastructure budgets have been implemented:

- In 2020/21, the reduction is largely the result of cuts to the transport and logistics, and the water and sanitation sectors.
- For 2021/22, the 26 per cent reduction is due to reductions across the transport and logistics, other social services and energy sectors.
- In 2022/23, there were significant reductions to energy, and transport and logistics.
- In 2023/24 reductions were again seen in transport and logistics, and energy.
- The 2024/25 year is the fifth consecutive year for reductions in the transport and logistics sector.

Table 3.8: Budgeting across MTEF periods: Public infrastructure investment by sector (R'billion)

Year	MTEF	Energy	Water and sanitation	Transport and logistics	Other economic services	Health	Education	Human settlements	Other social services	Administrative services
Allocation for 2020/21	2019 MTEF	53	42	104	14	11	19	19	10	12
	2020 MTEF	52	37	98	12	12	19	17	10	10
	Change	-0.4	-5	-6	-2	1	0	-2	0	-2
Allocation for 2021/22	2020 MTEF	52	40	105	12	12	20	13	10	11
	2021 MTEF	44	36	93	21	12	19	13	2	10
	Change	-8	-4	-13	9	0	-1	0	-8	-1
Allocation for 2022/23	2021 MTEF	50	41	96	21	12	19	14	2	10
	2022 MTEF	35	41	89	22	14	19	14	2	12
	Change	-15	1	-8	1	2	0	0	0	2
Allocation for 2023/24	2022 MTEF	45	44	106	20	13	18	15	2	11
	2023 MTEF	40	41	98	23	14	18	15	3	13
	Change	-5	-3	-9	2	1	0	0	1	1
Allocation for 2024/25	2023 MTEF	51	45	120	21	14	22	15	3	12
	2024 MTEF	58	53	106	20	13	20	14	3	9
	Change	7	8	-14	-1	-1	-2	-1	0	-3

Source: National Treasury, 2024b

Table 3.9 continues with an assessment of budgeting across successive MTEF periods, but considers it from the perspective of how the reductions have been implemented across the different spheres and entities responsible for public infrastructure spending. As reflected in Table 3.9, between 2020/21 and 2023/24, the reductions in budgeted amounts have mainly been in respect of SOCs and local government. As of 2024/25, there is a change in emphasis with budgeted amounts for SOCs and local government being strengthened and reductions effected to national and provincial government.

Table 3.9: Budgeting across MTEF periods: Public infrastructure investment by responsibility (R'billion)

Year	MTEF	National departments	Provincial departments	Local government	Public entities	Public-private partnerships	State-owned companies
Allocation for 2020/21	2019 MTEF	17	60	67	23	5	111
	2020 MTEF	16	60	62	19	6	104
	Change	-1	0	-5	-4	0	-7
Allocation for 2021/22	2020 MTEF	17	57	66	20	6	110
	2021 MTEF	15	59	61	19	6	89
	Change	-2	2	-5	0	0	-21
Allocation for 2022/23	2021 MTEF	15	61	64	21	6	100
	2022 MTEF	18	61	63	27	7	74
	Change	2	0	-1	6	2	-26
Allocation for 2023/24	2022 MTEF	17	61	64	37	7	89
	2023 MTEF	15	69	61	31	7	79
	Change	-2	8	-3	-6	0	-9
Allocation for 2024/25	2023 MTEF	20	69	63	42	7	102
	2024 MTEF	14	63	68	33	6	113
	Change	-6	-6	5	-9	-1	11

Source: National Treasury, 2024b

The preceding analysis reflected on the public infrastructure budget and spending trends that characterise South Africa. In the next section, the analysis hones in on the spending performance of subnational governments to understand whether the amounts allocated were spent in full or whether there are cases of under- or overspending.

3.5.2 Assessment of instruments to incentivise sound infrastructure planning

In the 2013 Division of Revenue, government announced infrastructure reforms, specifically the introduction of a performance-based approach to infrastructure conditional grants. Essentially, an incentive component would be added to infrastructure conditional grants as a lever to encourage better planning. The first phase commenced in 2015 with an incentive component being added to two provincial conditional grants: the Health Facilities Revitalisation Grant and the Education Infrastructure Grant. In 2019/20, a new grant, the Integrated Urban Development Grant, which included an incentive component, was introduced to the local government sphere. In the same year, a performance component was added to an existing conditional grant, the Public Transport Network Grant (PTNG).

This section reviews the rationale and allocations that have been made through these conditional grants. Importantly, using available non-financial data, an assessment is made of the extent to which the four performance-based grants have achieved the goal of encouraging better infrastructure planning and have led to an improvement in grant outputs.

Provinces first received an Infrastructure Grant for Provinces, which provided funding for infrastructure across various provincial sectors, including health, education, roads and agriculture. With the tabling of the 2011 Division of Revenue, the Infrastructure Grant for Provinces was restructured into separate and sector-specific infrastructure grants. This saw the establishment of the Health Infrastructure Grant, the Provincial Roads Maintenance Grant and the Education Infrastructure Grant.

Health Facilities Revitalisation Grant

The mechanics of the incentive component

As alluded to above, in 2011, a specific infrastructure grant, the Health Infrastructure Grant, was introduced in the health sector. According to the 2011 Division of Revenue Bill (DoRB), the purpose of the grant was to "...supplement provincial funding of health infrastructure to accelerate the provision of health facilities and ensure proper maintenance of provincial health infrastructure" (National Treasury, 2011). The 2012 DoRB broadened the purpose of this conditional grant to include addressing backlogs. In 2013, the Health Facilities Revitalisation Grant was introduced. The grant was overseen by the national Department of Health. As at 2024, the Health Facilities Revitalisation Grant was categorised as a Schedule 5A grant, implying that it is a specific-purpose grant

According to Annexure W1 of the 2013 Division of Revenue, the Health Facilities Revitalisation Grant was formed by merging three grants: the Health Infrastructure Grant, the Hospital Revitalisation Grant and the Nursing Colleges and Schools Grant (National Treasury, 2013). This new grant was also one of two grants, along with the Education Infrastructure Grant, that included a performance incentive amount for meeting certain criteria. As detailed in the 2015 Budget Review, a province's eligibility to receive the incentive component available in this grant was based on the outcome of an assessment by the national Department of Health and National Treasury "...of the provinces' infrastructure plans, followed by a moderation process between the national departments, provincial treasuries and provincial departments of health to agree on the final scores" (National Treasury, 2015: 27).

During 2015/16, which was the first year that the incentive component was implemented, provinces had to score a minimum of 60 per cent on their assessment to be eligible to receive the incentive component. Five provinces qualified for it in 2015/16. Table 3.10 provides details on the allocation per province. The Western Cape scored the highest at 76 per cent for its User Asset Management Plan assessment. This was closely followed by the Eastern Cape (71 per cent) and the Northern Cape (70 per cent). At the lower end of the spectrum, the Free State scored 52 per cent. The Free State, along with Mpumalanga, Limpopo and Gauteng, did not qualify for the incentive component in the first year of its activation.

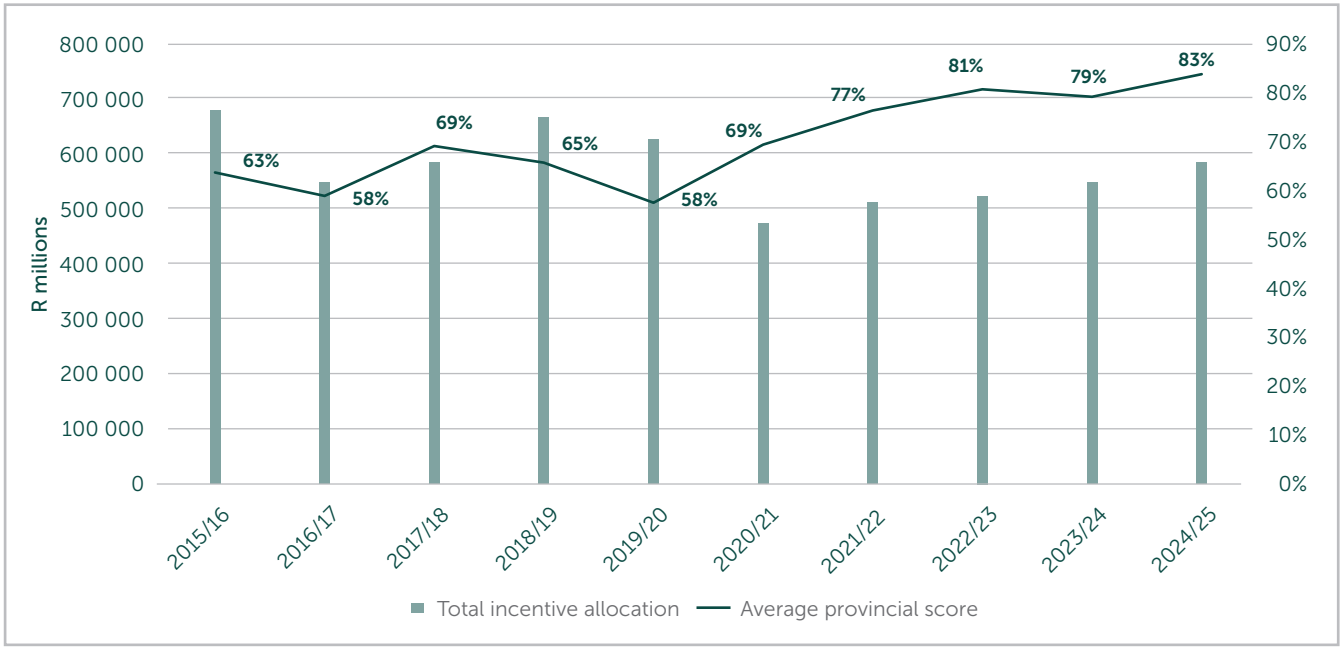
Table 3.10: Health Facilities Revitalisation Grant allocations for 2015/16

Province R'million	User Asset Management Plan assessment	2015/16			Final allocation 2015/16
		Basic component	Incentive component	Disaster recovery funds	
Eastern Cape	71%	451	139	2	592
Free State	52%	565			565
Gauteng	59%	314			314
KwaZulu-Natal	66%	1 100	129		1 229
Limpopo	58%	187		7	194
Mpumalanga	57%	287		1	288
Northern Cape	70%	456	137		593
Northwest	61%	569	120	7	696
Western Cape	76%	655	149		804
Total		**4 584**	**674**	**17**	**5 275**

Source: National Treasury, 2015

There was a change in the second year of implementing the incentive component, in that the incentive amount was standardised for all provinces scoring above the minimum of 60 per cent on their User Asset Management Plan assessments. Figure 3.8 illustrates the aggregate provincial incentive allocation alongside the average provincial score for the ten years from 2015/16 to 2024/25. There is no discernible correlation between the incentive allocation and average provincial scores. Where scores decline, allocations have increased (see 2018/19) and where scores have improved, allocations have declined (see 2020/21).

Figure 3.8: Incentive component of Health Facilities Revitalisation Grant relative to average provincial score – 2015/16 to 2024/2525



Source: National Treasury, 2015–2024a

Tables 3.11 and 3.12 both reflect on the incentive component of the Health Facilities Revitalisation Grant, honing in specifically on the score and allocation by province over the same ten-year period as Figure 3.8. As is evident, with the implementation of the standard incentive amount in 2016/17, a province like the Western Cape, which scored 84 per cent, received the same allocation as the Northern Cape, which, with a score of 61 per cent, narrowly escaped not receiving the incentive amount.

Table 3.11: Health Facilities Revitalisation Grant: Incentive score and allocation by province, 2015/16 to 2019/20

Province	2015/16		2016/17		2017/18		2018/19		2019/20	
	Score	Incentive amount (R'000)	Score	Incentive amount (R'000)	Score	Incentive amount (R'000)	Score	Incentive amount (R'000)	Score	Incentive amount (R'000)
Eastern Cape	71%	139 000	64%	109 454	77%	77 818	73%	95 139	70%	208 076
Free State	52%		52%		66%	77 818	60%	95 139	55%	
Gauteng	59%		63%	109 454	69%	77 818	65%	95 139	56%	
KwaZulu-Natal	66%	129 000	67%	109 454	73%	77 818	69%	95 139	63%	208 076
Limpopo	58%		43%		66%	77 818	61%	95 139	50%	
Mpumalanga	57%		31%		55%		56%		50%	
Northern Cape	70%	137 000	61%	109 454	64%	77 818	53%		49%	
North West	61%	120 000	56%		72%	77 818	61%	95 139	53%	
Western Cape	76%	149 000	84%	109 454	78%	36 315	88%	95 139	74%	208 076
Total	**63%**	**674 000**	**58%**	**547 270**	**69%**	**581 041**	**65%**	**665 973**	**58%**	**624 228**

Source: National Treasury, 2015–2019

Table 3.12 shows a similar trend, where provinces with divergent scores receive the same incentive. In addition, relative to the period 2015/16–2019/20, as reflected in Table 3.11, there has been a marked improvement in the scores, and therefore, in the number of provinces that qualify for the incentive component. The provinces with the highest average assessment scores over the ten years since the inception of the incentive component are the Western Cape (87 per cent), KwaZulu-Natal (79 per cent) and the Eastern Cape (76 per cent).

Table 3.12: Health Facilities Revitalisation Grant: Incentive score and allocation by province, 2020/21 to 2024/25

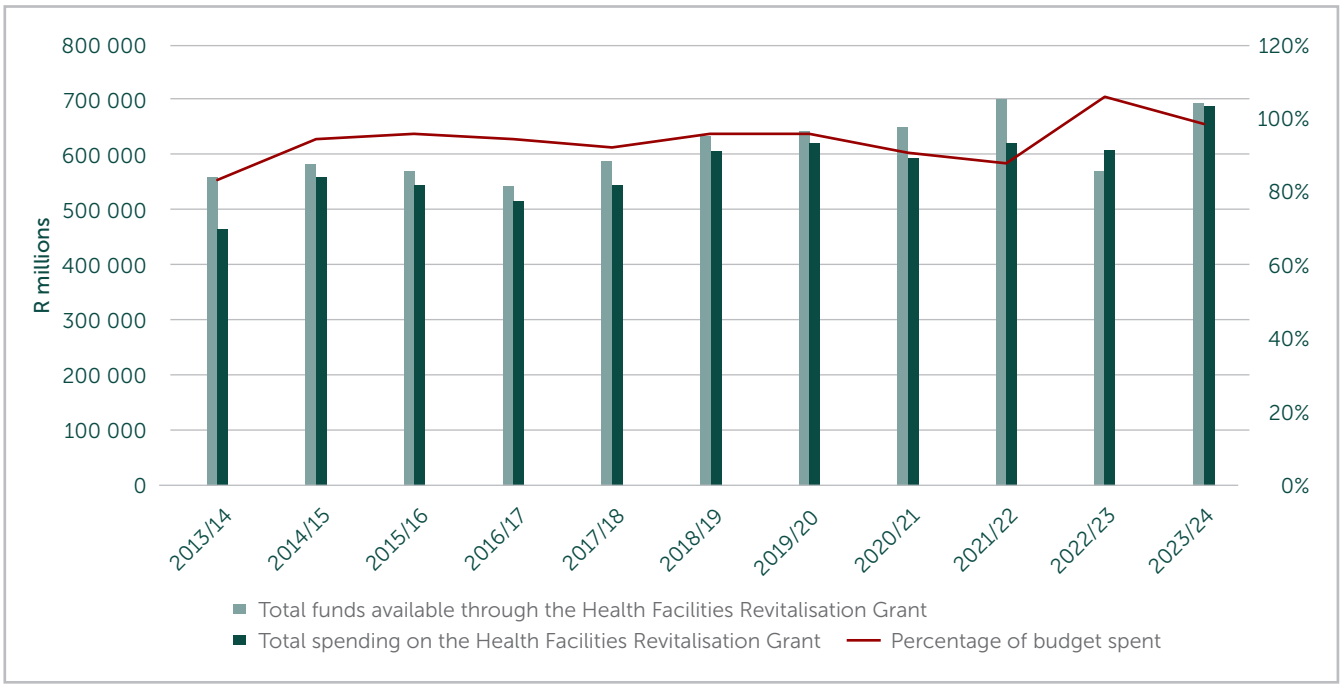
Province	2020/21		2021/22		2022/23		2023/24		2024/25	
	Score	Incentive amount (R'000)	Score	Incentive amount (R'000)	Score	Incentive amount (R'000)	Score	Incentive amount (R'000)	Score	Incentive amount (R'000)
Eastern Cape	73%	58 760	79%	63 366	83%	65 465	83%	78 195	87%	72 952
Free State	62%	58 760	77%	63 366	82%	65 465	80%	78 195	81%	72 952
Gauteng	70%	58 760	75%	63 366	78%	65 465	79%	78 195	80%	72 952
KwaZulu-Natal	80%	58 760	83%	63 366	92%	65 465	94%	78 195	99%	72 952
Limpopo	60%	58 760	75%	63 366	75%	65 465	71%		76%	72 952
Mpumalanga	69%	58 760	76%	63 366	87%	65 465	82%	78 195	83%	72 952
Northern Cape	50%		50%		50%		51%		72%	
North West	73%	58 760	79%	63 366	82%	65 465	79%	78 195	78%	72 952
Western Cape	86%	58 760	98%	63 366	98%	65 465	94%	78 195	94%	72 952
Total	**69%**	**470 080**	**77%**	**506 928**	**81%**	**523 720**	**79%**	**547 365**	**83%**	**583 616**

Source: National Treasury 2020–2024a

A snapshot of financial and non-financial performance

Since the inception of the Health Facilities Revitalisation Grant, R67.4 billion has been made available. The spending performance related to this conditional grant has improved significantly since inception, averaging 95 per cent between 2013/14 and 2023/24 (see Figure 3.9).

Figure 3.9: Health Facilities Revitalisation Grant spending performance, 2013/14 to 2023/24



Source: National Treasury 2013–2023

Given Figure 3.9, which shows that the nine provinces have generally been able to spend the funding allocated via the Health Facilities Revitalisation Grant, the expectation is that the outputs related to this conditional grant would be similarly positive. The purpose, outcome statements and outputs specified for each conditional grant in the annual DoRB provide the parameters of what to expect in relation to each conditional grant in the system. Table 3.13 provides an excerpt of the purpose, outcomes and outputs associated with the Health Facilities Revitalisation Grant. It should be kept in mind that outputs relate to short-term results, while outcomes refer to the impact that should be visible over the long term due to the achievement of said outputs.

Table 3.13: Health Facilities Revitalisation Grant: Purpose and anticipated outcomes and outputs

Parameter	Goal
Grant purpose	(a) To help accelerate the maintenance, renovations, upgrades, additions and construction of infrastructure in health (b) To help with the replacement and commissioning of health technology in existing and revitalised health facilities (c) To enhance capacity to deliver health infrastructure (d) To accelerate the fulfilment of the requirements of occupational health and safety
Outcome statements	(a) Improved service delivery by provincial departments as a result of an enhanced and better quality of health services (b) Improved quality and quantity of well-maintained health infrastructure (backlog and preventative maintenance) (c) Improved rates of employment and skills development in the delivery of infrastructure (d) Value for money and cost-effective design of facilities in line with the framework for infrastructure procurement and delivery management
Outputs	(a) Number of primary health care facilities constructed or revitalised (b) Number of hospitals constructed or revitalised (c) Number of facilities maintained or refurbished

Source: Republic of South Africa, 2024

Over the past 11 years, the Health Facilities Revitalisation Grant has been operational, with the inclusion of an incentive component to further motivate improved infrastructure planning. It is thus reasonable to expect that, due to the ongoing construction, revitalisation, refurbishment and maintenance of primary health care facilities and hospitals that have been funded via the Health Facilities Revitalisation Grant, there would be some evidence of outcomes such as, for example, improved service delivery and the improved quality and quantity of well-maintained health infrastructure. However, consider the results of the SAICE infrastructure rating. Table 3.14 shows the rating specifically for the health sector. Clinic-related infrastructure has been at risk since 2006, while hospital infrastructure deteriorated from satisfactory to at-risk in 2011.

Table 3.14: SAICE rating of health infrastructure

Sector: Health care	2022	2017	2011	2006
Hospitals	D+	D+	D+	C
Clinics	D	D	D	D+

**A = World-class; B = Fit for the future; C = Satisfactory for now; D = At risk; E = Unfit for purpose*

Sources: South African Institution of Civil Engineering, 2022; 2017; 2011; 2006

South Africa's health regulatory body, the Office of Health Standards Compliance (OHSC), conducts inspections at different health facilities, including clinics, community health centres and various types of hospitals, to ensure that safe and quality health care services are provided and that they are aligned with the sector norms and standards. Table 3.15 shows the high-level results of the OHSC's inspections carried out between 2019/20 and 2021/22. Regarding clinics, while the compliance rate has increased, a non-compliance rate of 65 per cent is cause for significant concern. Table 3.15 raises similar concerns in respect of community health centres, and district and regional hospitals.

Table 3.15: Compliance rate by type of health facility, 2019/20 to 2021/22

Type of health facility	2019/20			2020/21			2021/22		
	Inspected	Compliant	Compliance rate (%)	Inspected	Compliant	Compliance rate (%)	Inspected	Compliant	Compliance rate (%)
Clinics	647	95	14.7%	387	80	20.7%	473	165	34.9%
Community health centres							40	10	25.0%
District hospitals							19	0	0.0%
Regional hospitals							12	3	25.0%
Total	**647**	**95**	**14.7%**	**387**	**80**	**20.7%**	**544**	**178**	**32.7%**

Source: Office of Health Standards Compliance, 2022

Honing in on infrastructure, specifically maintenance, Table 3.16 shows the performance of the nine provinces in relation to essential and vital risk measures. The OHSC defines essential risk measures as measures that are fundamental to the provision of safe, quality care, while vital risk measures are measures that are critical to ensure the safety of staff and users (Office of Health Standards Compliance, 2022). Across all provinces, performance requires significant strengthening to ensure the provision of health care that is both safe and of a high quality.

Table 3.16: Maintenance support: Overview of overall risk rating performance by province, 2021/22

Province	Clinics		Community health centres	
	Essential risk-rated measure	Vital risk-rated measure	Essential risk-rated measure	Vital risk-rated measure
Eastern Cape	38%	51%	86%	60%
Free State	52%	51%	60%	33%
Gauteng	60%	63%	100%	74%
KwaZulu-Natal	62%	66%	96%	88%
Limpopo	34%	50%	65%	55%
Mpumalanga	45%	53%	67%	58%
Northern Cape	50%	48%	83%	63%
North West	36%	58%	100%	66%
Western Cape	77%	66%	100%	60%

Source: Office of Health Standards Compliance 2022

Education Infrastructure Grant

The mechanics of the incentive component

The introduction of the Education Infrastructure Grant was announced in the 2011 Division of Revenue. The Department of Basic Education is the responsible national sector department overseeing the implementation of the EIG. According to the 2024 DoRB, the purpose of the EIG is to "...help accelerate construction, maintenance, upgrading and rehabilitation of new and existing infrastructure in education, to address the achievement of the targets set out in the minimum norms and standards for school

infrastructure, to address damages to infrastructure and to enhance capacity to deliver infrastructure in education" (Republic of South Africa, 2024: 139) . The EIG is listed as a Schedule 4A grant, meaning that it is aimed at supplementing programmes partly funded by provinces.

Similar to the Health Facilities Revitalisation Grant, grant reforms announced in the 2013 Division of Revenue, and that were aimed at stimulating better infrastructure planning, were officially introduced in 2015/16 with the addition of an incentive component to the EIG. To be eligible to receive the incentive component, provincial education departments had to undergo a two-year planning process and have their infrastructure plans approved and subjected to an assessment by the national Department of Basic Education and National Treasury. The final assessment scores are decided through a moderation process involving again the national Department of Basic Education, National Treasury, the provincial treasuries and the provincial departments of Basic Education. To be eligible for the incentive, a final assessment score of 60 per cent is required. Table 3.17 provides a disaggregation of the EIG allocation in terms of the basic component and incentive components. This is looked at alongside the assessment score per province. As is evident in 2015/16, the higher the assessment score, the larger the incentive component amounts.

Table 3.17: Education Infrastructure Grant allocations for 2015/16

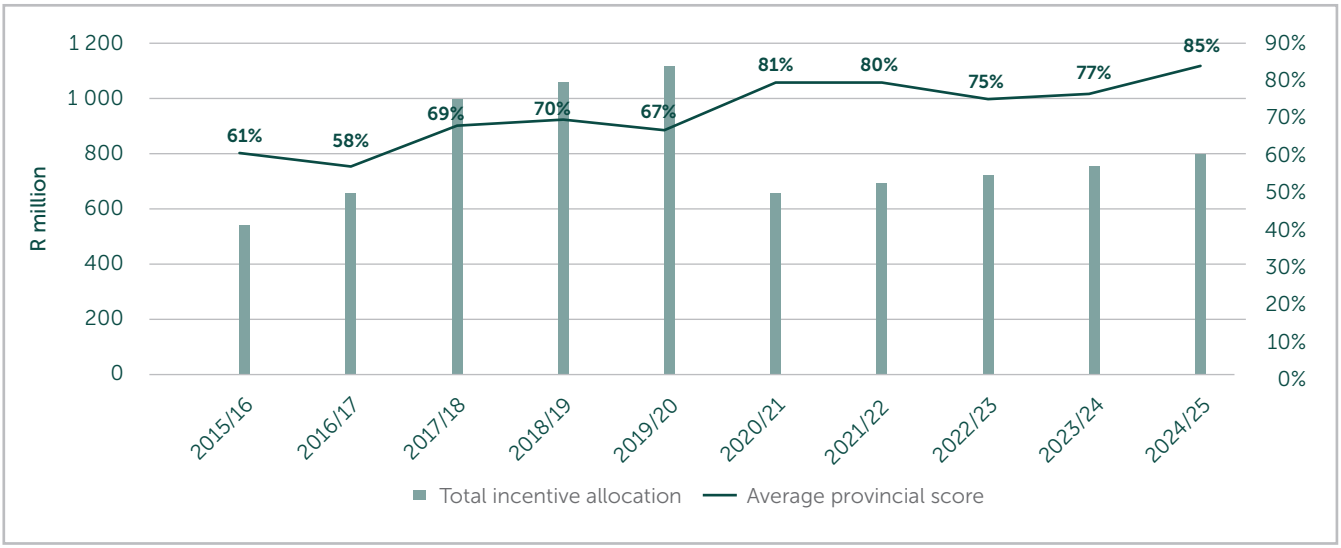
Province R'million	User Asset Management Plan assessment	2015/16			Final allocation 2015/16
		Basic component	Incentive component	Disaster recovery funds	
Eastern Cape	71%	1 560	94	50	1 704
Free State	42%	763			763
Gauteng	63%	852	84		936
KwaZulu-Natal	64%	1 870	85	24	1 979
Limpopo	43%	736		69	805
Mpumalanga	48%	848		10	858
Northern Cape	66%	359	88		447
North West	69%	852	92	51	995
Western Cape	81%	920	108	5	1 033
Total		**8 760**	**551**	**209**	**9 520**

Source: National Treasury, 2015

Similar to the Health Facilities Revitalisation Grant, in 2016/17, the second year of the newly introduced incentive component, a change was implemented to the approach of allocating the incentive. The gist of the change was to standardise the incentive allocation so that all provinces that achieved the minimum assessment score of 60 per cent received the same incentive allocation.

Figure 3.10 illustrates the total incentive allocation through the EIG relative to the average provincial scores for the period 2015/16–2024/25. As with the health-related conditional grant, the delinking of the incentive amount to performance gives rise to questions about the logic underpinning the incentive approach. For example, in 2016/17, when the average assessment score declined from 61 per cent to 58 per cent, the total incentive allocation increased from R551 million to R667 million. A similar trend is observed between 2018/19 and 2019/20.

Figure 3.10: Incentive component of the Education Infrastructure Grant relative to the average provincial score – 2015/16 to 2024/2025



Source: National Treasury, 2015–2024a

Tables 3.18 and 3.19 provide a provincial disaggregation of the assessment scores relative to the incentive component amounts allocated. Both tables cover a 10-year period, from 2015/16 to 2024/25. Similar to the health example, an assessment of the EIG incentive component shows that, once the incentive component is standardised, the province that scores the highest on the assessment receives the same allocation as one that has just qualified for the incentive. The illogical nature of the allocations is also evident in examples where, irrespective of a declining assessment score, a province receives a higher incentive allocation. See, for example, the Western Cape, which scored 81 per cent in 2015/16 and received R108 million, relative to receiving a larger R133 million for an assessment score of 78 per cent in 2016/17. Similar examples exist for the Eastern Cape and KwaZulu-Natal between 2018/19 and 2019/20, where scores were lower, but allocations increased.

Table 3.18: Education Infrastructure Grant incentive score and allocation by province, 2015/16 to 2019/20

Province	2015/16		2016/17		2017/18		2018/19		2019/20	
	Score	Incentive amount (R'000)	Score	Incentive amount (R'000)	Score	Incentive amount (R'000)	Score	Incentive amount (R'000)	Score	Incentive amount (R'000)
Eastern Cape	71%	94 000	62%	0	81%	168 334	78%	133 573	73%	188 071
Free State	42%	0	54%	0	53%	0	64%	133 573	65%	188 071
Gauteng	63%	84 000	64%	133 309	71%	168 334	75%	133 573	70%	188 071
KwaZulu-Natal	64%	85 000	64%	133 309	76%	168 334	80%	133 573	72%	188 071
Limpopo	43%	0	46%	0	56%	0	46%	0	58%	0
Mpumalanga	48%	0	27%	0	58%	0	61%	133 573	58%	0
Northern Cape	66%	88 000	69%	133 309	76%	168 334	79%	133 573	72%	188 071
North West	69%	92 000	60%	133 309	61%	168 334	60%	133 573	53%	0
Western Cape	81%	108 000	78%	133 309	89%	168 334	88%	133 573	83%	188 071
Total	**61%**	**551 000**	**58%**	**666 545**	**69%**	**1 010 004**	**70%**	**1 068 584**	**67%**	**1 128 426**

Source: National Treasury, 2015–2019

As at 2024/25, all nine provinces were eligible for and received the EIG incentive allocation. Over the 10 years from 2015/16 to 2024/25, the provinces with the highest average assessment scores were the Western Cape (88 per cent), followed by KwaZulu-Natal (79 per cent) and the Eastern and Northern Cape (with 76 per cent each).

Table 3.19: Education Infrastructure Grant incentive score and allocation by province, 2020/21 to 2024/25

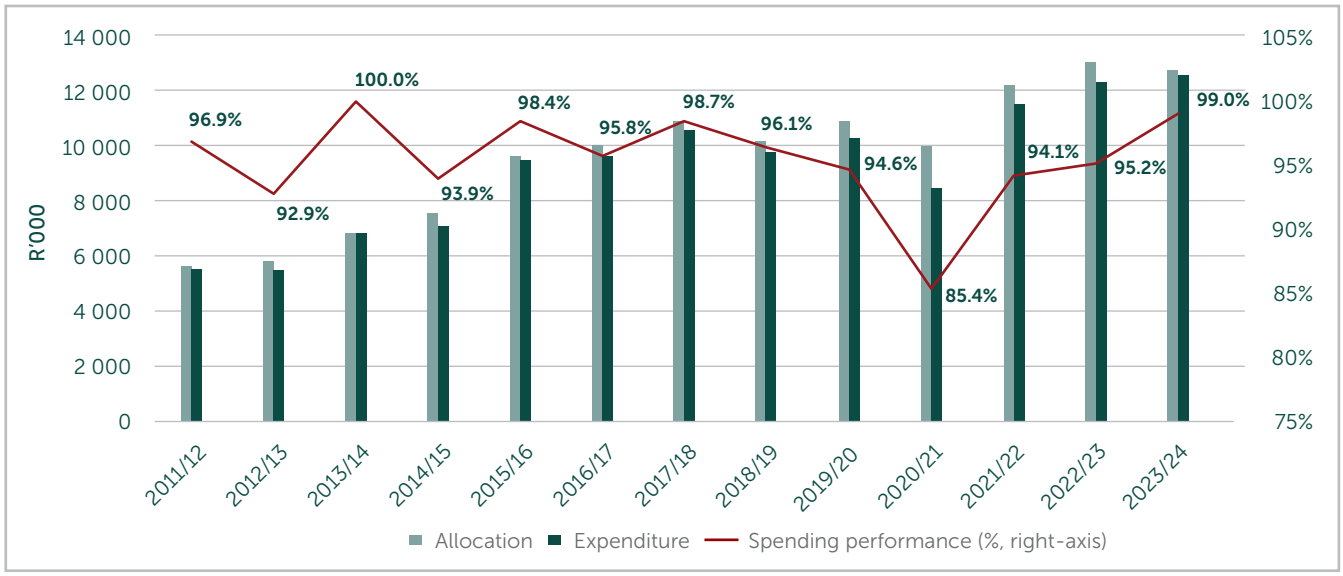
Province	2020/21		2021/22		2022/23		2023/24		2024/25	
	Score	Incentive amount (R'000)	Score	Incentive amount (R'000)	Score	Incentive amount (R'000)	Score	Incentive amount (R'000)	Score	Incentive amount (R'000)
Eastern Cape	77%	73 386	75%	78 100	81%	105 043	81%	109 673	81%	89 074
Free State	70%	73 386	79%	78 100	78%	105 043	78%	109 673	87%	89 074
Gauteng	90%	73 386	77%	78 100	79%	105 043	80%	109 673	82%	89 074
KwaZulu-Natal	93%	73 386	82%	78 100	83%	105 043	80%	109 671	98%	89 074
Limpopo	75%	73 386	75%	78 100	60%	0	61%	0	79%	89 074
Mpumalanga	84%	73 386	75%	78 100	61%	0	69%	0	83%	89 074
Northern Cape	80%	73 386	78%	78 100	75%	105 043	81%	109 673	86%	89 074
North West	65%	73 386	85%	78 100	85%	105 043	75%	109 673	79%	89 074
Western Cape	91%	73 386	91%	78 100	97%	105 043	91%	109 673	93%	89 074
Total	**81%**	**660 474**	**80%**	**702 900**	**75%**	**735 301**	**77%**	**767 709**	**85%**	**801 666**

Source: National Treasury, 2020–2024a

A snapshot of financial and non-financial performance

Between 2011/12 and 2023/24, R125.5 billion has been made available through the EIG. Of that amount, R119.8 billion has been spent (see Figure 3.11). While the EIG should supplement provincial funding for education infrastructure, provinces tend to rely more heavily on grant funding than on funding from other sources, such as the provincial equitable share. For example, in 2023/24, funding from the EIG comprised, on average across the nine provinces, 87 per cent of total education infrastructure spending by provincial education departments.

Figure 3.11: Education Infrastructure Grant spending performance, 2011/12 to 2023/24



Source: National Treasury, 2011–2023

While outcomes are long term in nature relative to outputs, given that the EIG has been in existence since 2011/12, aspects of the grant outcome statement (as outlined in Table 3.20) should be evident. While Figure 3.11 illustrates the spending performance of the EIG, which, at an average of 95.4 per cent, can be characterised as healthy, performance and evidence in terms of improved quality of education remain elusive. An example of this is evident in South Africa's high level of Grade 4 learners (81 per cent), who are unable to read for meaning.

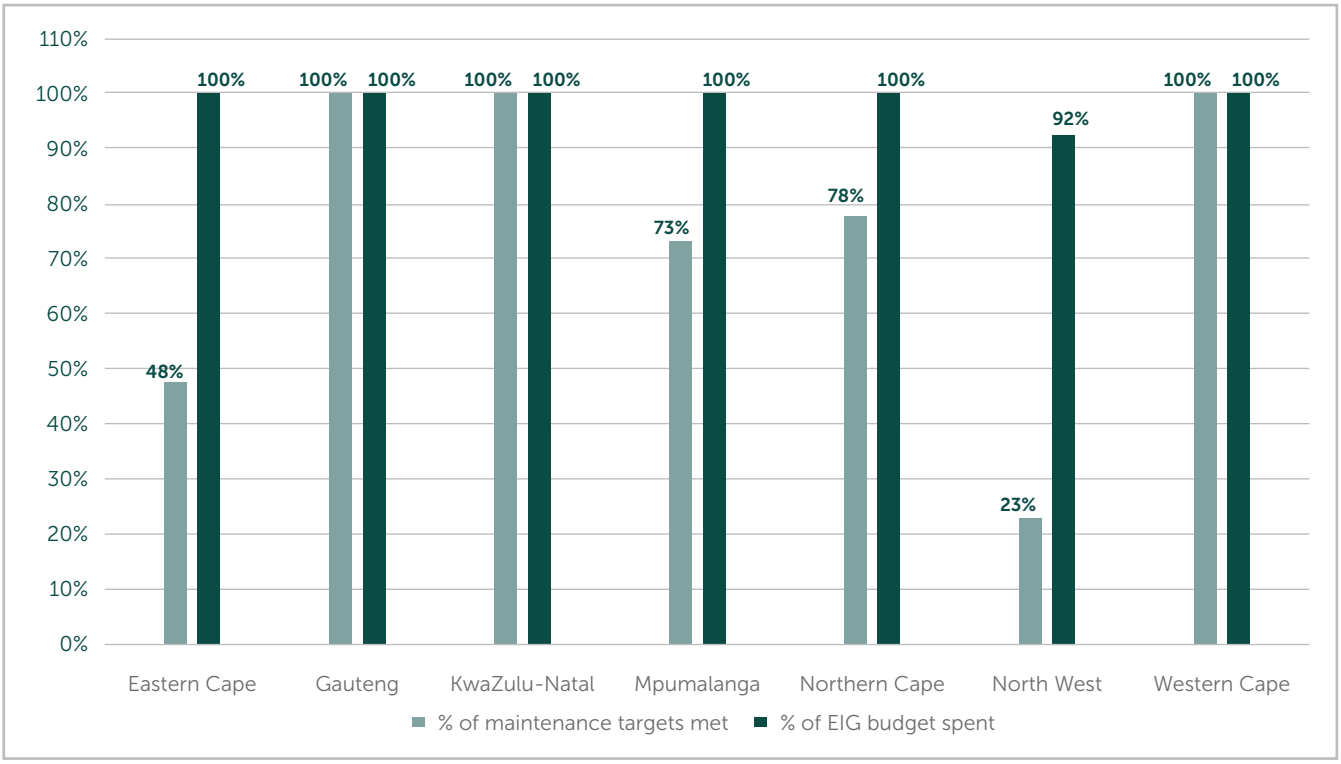
Table 3.20: The Education Infrastructure Grant: Purpose and anticipated outcomes and outputs

Parameter	Goal
Grant purpose	(a) To help accelerate construction, maintenance, upgrading and rehabilitation of new and existing infrastructure in education, including district and circuit accommodation (b) To address achievement of the targets set out in the minimum norms and standards for school infrastructure (c) To address damages to infrastructure (d) To enhance capacity to deliver infrastructure in education
Outcome statements	(a) Improved quality of education service delivery by provincial departments as a result of an improved and increased stock of school infrastructure (b) An aligned and a coordinated approach to infrastructure development at the provincial sphere (c) Improved education infrastructure expenditure patterns (d) Improved response to the rehabilitation of school infrastructure (e) Improved rates of employment and skills development in the delivery of infrastructure (f) Improved safety in school facilities through occupational health and safety
Outputs	(a) Number of new schools, additional education spaces, education support spaces and administration facilities constructed, as well as equipment and furniture provided (b) Number of existing schools' infrastructure upgraded and rehabilitated, including schools constructed of asbestos material and other inappropriate material (c) Number of new and existing schools maintained (d) Number of disaster-damaged schools rehabilitated (e) Number of schools provided with water, sanitation and electricity (f) Number of work opportunities created (g) Number of new special schools provided, and existing special and full-service schools upgraded and maintained

Source: Republic of South Africa, 2024

The Financial and Fiscal Commission (FFC)'s analysis of the EIG for the Parliamentary Commission on Basic Education shows that, with respect to the EIG's achievement of its maintenance targets relative to the funds spent, in certain provinces, for example, the Eastern Cape, North West and Mpumalanga, the target achievement has been out of synchronisation with the level of funds spent. For example, the Eastern Cape spent 100 per cent of its EIG allocation, but only achieved 48 per cent of its maintenance targets (see Figure 3.12).

Figure 3.12: Achievement of the maintenance performance targets relative to the spending of the allocated Education Infrastructure Grant funds, 2022/23



Sources: National Treasury, 2022; Department of Basic Education, 2023

Notwithstanding the high spending performance associated with the EIG and the generally high level of maintenance targets met, education infrastructure remains in a questionable state. According to the SAICE's rating of the education sector, public ordinary school infrastructure has been categorised as being at risk since 2011 (see Table 3.21)

Table 3.21: SAICE rating of basic education infrastructure

Sector: Education	2022	2017	2011
Public ordinary schools	D+	D+	D+

A = World class; B = Fit for the future; C = Satisfactory for now; D = At risk; E = Unfit for purpose

Sources: South African Institution of Civil Engineering, 2022; 2017; 2011

According to the Department of Basic Education's infrastructure data, there are significant gaps in access to important types of infrastructure, as required in terms of the sector's Minimum Uniform Norms and Standards for School Infrastructure. These include schools having computer centres, laboratory facilities, libraries and sports facilities (see Table 3.22).

Table 3.22: Percentage of schools without access to key education infrastructure

Province	Schools without access to computer centres			Schools without access to laboratories			Schools without access to libraries			Schools without access to sports facilities		
	2021	2023	2024	2021	2023	2024	2021	2023	2024	2021	2023	2024
Eastern Cape	88.8%	88.6%	88.4%	93.0%	92.7%	92.6%	93.3%	93.0%	92.7%	64.5%	62.8%	60.7%
Free State	60.2%	30.2%	29.0%	69.7%	29.2%	28.2%	60.5%	32.3%	31.2%	29.6%	27.2%	27.0%
Gauteng	19.9%	18.3%	18.1%	66.5%	55.2%	55.0%	36.7%	32.1%	31.9%	22.5%	24.5%	24.5%
KwaZulu-Natal	66.6%	65.0%	65.1%	88.5%	86.6%	86.5%	75.7%	74.0%	73.9%	54.3%	54.0%	54.3%
Limpopo	85.0%	83.1%	82.9%	93.9%	93.8%	93.7%	93.3%	91.4%	91.3%	32.5%	33.3%	32.6%
Mpumalanga	61.8%	66.7%	66.2%	87.5%	87.0%	86.7%	80.4%	79.4%	79.1%	30.4%	35.1%	35.2%
North West	54.7%	62.0%	61.7%	79.7%	87.4%	87.2%	75.5%	75.0%	74.8%	25.7%	20.0%	20.6%
Northern Cape	47.1%	81.7%	81.6%	76.3%	89.7%	89.7%	65.8%	80.4%	80.3%	31.3%	34.1%	35.4%
Western Cape	39.5%	39.4%	38.9%	65.3%	65.2%	64.5%	45.1%	44.9%	44.4%	25.3%	26.7%	27.0%
Total	**67.0%**	**66.2%**	**65.9%**	**85.2%**	**82.6%**	**82.4%**	**76.6%**	**74.2%**	**74.0%**	**43.1%**	**43.0%**	**42.6%**

Sources: Department of Basic Education, 2024; 2023; 2021

While the Education Infrastructure and Health Facilities Revitalisation grants represent the two oldest incentive grants in South Africa's Intergovernmental Fiscal Review (IGFR) system, the next two conditional grants are local government-specific. The incentive components were included more recently, in 2019/20.

Public Transport Network Grant

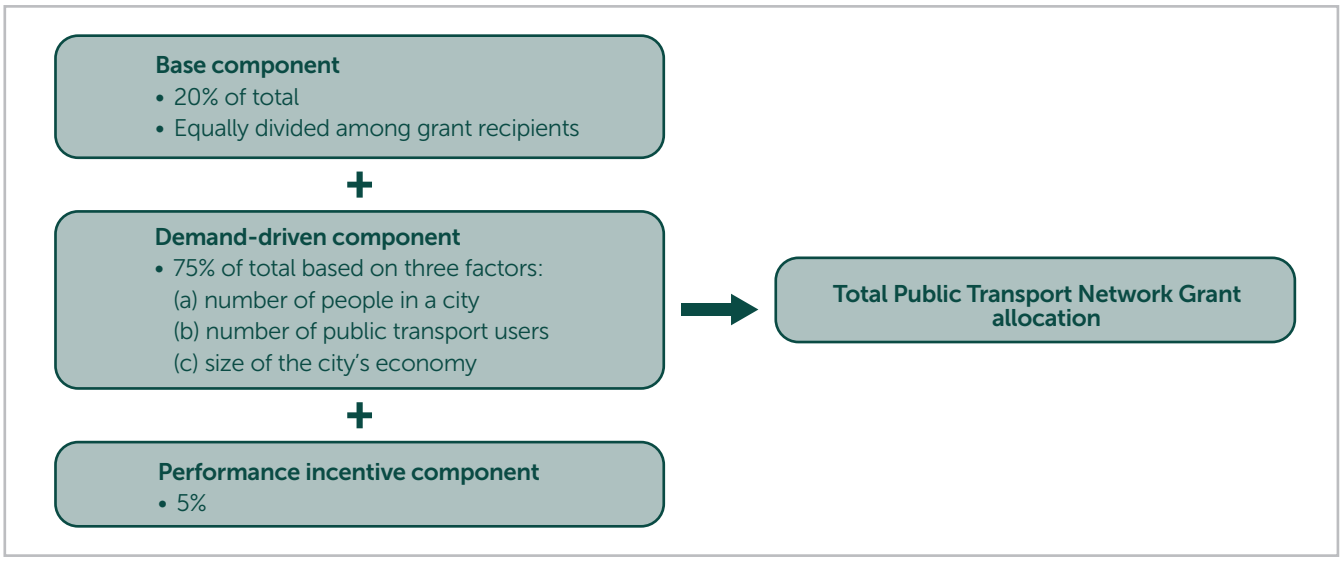
The mechanics of the incentive component

The Public Transport Network Grant was first introduced by the Department of Transport in 2015/16. The grant is the result of merging two separate grants, the Public Transport Network Operations Grant and the Public Transport Infrastructure Grant, which had been in the system since the 2006 MTEF period. The merged grant provides funding for network infrastructure, as well as subsidies for operational expenditure. The grant's focus includes "...bus rapid transit systems, conventional bus services and upgrades for pedestrian and cycling infrastructure" (National Treasury, 2015: 44). According to Annexure W1 of the 2015 Budget Review, the PTNG is aimed at helping "...cities create or improve public transport systems..." (National Treasury, 2015). Furthermore, that "consolidation is the first step towards changing the implicit incentives in the grant structure, so that cities are encouraged to plan for systems that will meet their public transport needs, while still being financially sustainable over the long term" (National Treasury, 2015). The 2024 DoRB categorises the PTNG as a Schedule 5B grant, which is geared at funding specific municipal programmes and responsibilities (Republic of South Africa, 2024).

Whereas allocations to this grant have been formula-based since the introduction of the merged grant, the 2018 DoRB introduced the iteration of the formula that is still in use today.

As illustrated in Figure 3.13, the formula comprises three components: a base component, a demand-driven component and an incentive component that was activated in 2019/20 (National Treasury, 2018; 2019).

Figure 3.13: Components informing the Public Transport Network Grant formula



Source: National Treasury, 2024a

Table 3.23 outlines the criteria that must be met to receive the incentive allocation. The information relates to the 2019/20 financial year (the first year in which the incentive component was active). Access to the incentive component is based on a two-phase process.

- To be considered for the incentive component, municipalities must meet two criteria. Firstly, they must have an operational and national Department of Transport-approved public transport system in place. Secondly, a municipality must exceed an 80 per cent grant expenditure threshold. If these two criteria are met, the municipality is eligible to receive the incentive.
- Once a municipality is deemed eligible to receive the incentive component, the second leg of the process is to determine the size of the incentive. The incentive allocation is "...calculated based on the coverage of costs from fares, passenger trips and the city's own financial commitment to the system. Cities must exceed the minimum threshold in at least one of these three indicators" (National Treasury, 2019: 44).

Table 3.23: Formula underpinning the incentive allocation in the Public Transport Network Grant, 2019/20

Municipality	Operational public transport system	Grant spent in 2017/18	Eligible for incentive	Coverage of direct costs from farebox	Average weekday passenger trips (percentage of population)	City's contribution (percentage of property rates)	Raw scores for incentive	Incentive allocation for 2019/20 (R'000)
Minimum threshold	Yes	80%		35%	1.0%	2.0%		
Buffalo City	No	26%	No	0.00%	0.00%	0.00%		
Cape Town	Yes	100%	Yes	41.10%	1.48%	5.20%	0.287	160 487
City of Johannesburg	Yes	98%	Yes	38.50%	0.95%	3.40%	0.13	99 394
City of Tshwane	Yes	93%	Yes	21.50%	0.24%	1.30%		
Ekurhuleni	Yes	66%	No	16.80%	0.13%	2.70%		
eThekwini	No	67%	No	0.00%	0.00%	0.00%		

Municipality	Operational public transport system	Grant spent in 2017/18	Eligible for incentive	Coverage of direct costs from farebox	Average weekday passenger trips (percentage of population)	City's contribution (percentage of property rates)	Raw scores for incentive	Incentive allocation for 2019/20 (R'000)
George	Yes	100%	Yes	41.80%	5.61%	4.80%	0.555	45 831
Mangaung	No	63%	No	0.00%	0.00%	0.00%		
Mbombela	No	70%	No	0.00%	0.00%	0.00%		
Msunduzi	No	83%	No	0.00%	0.00%	0.00%		
Nelson Mandela Bay	Yes	90%	Yes	11.40%	0.03%	0.70%		
Polokwane	No	82%	No	0.00%	0.00%	0.00%		
Rustenburg	No	88%	No	0.00%	0.00%	0.00%		
Total								**305 712**

Source: National Treasury, 2019

The incentive allocation is then combined with the base component (20 per cent), which is split equally among the recipient municipalities, and the demand-driven component (75 per cent) to determine the total grant allocation. The final allocation is shown in Table 3.24.

Table 3.24: Total grant allocation informed by base, demand and incentive components, 2019/20

Municipality	Base (20%): Equally shared	Demand-driven factors (75%)			Subtotal: Base and demand-driven factors	Performance incentive component (5%) R'000	Grant allocation R''000 (100%)
		Population component shares	Regional gross value-added component shares	Public transport users' component shares			
Buffalo City	7.7%	3.3%	2.8%	3.1%	3.8%		234 465
Cape Town	7.7%	16.3%	15.8%	13.9%	13.0%	160 487	957 645
City of Johannesburg	7.7%	19.3%	25.2%	20.5%	17.8%	99 394	1 187 518
City of Tshwane	7.7%	12.7%	15.0%	14.0%	12.0%		731 751
Ekurhuleni	7.7%	13.8%	9.5%	14.9%	11.1%		679 153
eThekwini	7.7%	15.0%	15.8%	18.0%	13.7%		840 549
George	7.7%	0.8%	0.5%	0.2%	1.9%	45 831	163 499
Mangaung	7.7%	3.3%	2.4%	3.2%	3.8%		229 596
Mbombela	7.7%	2.6%	1.9%	2.4%	3.3%		198 919
Msunduzi	7.7%	2.7%	1.5%	2.4%	3.2%		194 665
Nelson Mandela Bay	7.7%	5.0%	4.7%	3.6%	4.9%		298 143
Polokwane	7.7%	2.70%	1.50%	1.30%	2.90%		179 433
Rustenburg	7.7%	2.40%	3.50%	2.30%	3.60%		218 911
Total	**100%**	**100%**	**100%**	**100%**	**95.00%**	**305 712**	**6 114 247**

Source: National Treasury, 2019

In 2020/21, the second year of introducing the incentive component, three of the 13 cities that had been receiving this conditional grant were suspended: Buffalo City, Mbombela and Msunduzi.

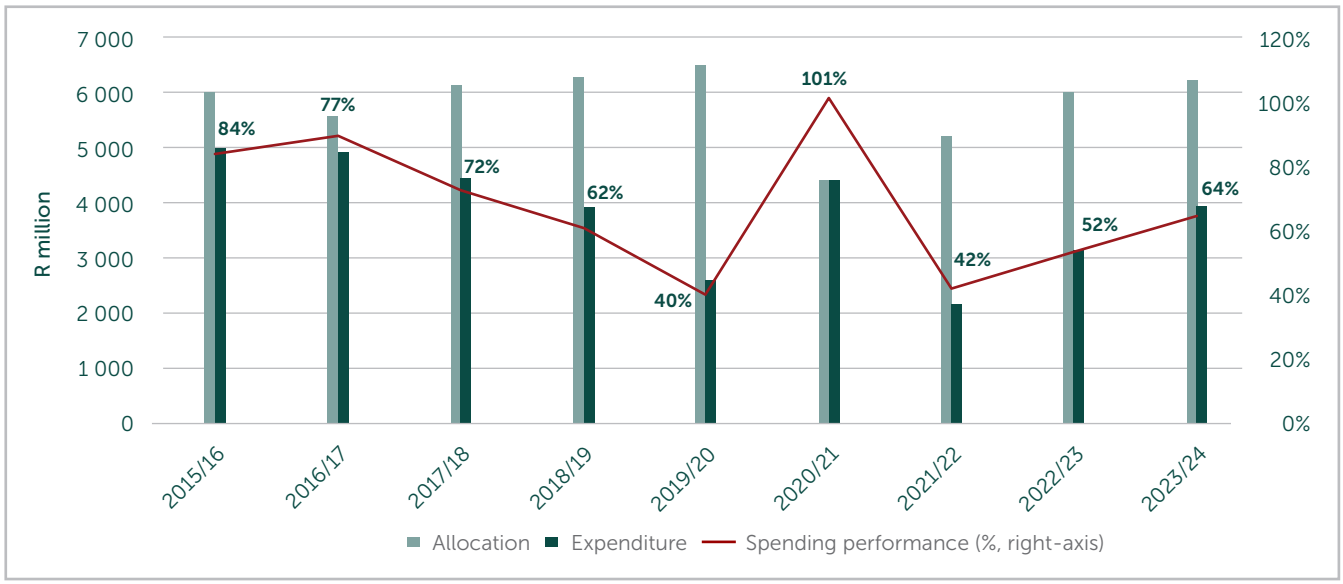
The three-year suspension of these three cities from receiving this conditional grant was a result of slow progress. According to National Treasury, the three cities had "...been in the planning phase since the introduction of the grant in the 2006 MTEF period" (National Treasury, 2020: 49).

In 2024/25, due to the progress shown in the implementation of its Integrated Public Transport Network Plan, a decision was taken to reintroduce Msunduzi into the grant. Given the phased reintroduction, Msunduzi, while not meeting the requirements in terms of the incentive allocation, received a small portion of the base component allocated to the recipient municipalities (National Treasury, 2024a). The case of Msunduzi is illustrative of the sector department's determination to ensure that funding via the grant is indeed strongly linked to performance, especially given that progress has prompted reintroduction. Also notable in the history of this incentive grant is that the incentive component was deactivated during 2023/24 due to concerns about the validity of data with the reactivation of the component in 2024/25, reflecting that the concerns have been resolved (National Treasury, 2024a: 50).

A snapshot of financial and non-financial performance

Between 2015/16 and 2023/24, R52.2 billion has been made available through the PTNG. Of that amount, R344.4 billion has been spent (see Figure 3.14). The PTNG is a crucial direct local government infrastructure grant, accounting for 13.6 per cent of total direct infrastructure-related grants in 2023/24. This was the second largest transfer, behind the Municipal Infrastructure Grant. The PTNG has fluctuated over the years, peaking at R6.5 billion in 2019/20, before declining significantly to R4.4 billion in 2020/21. Since then, allocations have gradually increased, reaching R6.2 billion in 2023/24. However, spending performance has been inconsistent, starting at 84 per cent in 2015/16, before improving in 2016/17 (87.7 per cent). A sharp decline occurred in 2017/18 (72.4 per cent), followed by a more significant drop in 2019/20 (40.1 per cent). The year 2020/21, which coincided with the COVID-19 pandemic, saw an anomaly where expenditure exceeded allocation, resulting in a spending performance of 100.76 per cent. In subsequent years, performance remained weak, with spending levels at 41.62 per cent in 2021/22, 52.08 per cent in 2022/23, and 63.68 per cent in 2023/24. This indicates ongoing challenges in fund absorption and project implementation efficiency.

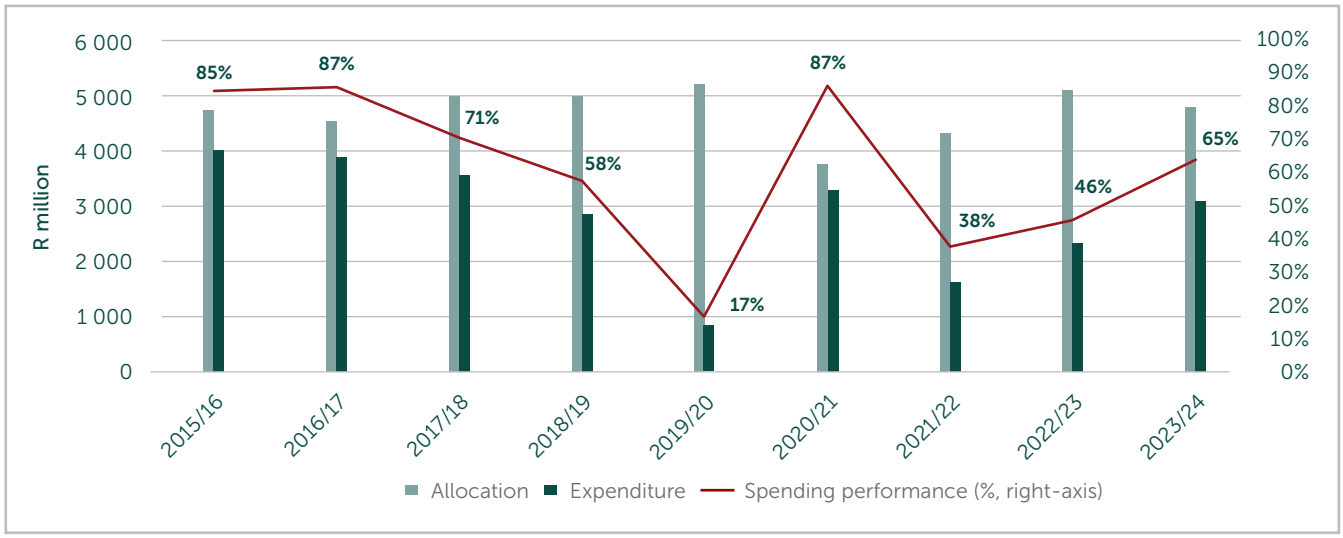
Figure 3.14: Public Transport Network Grant spending performance, 2015/16–2023/24



Source: National Treasury, 2015–2024a

At the metro level, the PTNG allocation followed a downward trend, from R4.8 billion in 2015/16 to R4.6 billion in 2016/17, with some fluctuations in later years, reaching R4.8 billion in 2023/24 (see Figure 3.15). The expenditure trend largely followed allocation patterns, but spending performance varied significantly. While metros exhibited strong spending efficiency in the earlier years (85.2 per cent in 2015/16 and 87 per cent in 2016/17), a sharp decline followed, with performance dropping to 71.3 per cent in 2017/18 and further down to 58 per cent in 2018/19. The most alarming drop occurred in 2019/20, when only 17 per cent of the allocated funds were spent. In 2020/21, spending performance rebounded to 87 per cent, reflecting an improvement; but it again dropped significantly to 38 per cent in 2021/22. The figures for 2022/23 (46.1 per cent) and 2023/24 (64.9 per cent) indicate that, while spending efficiency has improved, metros still face difficulties in fully utilising their allocated funds.

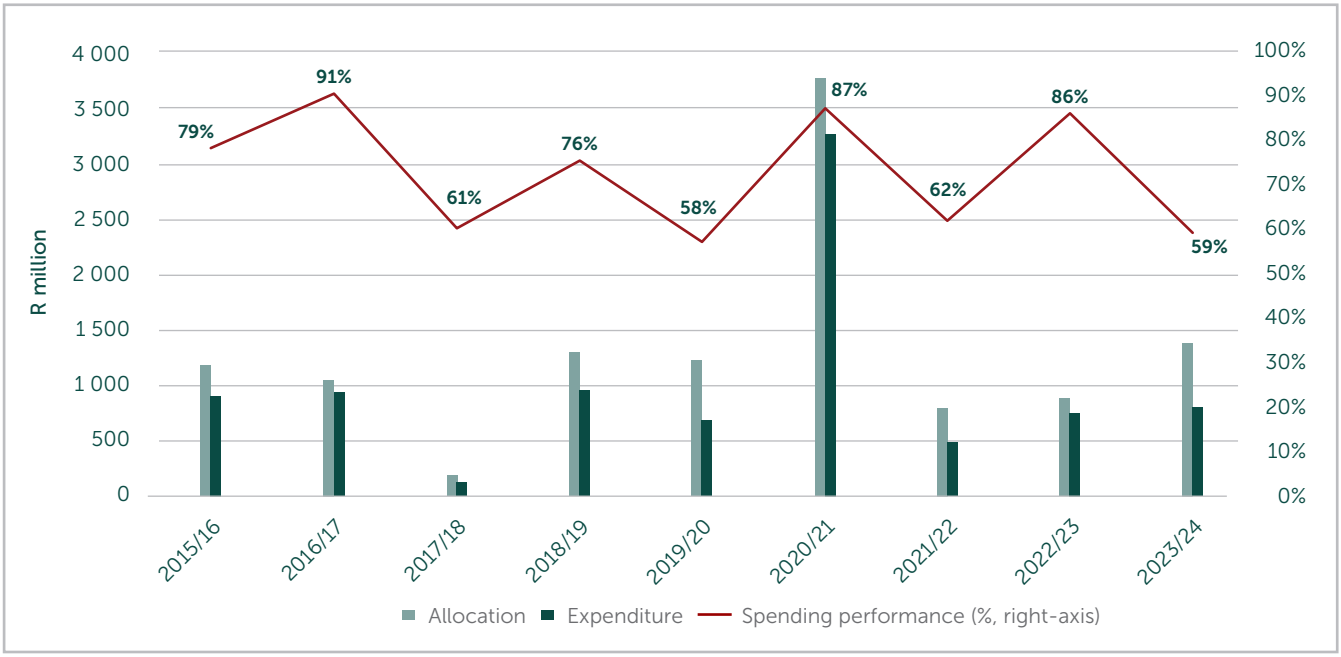
Figure 3.15: The Public Transport Network Grant's spending performance for metros, 2015/16–2023/24



Source: National Treasury, 2015–2024a

Secondary cities received significantly lower allocations compared to metros, with funding declining from R1.2 billion in 2015/16 to R1.0 billion in 2016/17, before experiencing erratic changes in subsequent years (see Figure 3.16). Expenditure trends followed a similar pattern, with spending performance fluctuating. Secondary cities demonstrated better fund absorption rates in the earlier years, with performance at 78.7 per cent in 2015/16, and peaking at 90.9 per cent in 2016/17. However, spending efficiency dropped drastically in 2017/18 (to 60.8 per cent) and 2019/20 (to 58 per cent). A substantial improvement was observed in 2020/21, when spending performance reached 87.2 per cent, but this was not sustained in the following years. In 2021/22, spending fell to 62.1 per cent, improved to 86.5 per cent in 2022/23, and dropped again to 59.4 per cent in 2023/24. These trends suggest that, while secondary cities have, at times, demonstrated strong spending efficiency, inconsistent financial absorption remains a challenge.

Figure 3.16: The Public Transport Network Grant's spending performance for secondary cities



Source: National Treasury, 2015–2024a

Integrated Urban Development Grant

The mechanics of the incentive component

The Integrated Urban Development Grant was introduced in 2019/20 by the Department of Cooperative Governance and Traditional Affairs (CoGTA). The grant aims to support "spatially aligned public infrastructure investment" (National Treasury, 2024a: 45). The IUDG is listed as a Schedule 5B grant, which means that the funding is aimed at specific municipal programmes and responsibilities.

This grant offers an alternative to the Municipal Infrastructure Grant (MIG), with municipalities being able to receive one or the other. The IUDG allows a recipient municipality a greater level of flexibility in determining the suite of individual infrastructure projects. Instead, municipalities need to ensure that, on aggregate, infrastructure projects are aligned and in support of a municipality's three-year capital programme, which, in turn, must be aligned with the broader 10-year capital expenditure framework. This type of approach can help promote a well-linked, integrated approach to infrastructure investment that is based on a long-term development plan.

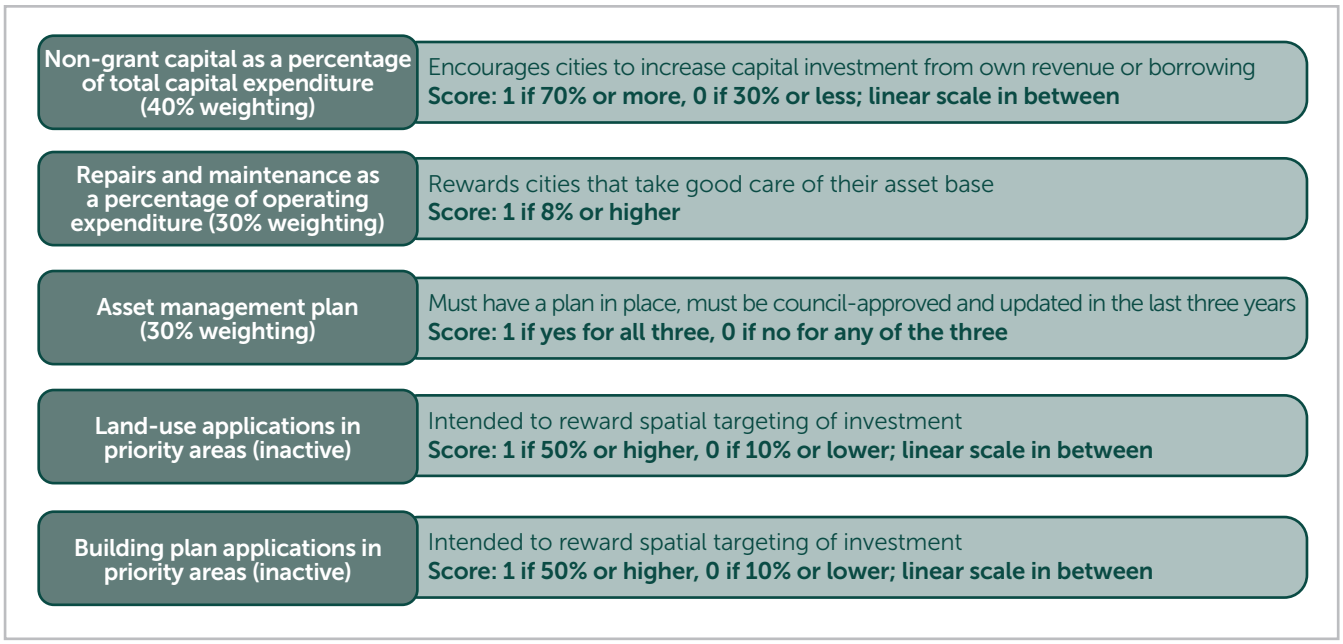
Approval to receive this conditional grant is based on an application process whereby a municipality must meet entry criteria related to five aspects (National Treasury, 2019: 41):

- Management stability, specifically a low vacancy rate among senior staff members
- Audit findings
- Unauthorised, irregular, fruitless and wasteful expenditure
- Capital expenditure
- Municipal Finance Management Act reporting

To continue receiving the IUDG, municipalities must annually meet or exceed the entry criteria. Those municipalities that fall short of these entry requirements are placed on a performance improvement plan. If this does not assist in overcoming the challenge, the municipality is shifted back to receiving the MIG.

The IUDG allocation is formula-based, consisting of two components. The first component is a base allocation, which is equal to the basic component contained in the MIG. The second component is a performance-based, incentive component, which is calculated based on the five indicators and associated weightings outlined in Figure 3.17.

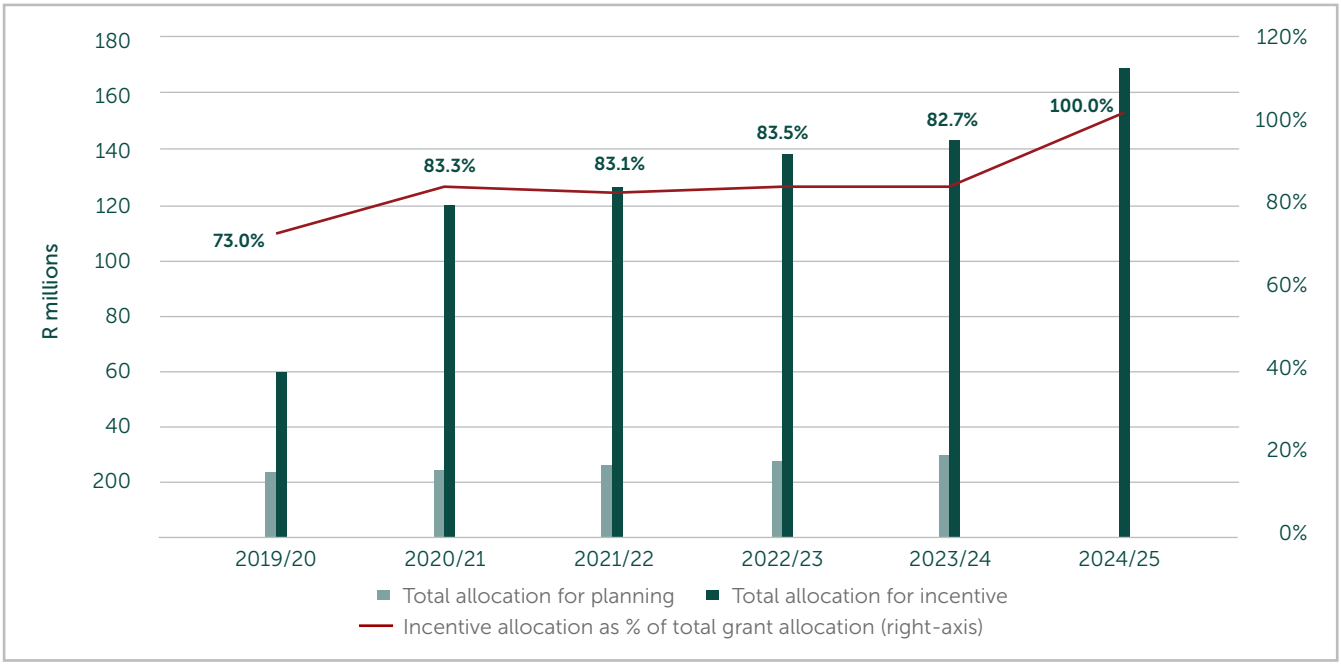
Figure 3.17: Indicators informing the incentive component of the Integrated Urban Development Grant



Source: National Treasury, 2019: 42

A total of R887.7 million has been allocated to municipalities from the grant's inception in 2019 until 2024/25. As evident in Figure 3.18, the bulk of the allocation over the past six years has been in respect of the incentive component.

Figure 3.18: The Integrated Urban Development Grant's basic and incentive allocation since inception

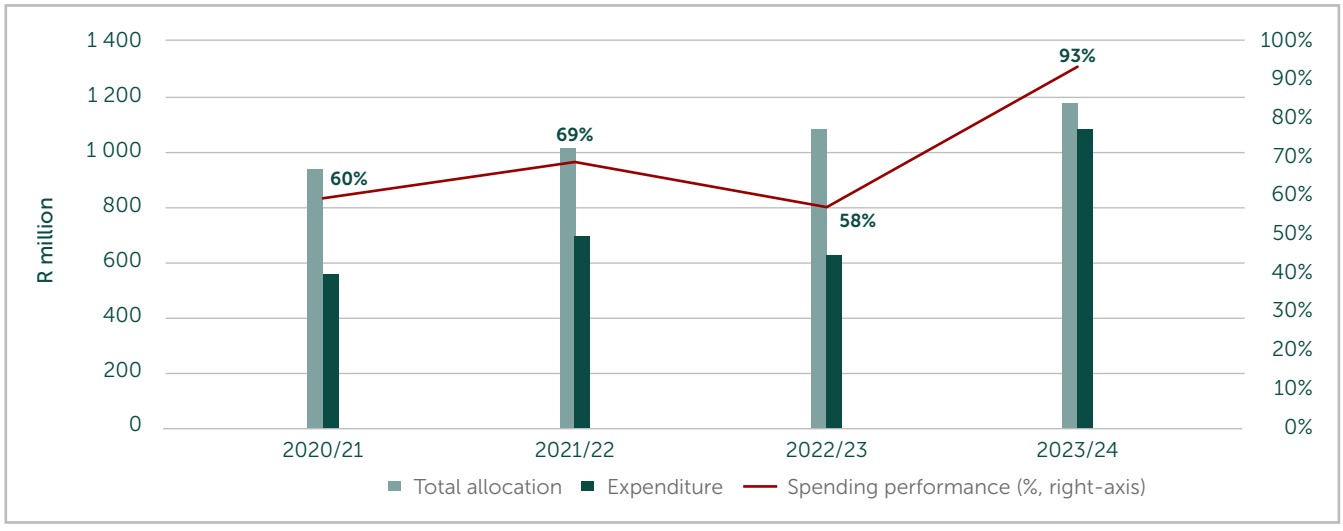


Source: National Treasury, 2019–2024a

A snapshot of financial and non-financial performance

For the period between 2020/21 and 2023/24, a total of R4.2 billion has been made available through the IUDG. Of that amount, R2.9 billion has been spent (see Figure 3.19). Overall, the total allocation has steadily increased, reaching its peak in 2023/24, after a minor decline 2022/23. Spending has also increased progressively, although it has not kept pace with the budgeted amounts, especially in previous years when there was a noticeable discrepancy. It improved from 60 per cent in 2020/21 to 69 per cent in 2021/22, but then declined to 58 per cent in 2022/23. This indicated a possible challenge in budget utilisation. However, a significant improvement occurred in 2023/24, with spending performance reaching 93 per cent. This suggests enhanced financial management or the more effective implementation of allocated funds.

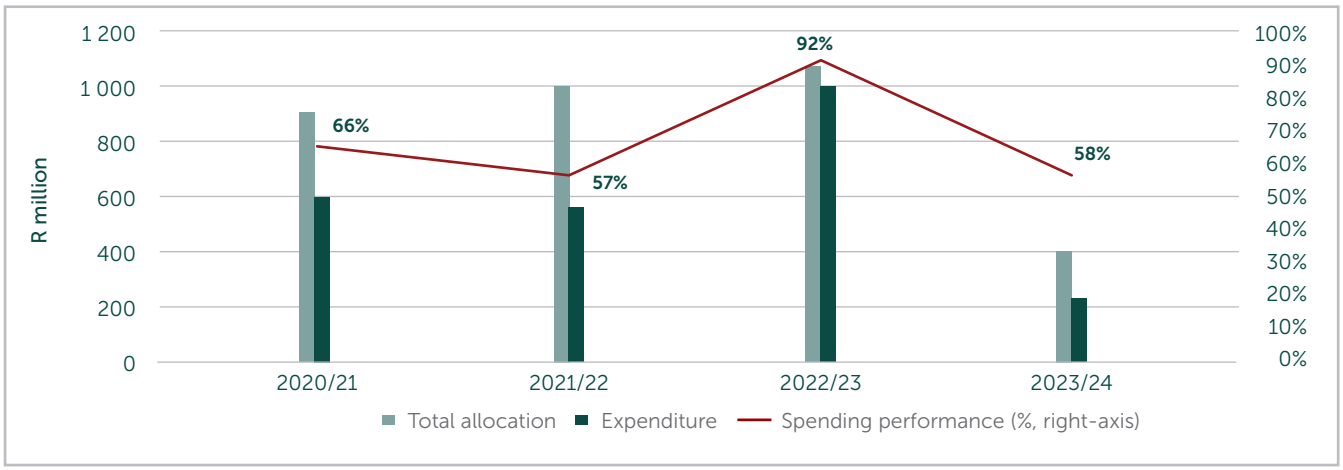
Figure 3.19: The Integrated Urban Development Grant's spending performance, 2020/21–2023/24



Source: National Treasury, 2020–2023

For secondary cities, allocations remained relatively stable from 2021/22 to 2023/24, but experienced a significant decline in Quarter 1 of 2024/25, with spending following the same trend; peaking in 2023/24 before dropping sharply in 2024/25. Altogether, spending performance fluctuated over the years, submerging from 66 per cent in 2021/22 to 57 per cent in 2022/23. This suggests underutilisation of the budget. However, the performance of the IUDG improved to 92 per cent in 2023/24, followed by a sharp decline to 58 per cent in 2024/25. These trends, coupled with reduced spending patterns, suggest changes in funding priorities, project delays or other financial constraints.

Figure 3.20: The Integrated Urban Development Grant's spending performance for secondary cities (B1), 2021/22–2024/25



Source: National Treasury, 2021–2024a

3.6 SYNTHESIS OF FINDINGS

Single window of coordination

The analysis of the policy and regulatory environment illustrates the strides that government has made in bringing a greater level of coordination to the development of infrastructure in South Africa. That being said, the developments have centred around very large, catalytic infrastructure projects, where the focus of interventions such as the PICC, SIPs, Infrastructure South Africa and the Budget Facility for Infrastructure is pitched. A similar, single window of coordination for infrastructure projects is absent at the subnational government level. The absence of a single window of coordination at the subnational level has resulted in fragmented infrastructure planning, misalignment between provincial and municipal priorities, and inefficiencies in project execution. This results in the duplication of efforts, budget misallocations and inconsistencies in infrastructure quality and service delivery.

Incentivising better performance

To facilitate better planning and more integrated infrastructure development at the subnational government level, government has relied on the introduction of incentive components within conditional grants. The first and oldest incentive components were introduced in the health and education sectors. However, a closer assessment of these incentives shows that they did and do not operate as true incentives. This is evident in the poor correlation between performance and reward or incentive. The younger, local government incentive-based grants fit the classic profile of a performance or incentive-based grant in that eligibility is earned and rewards are increased progressively in line with performance.

A key ingredient that seems to be missing, especially across the provincial incentive grants, is a feedback loop that links performance in respect of grant outputs to receipt of funds, and especially the incentive-related funds.

3.7 CONCLUSION

South Africa's infrastructure-led growth strategy is a cornerstone of the country's long-term development vision, as outlined in NDP 2030. An analysis of the policy and regulatory environment highlights the progress made in enhancing infrastructure coordination and planning. However, these efforts have primarily focused on large-scale, catalytic projects, supported by initiatives such as the PICC, SIPs, ISA and BFI. In contrast, a similar centralised framework for infrastructure coordination is lacking at the subnational level, leaving provinces and municipalities to navigate fragmented planning and implementation processes without adequate support or integration with national priorities.

Budget allocation trends underscore the significant role of provinces and municipalities in South Africa's infrastructure development. However, their ability to drive infrastructure growth is hindered by persistent challenges, including ineffective planning, financing constraints, weak governance and fragmented intergovernmental coordination, all of which undermine project execution and overall investment impact. Performance-based grants were introduced to encourage better infrastructure planning and management by subnational governments.

An analysis of these performance-based grants reveals mixed success. While spending performance has improved, with subnational governments showing higher utilisation rates over time, qualitative outcomes remain inconsistent. For instance, despite improved spending on the Health Facilities Revitalisation Grant, the SAICE infrastructure grading for health facilities has remained poor, indicating that investments have not sufficiently enhanced infrastructure quality. Similarly, while the Education Infrastructure Grant has supported school construction and refurbishment, persistent maintenance backlogs highlight inefficiencies in planning and execution.

At the municipal level, the Public Transport Network Grant and the Integrated Urban Development Grant have shown some improvements in aligning investments with urban development needs. However, the performance-based components of these grants have not always resulted in better planning or service delivery outcomes. Some municipalities continue to receive incentive allocations, despite failing to meet key performance benchmarks. This suggests that the link between performance and funding allocation needs to be strengthened, ensuring that underperforming provinces and municipalities face real consequences, while high performers are rewarded more effectively.

Overcoming these challenges requires a clearer alignment between infrastructure investment and developmental outcomes at the subnational level. The link between funding allocations and actual performance outcomes remains weak in some instances, with underperforming provinces and municipalities continuing to receive incentive funding. As South Africa advances its infrastructure-led growth strategy, it must ensure that investments result in long-term, sustainable improvements in service delivery and that economic development remains a key priority.

3.8 RECOMMENDATIONS

The Commission makes the following recommendations:

1. *As a means to a single window of coordination, the Minister of Finance, in collaboration with the Minister of Public Works and Infrastructure, should seek to establish a Subnational Infrastructure Coordination Framework to streamline infrastructure development at the provincial and municipal level.*

The proposed framework should be modelled after national-level coordinating institutions like Infrastructure South Africa and the Presidential Infrastructure Coordinating Commission to guarantee integrated planning, effective resource allocation and alignment with national priorities. It should also offer a one-stop shop for funding applications, technical assistance and approvals of infrastructure projects, which would improve subnational project execution and lessen fragmentation.

2. *To strengthen the link between infrastructure performance and funding allocation, the Minister of Finance should introduce a performance-linked feedback mechanism in provincial and municipal incentive grants.*

The performance-linked feedback approach should guarantee that funding payments, especially the incentive-related portion, are clearly linked to the accomplishment of grant outputs and set clear, quantifiable success metrics. In addition to improving service delivery and accountability, regular performance evaluations, open reporting and stakeholder involvement will guarantee that incentive-based grants are effective performance-driven funding tools.

3.9 REFERENCES

Abiad, A., Furceri, D. & Topalova, P. (2016). The macroeconomic effects of public investment: Evidence from advanced aconomies. *Journal of Macroeconomics 50*, 224–240.

Acemoglu, D. (2012). Introduction to economic growth. *Journal of Economic Theory 147*(2), 545–550.

Aschauer, D.A. (1989). Is public expenditure productive? *Journal of Monetary Economics 23,* 177–200.

Department of Basic Education (2021). National Education Infrastructure Management System Report as at 12 April 2021. Available at: https://www.education.gov.za/Portals/0/Documents/Reports/NEIMS%20STANDARD%20REPORT%202021.pdf. [Accessed 1 September 2024].

Department of Basic Education (2023). Education Facility Management System as at 21 August 2023. Available at: https://www.education.gov.za/Portals/0/Documents/Reports/2023/EFMS%202023.pdf?ver=2023-09-04-115953-093. [Accessed 1 September 2024].

Department of Basic Education (2024). Education Facility Management System. Available at: https://www.education.gov.za/Portals/0/Documents/Reports/Norms%20and%20Standard%20Reports%202021/Norms%20and%20standard%20reports%202023/EFMS%20Publication%202024.pdf?ver=2024-07-10-102139-047. [Accessed 1 September 2024].

Dougherty, S., Nebreda, A. & Mota, T. (2024). Adapting intergovernmental transfers for the future: Emerging trends and innovative approaches. *OECD Working Papers on Fiscal Federalism 49*.

Furceri, D. & Li, B. (2017). The macroeconomic and distributional effects of public investment in developing economies. *International Monetary Fund (IMF) Working Paper WP/17/217.*

Grossman, G.M. & Krueger, A.B. (1995). Economic growth and the environment. *The Quarterly Journal of Economic 110(2),* 353–377.

Miyamoto, H., Baum, A., Gueorguiev, N., Honda, J. & Walker, S. (2020). Growth impact of the public investment and the role of infrastructure governance. *Well Spent: How strong infrastructure governance can end waste in public investment,* 15–29.

National Planning Commission (2011). *National Development Plan 2030: Our Future – Make it Work*. Available at: https://www.gov.za/sites/default/files/gcis_document/201409/ndp-2030-our-future-make-it-workr.pdf.

National Treasury (2011). Division of Revenue Bill. Available at: https://www.treasury.gov.za/legislation/bills/2011/bills2011_bill04-2011.pdf.

National Treasury (2012). Annexure W1 Explanatory Memorandum to the Division of Revenue. Available at: https://www.treasury.gov.za/documents/national%20budget/2012/review/default.aspx.

National Treasury (2013). Division of Revenue Bill. Available at: https://www.treasury.gov.za/legislation/bills/2013/bills2013_bill02-2013.pdf.

National Treasury (2014). *A*nnexure W1 Explanatory Memorandum to the Division of Revenue. Available at: https://www.treasury.gov.za/documents/national%20budget/2014/review/default.aspx.

National Treasury (2015). Annexure W1 Explanatory Memorandum to the Division of Revenue. Available at: https://www.treasury.gov.za/documents/national%20budget/2015/review/Annexure%20W1.pdf.

National Treasury (2016). Annexure W1: Explanatory Memorandum to the Division of Revenue. Available at: https://www.treasury.gov.za/documents/national%20budget/2016/review/Annexure%20W1.pdf.

National Treasury (2017). Annexure W1 Explanatory Memorandum to the Division of Revenue. Available at: https://www.treasury.gov.za/documents/national%20budget/2017/budgetReview.aspx

National Treasury (2018). Annexure W1: Explanatory Memorandum to the Division of Revenue. Available at: https://www.treasury.gov.za/documents/national%20budget/2018/review/Annexure%20W1.pdf.

National Treasury (2019). Annexure W1: Explanatory Memorandum to the Division of Revenue. Available at: https://www.treasury.gov.za/documents/national%20budget/2019/review/Annexure%20W1.pdf.

National Treasury (2020). Annexure W1: Explanatory Memorandum to the Division of Revenue. Available at: https://www.treasury.gov.za/documents/national%20budget/2020/review/Annexure%20W1.pdf. [Accessed 20 November 2024].

National Treasury (2021). Annexure W1: Explanatory Memorandum to the Division of Revenue. Available at: https://www.treasury.gov.za/documents/national%20budget/2021/review/FullBR.pdf

National Treasury (2022). Annexure W1: Explanatory Memorandum to the Division of Revenue. Available at: https://www.treasury.gov.za/documents/national%20budget/2022/review/FullBR.pdf

National Treasury (2023). Annexure W1: Explanatory Memorandum to the Division of Revenue. Available at: https://www.treasury.gov.za/documents/national%20budget/2023/review/FullBR.pdf

National Treasury (2024a). Annexure W1: Explanatory Memorandum to the Division of Revenue. Available at: https://www.treasury.gov.za/documents/national%20budget/2024/review/Annexure%20W1.pdf. [Accessed 20 November 2024].

National Treasury (2024b). Budget Review: Annexure D-Public Sector Infrastructure Updated. Available at: https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.treasury.gov.za%2Fdocuments%2Fnational%2520budget%2F2024%2Freview%2FBR%25202024%2520-%2520Tables%2520for%2520Annexure%2520D.xlsx&wdOrigin=BROWSELINK. [Accessed 1 November 2024].

Office of Health Standards Compliance (OHSC) (2022). *Annual Inspection Report 2021/22*. Available at: https://ohsc.org.za/wp-content/uploads/Inspection_Report.pdf. [Accessed 1 November 2024].

President of the Republic of South Africa (2018). State of the Nation Address, 2018. Available at: https://www.gov.za/state-nation-address.

President of the Republic of South Africa (2019). State of the Nation Address, 2019. Available at: https://www.gov.za/state-nation-address.

President of the Republic of South Africa (2020). State of the Nation Address, 2020. Available at: https://www.gov.za/state-nation-address.

President of the Republic of South Africa (2021). State of the Nation Address, 2021. Available at: https://www.gov.za/state-nation-address.
Presidential Infrastructure Coordinating Commission (PICC) (n.d.). *A summary of the National Infrastructure Plan*. Available at: https://www.gov.za/sites/default/files/PICC_Final.pdf.
Presidential Infrastructure Coordinating Commission (2017). Report on PICC: A Presentation to the Economic Cluster Committees.
Republic of South Africa (1994). White Paper on Reconstruction and Development, Notice Number 1954 of 1994.
Republic of South Africa (2014). Infrastructure Development Act, Act No. 23 of 2014.
Republic of South Africa (2024). Division of Revenue Bill. Available at: https://www.treasury.gov.za/legislation/bills/2024/[B4-2024]%20Division%20of%20Revenue%20Bill.pdf. [Accessed 20 November 2024].
Soucat, A., Dale, E., Mathauer, I. & Kutzin, J. (2017). Pay-for-performance debate: not seeing the forest for the trees. *Health Systems and Reform 3*(2), 74–79.
South African Institution for Civil Engineering (SAICE) (2006). *The SAICE Infrastructure Report Card for South Africa: 2006*. Available at: https://saice.org.za/downloads/saice-reportcard.pdf. [Accessed 1 October 2024].
South African Institution for Civil Engineering (2011). *SAICE Infrastructure Report Card for South Africa 2011*. Available at: https://saice.org.za/downloads/IRC2011-landscape-1-final-lr.pdf. [Accessed 1 October 2024].
South African Institution of Civil Engineering (2017). *SAICE 2017 Infrastructure Report Card for South Africa*. Available at: https://saice.org.za/wp-content/uploads/2017/09/SAICE-IRC-2017.pdf. [Accessed 1 October 2024].
South African Institution of Civil Engineering (2022). *SAICE 2022 Infrastructure Report Card for South Africa*. Available at: https://saice.org.za/downloads/SAICE-2022-Infrastructure-Report-Card.pdf. [Accessed 15 October 2024].
Statistics South Africa (Stats SA) (2023). *General Household Survey 2023*. Available at: https://www.statssa.gov.za/?page_id=1854&PPN=P0318&SCH=73897
Vaidya, V. (2024). *Public infrastructure*. Available at: https://www.wallstreetmojo.com/public-infrastructure/.
World Bank (1994). *World Development Report 1994*. Oxford University Press.
World Bank (2021). *Conditional grants in principle, in practice and in operations: A Primer*. Available at: https://documents1.worldbank.org/curated/en/099225502022337463/pdf/P175449029c8ed06009fb90e02571fb606d.pdf.

Section 3: Subnational spheres

Chapter 4: *An assessment of the performance of coalition-led municipalities*

Chapter 5: *Measuring the fiscal pressures of urbanisation*

CHAPTER 4
An assessment of the performance of coalition-led municipalities

Sabelo Mtantato

4.1 INTRODUCTION

The Constitution of the Republic of South Africa established three distinct, yet interrelated government spheres: national, provincial and local. The Constitution further allocates these three spheres of government functions and responsibilities. In the main, municipalities are responsible for the provision of basic services, including water, sanitation, electricity and refuse removal. The functioning, which includes the effectiveness and efficiency of municipalities in the delivery of basic services, is closely linked or determined by the functionality of municipal councils. The composition of these municipal councils is determined by the municipal election results, as the number of seats in a Municipal Council is allocated in proportion to the number of votes received. Election results determine the number of seats each political party will have in a Municipal Council. If one political party wins over 50 per cent of the votes, there will be no need for coalition governance. In cases where there is no political party that has won more than 50 per cent of the votes, two or more political parties must form a coalition government. The results of the 2024 National and Provincial Elections showed a decline in support for the African National Congress (ANC), which was a majority and dominant party in most provinces in the previous elections. This necessitated the need for a coalition. At the local government level, coalitions have been part of the South African landscape for many years. However, an increase in the number of hung councils was observed in the 2016 Local Government Elections. The trajectory of increasing coalition councils is expected to increase in South Africa, given the changing political dynamics, making it important to fully understand the impact of hung councils on the performance of municipalities.

4.2 PROBLEM STATEMENT AND RESEARCH QUESTIONS

The literature review has shown that coalition governments, especially in the local government sphere, are increasing and are likely to increase even further after the 2026 Local Government Elections. The literature also highlights some challenges that are common in coalition governments, which affect the stability and functionality of hung councils. Given that coalition-led municipalities are increasing and are becoming a permanent feature in local government, this research seeks to assess the performance of coalition-led municipalities and intends to answer the following questions:

- What has been the extent of coalition in municipalities in South Africa since 2006?
- What is the impact of coalition government compared to majority party-led councils?

4.3 RESEARCH METHODOLOGY AND DATA

To answer the research questions, the study utilises different research methods, including quantitative analysis:

- A review and analysis of the trend of municipalities with hung councils in South Africa by province between 2006 and 2021 is undertaken to determine the extent to which coalition governments in local government are increasing.
- A quantitative analysis is undertaken by means of a t-test analysis on municipalities with hung councils, and those led by the majority. This is undertaken on water service provision by both groups of municipalities by comparing water provision before and after the 2021 Local Government Election. The report used water provision data for 2020 (the year before the 2021 Local Government Elections) and 2022 (a year after the 2021 Local Government Elections). Data for the provision of water services utilised in the study includes water provided within the yard, water provided from a distance of less than 200 metres from the yard, and water provided from a distance of more than 200 metres from the yard.
- An analysis of audit outcomes obtained by these two groups of municipalities for 2020 and 2022 is also undertaken.

4.3.1 Limitations of the study

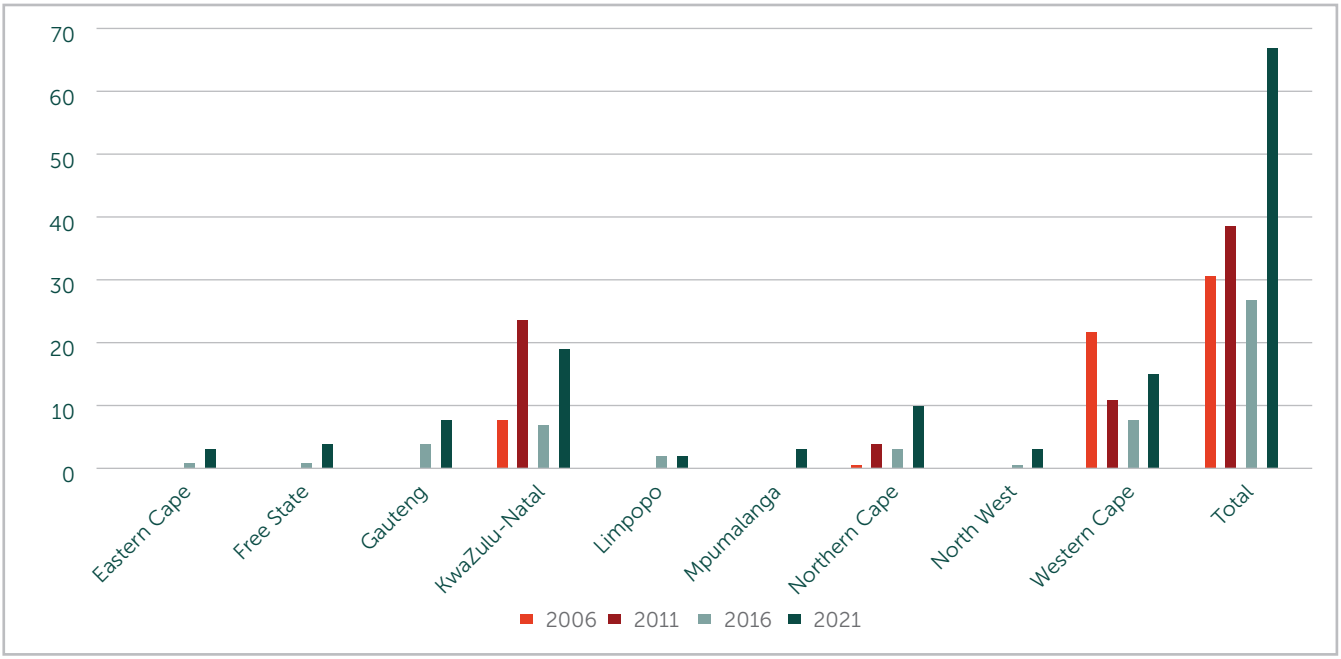
Municipalities provide a number of services to communities. This includes refuse and waste collection, and the provision of electricity and water. The analysis undertaken is limited to the provision of water services as measured by the total number of domestic consumer units. It is also important to note that not all local municipalities provide water services. In some municipalities, water is provided by district municipalities (where district municipalities are accredited as water services authorities). The fact that some municipalities that are governed by hung councils do not provide water services makes the study biased.

4.4 FINDINGS

4.4.1 An analysis of the trend of hung councils in South Africa

There has been a significant increase in the number of coalition-led councils in South Africa between 2006 and 2021. The number of coalition-led municipalities increased significantly between 2016 and 2021, from 27 municipalities in 2016 to 67 municipalities in 2021, representing a 66 per cent increase, as shown in Figure 4.1. While the number of hung municipalities in KwaZulu-Natal decreased from 24 in 2011 to seven in 2016, this number increased from seven in 2016 to 19 in 2021. All other provinces, except Limpopo, experienced an increase in the number of coalition-led municipalities. Given this trajectory and what transpired in the National and Provincial Elections in terms of a declining outright majority win, it is likely that the 2026 Local Government Elections will result in even more municipalities under this arrangement.

Figure 4.1: Number of coalition-led municipalities per province from 2006 to 2021



Sources: Independent Electoral Commission, 2006, 2011, 2016, 2021

4.4.2 Quantitative results

A t-test is a statistical test used to compare the means of two groups. It is often used in hypothesis testing to determine whether a process or treatment has an effect on the population or variable of interest, or whether two groups or variables are different from one another. Data relating to the provision of water to domestic households has been utilised to determine the performance of municipalities. Data on water provision is divided into three categories:

- Water provided within the yard
- Water provided outside the yard, but within a distance of less than 200 metres
- Water outside the yard, more than 200 metres from the yard

The quantitative results are presented in two categories:

- Water provided within the yard
- The total number of water consumer units, which combines all three categories

Municipalities are grouped into municipalities with majority-led councils and municipalities with hung councils.

It is key to note that some municipalities that were under coalition government arrangements before the 2021 Local Government Elections became majority-led councils after the elections, while very few changed from hung councils to majority-led municipal councils after the 2021 Local Government Elections. The quantitative results are shown in Table 4.1.

Table 4.1 compares the percentage change from the 2020 to 2022 water unit access in individual municipalities between majority-led councils and those with hung councils. The mean for both groups of municipalities is positive for water in terms of both water provided within the yard and the total.

The difference in the total water provision, where municipalities with hung councils have a mean of 0.0523, while the majority is at 0.028, shows better performance of water unit access delivery on average among hung council municipalities. However, the standard deviation for the municipalities with hung councils is also higher than it is for the municipalities with majority-led councils for both water provided in the yard and the total. This higher standard deviation shows a wider distribution, and therefore, uncertainty in service delivery performance in municipalities with hung councils. This wide distribution in the case of these two groups of municipalities is also shown by the difference between the minimum and the maximum on both the domestic water consumer units provided within the yard and the total.

Table 4.1: Descriptive statistics

	Hung		Majority	
	In-yard	Total	In-yard	Total
Mean	0.0464	0.0523	0.0157	0.028
Standard deviation	0.203	0.240	0.107	0.0916
Minimum	-0.430	-1.00	-0.346	-0.400
Maximum	1.35	1.39	0.571	0.673

Source: Financial and Fiscal Commission's calculations.

The results of a t-test are based on the null hypothesis that there is no significant difference, effect or relationship between municipalities with hung councils and majority councils. If a p-value from a t-test is less than 0.05, the result is considered statistically significant at the 95% confidence level, while it is regarded as insignificant if it is greater than 0.05.

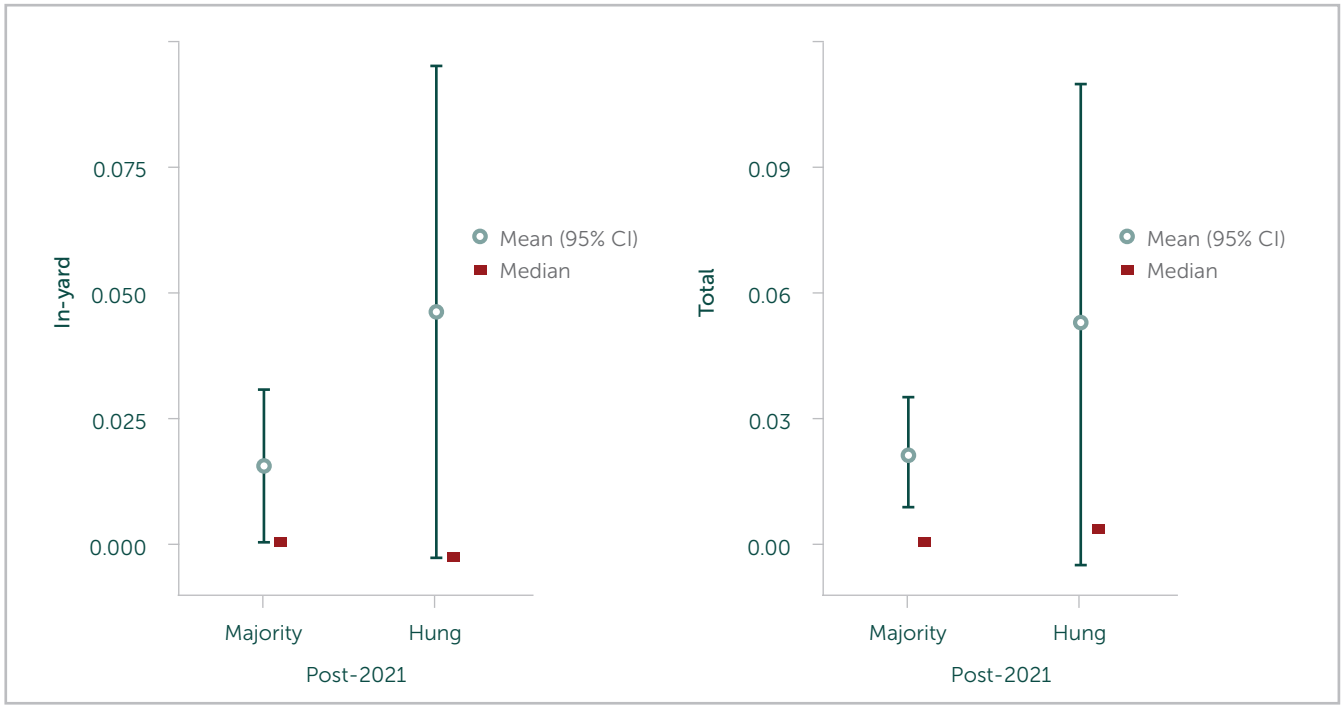
Since the distribution is non-normal, the Mann-Whitney U test has been considered. The results are shown in Table 4.2. In both instances (within the yard and the total), the results show p-values of 0.034 and 0.008, respectively. These results show p-values of less than 0.05, suggesting a rejection of the null hypothesis that there is no difference between the hung and the majority municipalities. This implies that the municipalities with hung councils perform better than the municipalities with majority-led councils in terms of the provision of water services.

Table 4.2: Statistic and p-values

		Statistic	P-value
Total	Student's t-value	-1.53	0.128
	Wech's t-value	-1.05	0.298
	Mann-Whitney U test	5096	0.008
In-yard	Student's t-value	-1.56	0.121
	Wech's t-value	-1.18	0.243
	Mann-Whitney U test	5367	0.034

Figure 4.2 illustrates the distribution of water provision for both within the yard and the total using the mean and the median. Figure 4.2 illustrates a wider distribution for municipalities with hung councils than the majority-led municipal councils, particularly using the mean.

Figure 4.2: Distribution of domestic water consumer units by group using the mean and median

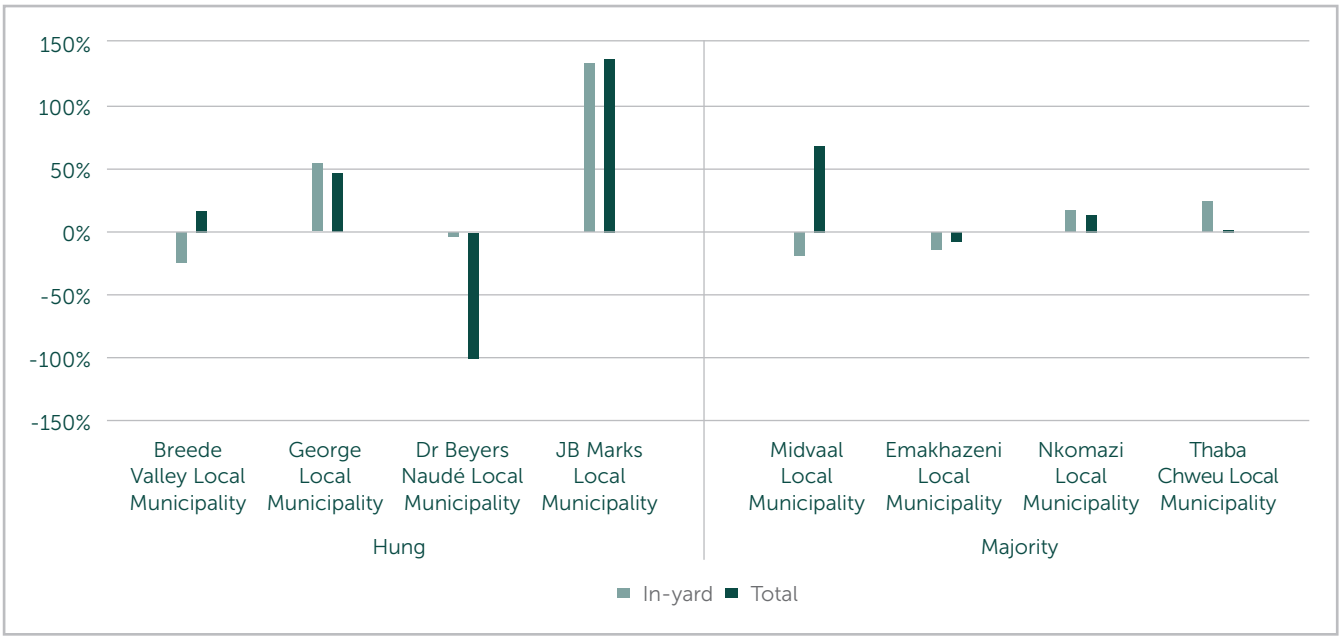


Source: Stats SA and Commission's own calculation

Municipalities that are outliers in both groups of municipalities (municipalities with hung councils and those with majority-led councils) are illustrated in Figure 4.3. In line with Figure 4.2, which shows the distribution of the score in both municipal groups, Figure 4.3 shows four municipalities selected at random in each group of municipalities. Municipalities with hung councils, as illustrated, range from -100 per cent to 139 per cent. The total domestic water consumer units, for example, decreased by 100 per cent between 2020 and 2022, while both the total and the water consumer units within the yard for the JB Marks Local Municipality increased by 139 per cent and 135 per cent, respectively, between 2020 and 2022. On the contrary, the distribution of a percentage change in consumer water units for municipalities with majority councils is not as wide when compared to municipalities with hung councils.

For example, in the Midvaal Local Municipality, most of the outliers in the group, which showed a percentage change in total domestic water consumer units between 2020 and 2022, increased by 67 per cent, while the provision of domestic water consumer units for inside the yard decreased by 20 per cent over the same period.

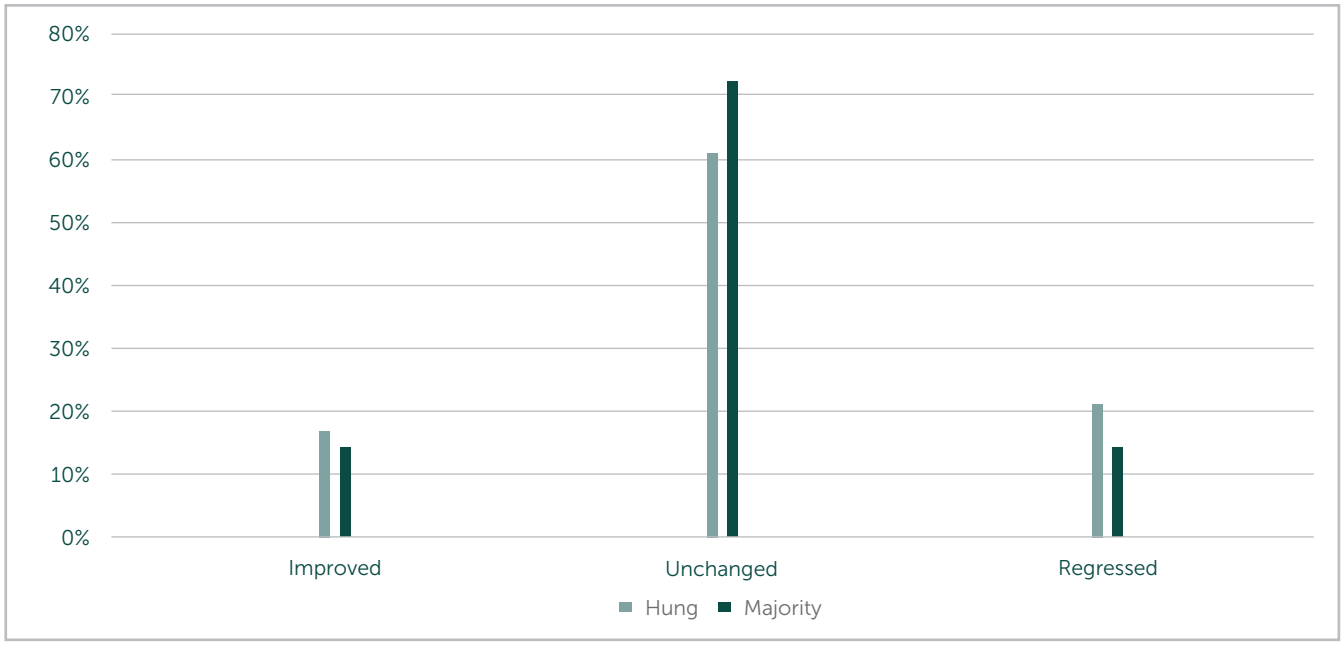
Figure 4.3: Domestic water consumer units for select municipalities



Sources: Statistics South Africa, 2022, 2024

Regarding the audit outcomes, the performance of municipalities with hung councils and those with majority councils is illustrated in Figure 4.4. Comparing the percentage of municipalities that have regressed in 2022/23 compared to 2020/21, Figure 4.4 illustrates that 21 per cent of municipalities under coalition-led councils have shown regression or worsening audit outcomes compared to 14 per cent in majority-led municipalities. Concerning municipalities with unchanged audit outcomes, 72 per cent of municipalities with majority-led councils did not improve or regress on their audit outcomes, while the audit outcomes of 61 per cent of municipalities with hung councils did not change either. Figure 4.4 shows that there has been some improvement in municipalities' audit outcomes: 17 per cent and 14 per cent for municipalities with hung councils and municipalities with majority-led councils, respectively. Concerning improvement and regression in audit outcomes for both groups, Figure 4.4 reveals that there has not been any improvement for municipalities with majority-led councils, as improvement and regression is at 14 per cent. On the other hand, concerning municipalities with hung councils, there has been a regression on average, with an improvement of 17 per cent, and a regression of 21 per cent. On average, considering the net performance audit outcomes, comparing the improvement and regression for both groups of municipalities, it can be concluded that municipalities with hung councils regressed slightly by 4 per cent (regressed by 21 per cent and improved by 17 per cent), while municipalities with majority-led councils remained unchanged (regressed by 14 per cent and improved by 14 per cent).

Figure 4.4: Audit outcomes: Percentage of regressed municipalities, 2020/21 compared to 2022/23



Financial and Fiscal Commission's compilation

Sources: Auditor-General South Africa, 2023; South African Local Government Association, 2024

4.5 CONCLUSION

The local government, as the sphere closest to the citizens, is responsible for the delivery and provision of basic services. This includes water, sanitation, electricity and refuse removal. This sphere of government is also responsible for the provision and maintenance of basic infrastructure. The ability of municipalities to effectively provide basic services is closely linked to or is determined by the functionality of the municipal councils. In recent years, there has been an increase in the number of hung councils as political parties are failing to win with an outright majority of over 50 per cent of votes. The trend of coalition governance is increasing and is likely to continue, even in the upcoming 2026 Local Government Elections. Communities are more interested in service delivery to improve their lives and livelihoods. The research findings reveal that the number of hung municipalities increased from 31 in the 2006 Local Government Election to 67 in the 2021 Local Government Election, an increase of 148 per cent. Quantitative results show that the mean for both groups of municipalities is positive, though higher for hung councils versus the majority council. However, the standard deviation for municipalities with hung councils is higher than for those with majority-led councils for both water provided in the yard and the total. In both instances (within the yard and the total), the results showed p-values of 0.034 and 0.008, respectively, meaning that, under the assumption of non-normal distribution, hung council municipalities perform better than majority councils in water unit access delivery.

Regarding audit outcomes, 21 per cent of municipalities under coalition-led councils have shown regression audit outcomes compared to 14 per cent in majority-led municipalities. A total of 72 per cent of municipalities with majority-led councils did not improve or regress, compared to 61 per cent in the case of municipalities with hung councils. However, there has been better improvement in audit outcomes in hung councils than in municipalities with majority councils.

4.6 RECOMMENDATIONS

The Commission makes the following recommendations:

1. ***The Provincial Department of Cooperative Governance and Traditional Affairs, and the South African Local Government Association should identify key challenges and risks associated with hung councils, particularly in terms of the capabilities and performance of basic services.***

   According to this study, there is no evidence that municipalities with majority councils outperform hung councils. The research shows that, on average, though, hung councils deliver more water unit access to households than majority councils. However, this outcome also brings higher uncertainties in performance efficiencies of the municipality.

4.7 REFERENCES

Auditor-General South Africa. (2023). Consolidated General Report on Local Government Audit Outcomes for 2022–23. Available at: https://mfma-2023.agsareports.co.za/.

Independent Electoral Commission (2006). Local Government Elections. Independent Electoral Commission.

Independent Electoral Commission (2011). Local Government Elections. Independent Electoral Commission.

Independent Electoral Commission (2016). Local Government Elections. Independent Electoral Commission.

Independent Electoral Commission (2021). Local Government Elections. Independent Electoral Commission.

South African Local Government Association (2024). *SALGA perspective on the impact of coalition governments with proposed solutions.*

Statistics South Africa (2022). Improving lives through data ecosystems – Non-financial census of municipalities, 19 July 2022. Statistics South Africa.

Statistics South Africa. (2024). Improving lives through data ecosystems – Non-financial census of municipalities, 2022. Statistics South Africa. Available at: https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.statssa.gov.za%2Fpublications%2FP9115%2FP9115_2020%2520Unit%2520Data%25202020_final.xlsx&wdOrigin=BROWSELINK.

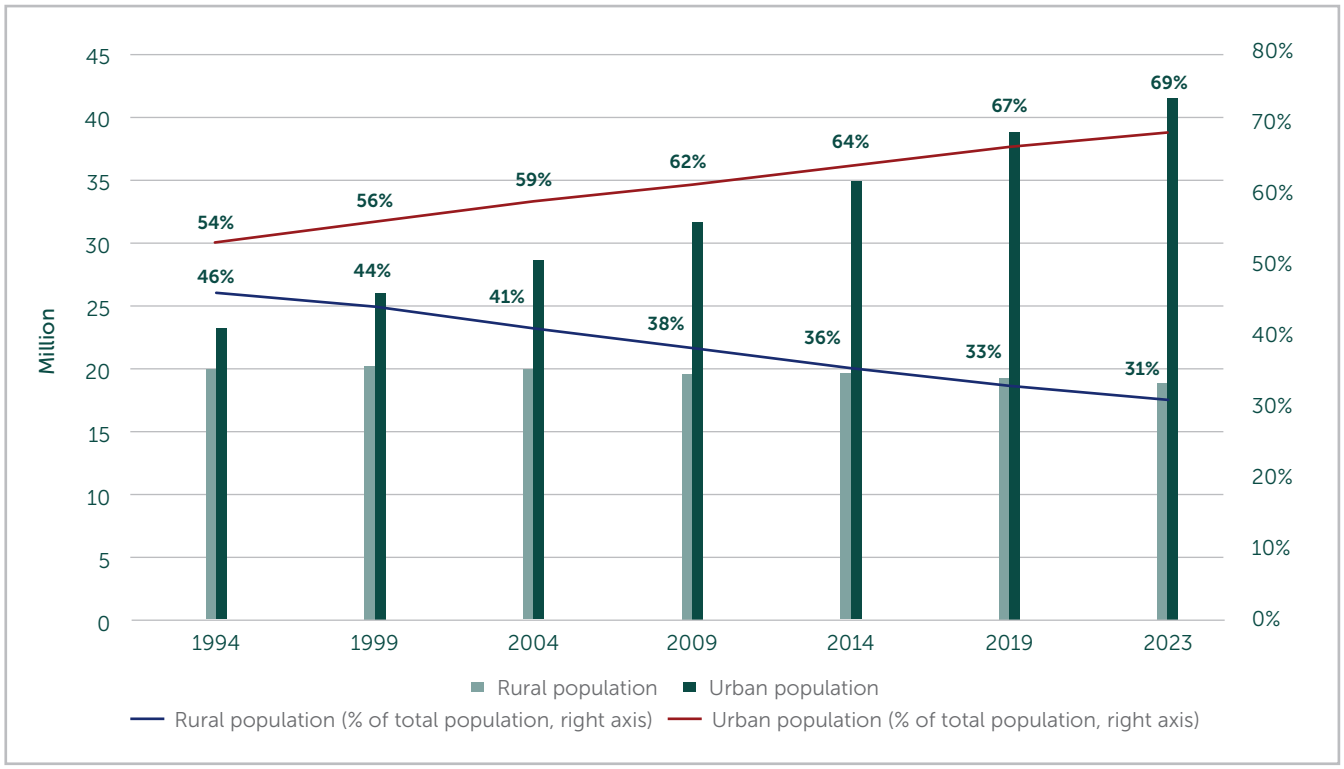
CHAPTER 5
Measuring the fiscal pressures of urbanisation

Khutso Makua and Mduduzi Nkosi

5.1 INTRODUCTION

South Africa has the largest and most industrial economy in Africa (UN-Habitat, 2012). More than two-thirds (68.82 per cent) of the population of 61 million resides in urban areas, compared to 54 per cent in 1994. This rapid growth in the population is defined as urbanisation. South Africa is the tenth most urbanised country in sub-Saharan Africa. For low- and middle-income nations, urbanisation offers both significant benefits and disadvantages. There is a risk that poverty, insecurity, instability and environmental degradation could worsen as a result of the world's population becoming more concentrated in urban areas due to a lack of funding and insufficient institutional capacity (UNEP, 2013; UN-Habitat, 2012; World Bank, 2013). Conversely, historical evidence indicates that, contingent upon the degree of planning and management, urbanisation can also alter socio-economic circumstances and lessen human vulnerabilities (Glaeser, 2011; Jha & Kremen, 2013; Storper, 2013).

Figure 5.1: Rural vs urban population (1994–2023)



Source: Financial and Fiscal Commission's calculations based on Statistics SA's data

Figure 5.1 uses official population data from Statistics South Africa (Stats SA) to describe the growth in the country's urban population, as opposed to its rural population, between 1994 and 2023. The figure shows that the urban population has been growing steadily, while the rural population has been declining at the same rate. This occurrence can be explained by the fact that, during this period, people living in rural areas became more attracted to the industrial nature of urban areas and migrated towards cities. However, this movement is not without its consequences. In South Africa, the eight metropolitan municipalities account for 41 per cent of the population. A growing population, coupled with slow growth, places immense pressure on municipal service delivery. The result is a growing gap in the demand and supply of basic services.

Given their greater revenue autonomy, metropolitan municipalities and secondary cities should be able to absorb the fiscal pressures that are brought forth by rapid population growth. There is, however, a need to investigate the impact of urbanisation on service delivery and understand how metropolitan and other urban centres are coping with expanding service delivery mandates arising from urbanisation.

5.2 RESEARCH METHODS

The study focuses on eight metropolitan municipalities and twelve secondary cities due to data constraints. The research method used is quantitative in nature. To determine the impact of urbanisation on service delivery, the panel fixed effects model was utilised. The choice of model was informed by the Hausman test, which compared the fixed effects and random effects estimators to determine which estimator is more appropriate.

5.3 FINDINGS

5.3.1 Urbanisation in South Africa

There are three municipal categories in South Africa: metropolitan municipalities (metros) (A), local municipalities (B) and district municipalities. Local municipalities have further categorisations, secondary cities (B1), large towns (B2), small towns (B3) and rural towns (B4), while district municipalities are categorised into C1 and C2 districts. Of these categories, A, B1 and B2 can be classified as urban municipalities.

Looking at the different categories (see Table 5.1), Gauteng boasts the highest number of metros, followed by the Eastern Cape, the Free State, the Western Cape and KwaZulu-Natal, which have one metro each. There are four provinces without a metro: Limpopo, Mpumalanga, Northern Cape and North West. The picture changes somewhat in terms of the distribution of non-metro cities and towns (B1 and B2 municipalities). The Western Cape and KwaZulu-Natal have the highest number of B1 and B2 municipalities (nine per province), followed by Mpumalanga (with a total of six). The Northern Cape only has one B1 municipality.

Table 5.1: Number of urban municipalities per province

Province	Municipal categories			Total urban	Percentage
	Metros	Secondary cities	Large towns		
Gauteng	3	2	3	8	15%
Western Cape	1	3	6	10	18%
Eastern Cape	2	0	3	5	9%
Free State	1	1	3	5	9%
KwaZulu-Natal	1	3	6	10	19%
North West	0	4	1	5	9%
Mpumalanga	0	4	2	6	11%
Limpopo	0	1	1	2	3%
Northern Cape	0	1	1	2	3%
Total	**8**	**19**	**26**	**53**	**100%**

Source: Financial and Fiscal Commission's calculations

In this sub-categorisation, A, B1 and B2 municipalities are characterised by large population numbers, high levels of urbanisation, large budgets, consolidated revenue bases and the potential to grow their economies. The B2 municipalities have interesting own-revenue characteristics, which, together with the fact that they have a large town as core, means they can conceivably demonstrate the capacity to tackle urban issues

Population growth and employment growth

South Africa's urban population has accelerated since the 1980s, following the removal of apartheid influx controls (United Nations Population Division, 2012). According to Turok (2014), the country's population growth would have been even stronger without the effects of HIV/Aids and associated illnesses such as tuberculosis.

Table 5.2: Population growth in metropolitan municipalities (2001–2022)

	2001	2022	Absolute growth	Percentage growth
Nelson Mandela Bay	1 077 483	1 190 423	112 941	10%
Mangaung	729 764	811 534	81 770	11%
Buffalo City	754 332	974 423	220 090	29%
eThekwini	3 034 009	4 240 510	1 206 501	40%
City of Johannesburg	3 218 260	4 803 276	1 585 017	49%
City of Cape Town	3 025 626	4 772 891	1 747 265	58%
Ekurhuleni	2 458 727	4 066 613	1 607 886	65%
City of Tshwane	2 188 593	4 039 442	1 850 849	85%
Total metros	**16 486 794**	**24 899 112**	**8 412 319**	**36%**
South Africa	**46 095 679**	**62 035 325**	**15 939 646**	**35%**

Source: Quantec easy data and Financial and Fiscal Commission's calculations

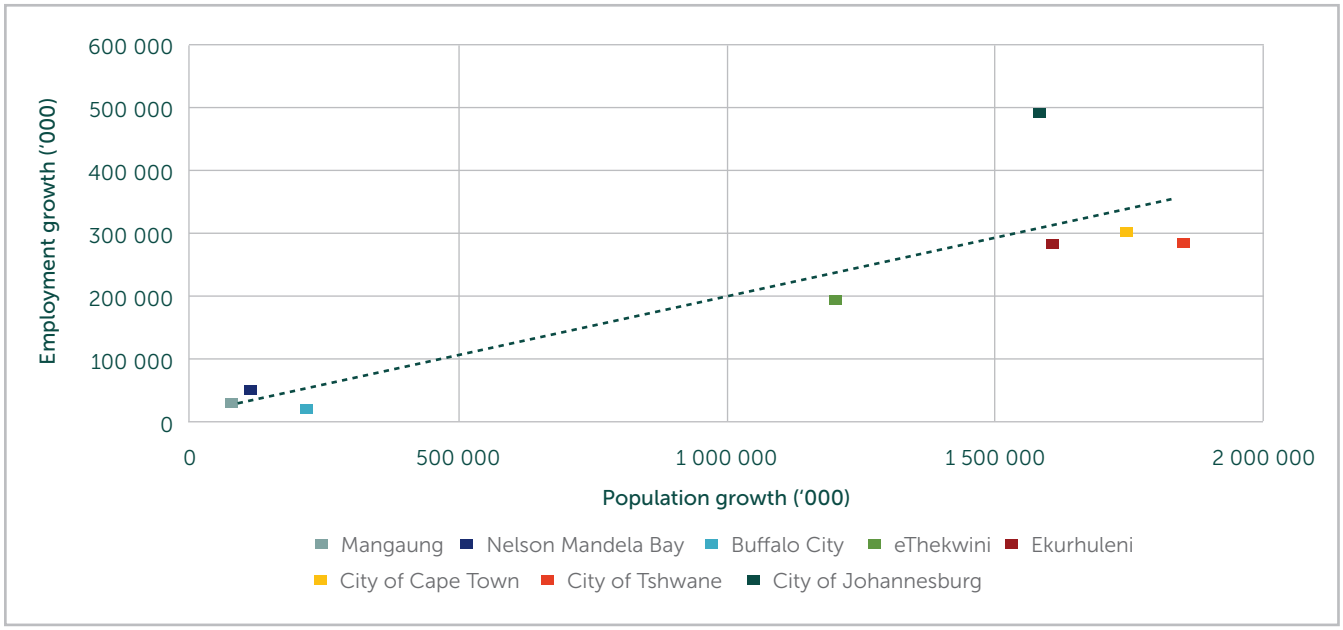
The importance of urbanisation manifests in the large disparity in demographic growth rates between the metros and other areas in the rest of South Africa. Table 5.2 shows that 60 per cent of South Africa's total population growth occurred in the eight metros.

The population growth rate in the metros has also been uneven throughout the two decades spanning 2001 to 2022. The fastest growth was witnessed in the City of Tshwane, followed by Ekurhuleni, the City of Cape Town and the City of Johannesburg. More striking is the fact that over half of the country's total population growth between 2001 and 2022 occurred in Gauteng and Cape Town.

The uneven pattern translates into very different challenges and opportunities between cities and other places. There is greater strain on public services in the large metros and a considerable demand for jobs and livelihoods. Furthermore, a rapidly growing population requires more infrastructure development, including schools, clinics and roads, water pipes, sewage treatment plants, electricity networks and waste disposal facilities.

The nexus between the location of economic growth and where people settle is particularly important, since employment provides the main source of income for households. Local economic activity is also a major source of revenue for public investment in municipal services. Perhaps the question to pose is whether jobs and population have become more closely aligned over the past two decades. Figure 5.2 provides an indication of the relationship between population growth and employment growth in the eight metros between 2001 and 2022.

Figure 5.2: Population vs employment growth in the metros (2001–2022)



Source: Financial and Fiscal Commission's calculations

Figure 5.2 shows that there is a reasonably strong correlation between the trends in jobs and people. In general, employment growth has kept up with population growth in the eight metro areas. This finding is encouraging from the standpoint of sustainable urbanisation, since it implies that the primary factor influencing household income has a tendency to align with population growth.

Individuals are generally adapting proportionately to the unequal expansion of economic possibilities around the nation. According to the figure, people appear to be relocating to areas like the City of Johannesburg, where they have a better chance of finding employment. The stimulus to jobs brought about by increased local demand for housing, schools, consumer goods and services, and other public facilities due to demographic growth can also be reasons for this correlation (Turok & Mykhnenko, 2007). However, metropolitan municipalities are not the only regions that absorb the effects of rapid urbanisation. Although only 14 per cent of the population resided in secondary cities in 2022, 36 per cent of the total population growth between 2001 and 2022 occurred in secondary cities. This suggests that substantial in-migration takes place towards secondary cities. This growth is slightly higher than the national population growth of 35 per cent and equal to the 36 per cent population growth rate in the metros. Figure 5.3 shows a correlation between population growth and unemployment growth in the metros.

Figure 5.3: Unemployment growth and population growth in the metros (2001–2022)

Source: Financial and Fiscal Commission's calculations based on IHS Markit

Figure 5.3 shows that there is a strong correlation between population growth and unemployment in the eight metropolitan areas. The City of Tshwane appears to be the only outlier, with population growth outpacing job creation. The City of Johannesburg, on the other hand, has experienced high population growth and low unemployment, which shows that the city is doing well in so far as creating jobs. Metros like Ekurhuleni and the City of Cape Town have experienced relatively proportional increases in population growth and unemployment, which shows that the metros are making progress in creating job opportunities for their citizens. A rather odd finding displayed in Figure 5.3 is the Nelson Mandela Bay metro. The figure shows that the unemployment rate outpaces population growth by 20 per cent in Nelson Mandela Bay. This figure presents a worrisome picture for metros like the City of Tshwane and Nelson Mandela Bay because, as population increases, demand for services also increases, and high unemployment in a rapidly growing population will erode the metros' revenue bases and increase their fiscal pressures as more households will depend on the municipalities for free basic services.

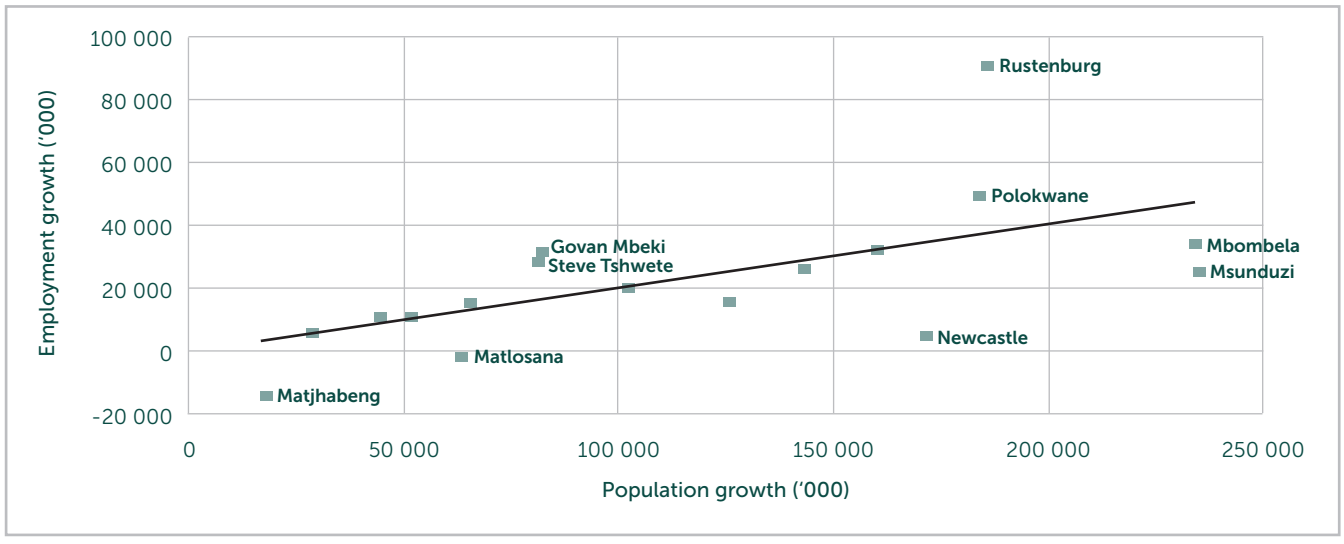
Table 5.3: Population growth in secondary cities (2001–2022)

	2001	2022	Absolute growth	Percentage growth
Drakenstein	210 811	276 814	66 003	31%
Stellenbosch	123 396	175 427	52 032	42%
George	169 063	294 944	125 881	74%
Sol Plaatjie	224 701	270 029	45 328	20%
Matjhabeng	420 440	439 084	18 644	4%
Msunduzi	581 686	817 141	235 455	40%
Newcastle	335 627	507 705	172 078	51%
City of uMhlathuze	309 671	412 451	102 780	33%
Rustenburg	375 952	562 369	186 417	50%
Madibeng	361 804	522 747	160 944	44%
City of Matlosana	367 321	431 219	63 898	17%
JB Marks	183 735	212 720	28 985	16%
Mogale City	294 309	438 197	143 887	49%
Govan Mbeki	227 430	310 125	82 695	36%
Steve Tshwete	159 923	242 041	82 118	51%
City of Mbombela	584 661	819 067	234 406	40%
Polokwane	656 816	841 175	184 359	28%
Emfuleni	706 046	945 633	239 588	34%
Emalahleni (MP)	286 278	434 535	148 257	52%
Total secondary cities	**6 579 669**	**8 953 425**	**2 373 756**	**36%**

Source: Quantec easy data and Financial and Fiscal Commission's calculations

The relationship between population increases and an increase in employment in secondary cities is also an important one. This is because employment remains the main source of household income and consumption in secondary cities. As seen with the metros, this pattern suggests a reasonably strong relationship between population and employment (Table 5.3). This strong relationship is also applicable in secondary cities, except in the case of Rustenburg, Msunduzi, Mbombela and Newcastle, which are outliers, as seen in Figure 5.4.

Figure 5.4: Population vs employment growth in secondary cities (2001–2022)



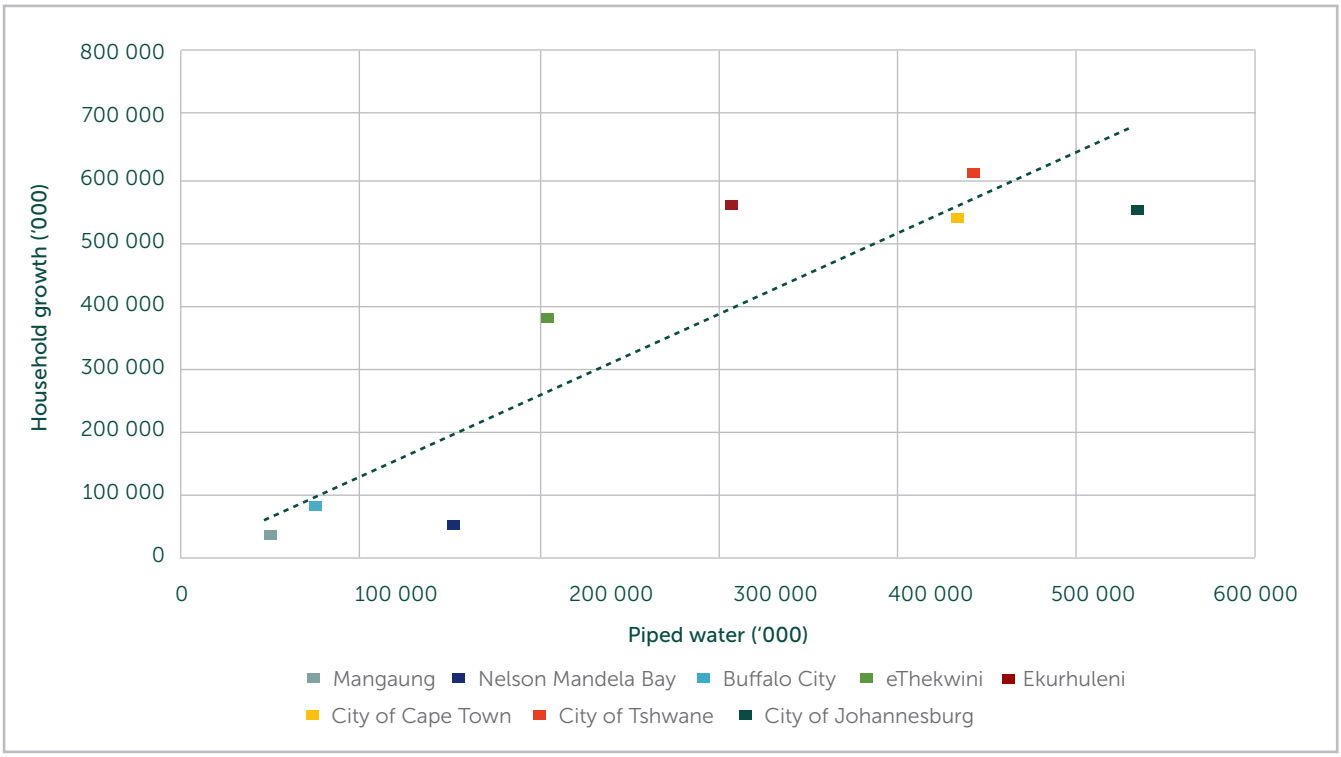
Source: Financial and Fiscal Commission's calculations

The Rustenburg Local Municipality in North West has experienced both high population increases and high employment due to the growth of mining in the area. However, employment increases have outstripped population growth. Newcastle, which is another mining and manufacturing area, has surprisingly experienced a large population growth (51 per cent), while employment increased by only 9 per cent from 2001 to 2022. This is the same with Matjhabeng and the City of Matlosana. Matjhabeng has notably experienced negative employment growth, which signifies job losses in the municipal area. For municipalities like Matjhabeng, Newcastle and the City of Matlosana, there is bound to be increased strain on municipal finances due to the high unemployment rates as more citizens will require assistance in the form of free basic services, while the Polokwane Local Municipality and Rustenburg, which appear to be doing well in creating job opportunities, should be able to absorb the fiscal pressures of growing populations well, as the increasing working population should be paying for services. The municipalities should, however, ensure that they implement innovative billing systems to manage the growing populations, and ensure they are able to recover the costs of providing services.

5.3.2 Urban infrastructure

Large cities run the risk of experiencing rapid population expansion that exceeds their capacity to provide household services and basic infrastructure. Failing to keep up would have more negative effects on the environment and human health, increase the likelihood of untreated waste and contaminated waterways, degrade ecosystems, and increase the prevalence of poverty. Because they often lack public infrastructure and have extremely high population densities, informal urban settlements are especially susceptible to these problems. Figure 5.5 shows the relationship between household growth and access to piped water in the metros

Figure 5.5: Household growth vs increased number of piped water installations in the metros (2001–2022)



Source: Financial and Fiscal Commission's calculations

The evidence presented in Figure 5.5 shows that there have been large improvements in access to piped water in the eight metropolitan municipalities in the last two decades. The figure shows that there is a close correlation between increases in the number of households and access to piped water in the large cities. This suggests that the metros have been successful in keeping pace with the growing populations and have not been overwhelmed by them. Part of this correlation may be explained by the linkage between the local government equitable share allocations and population growth.

Access to electricity

In the last 20 years, government has made significant strides towards facilitating access to electricity for citizens. Between 2001 and 2022, there was a shrinking divide when it came to metro and non-metro regions, with a considerable drop in the number of households without access to electricity (Table 5.4).

Table 5.4: Number of households without access to electricity (2001 vs 2022)

Category	Households with no access to electricity 2001	Households with no access to electricity 2022	Absolute difference	Percentage change
Secondary cities	325 682	177 365	-148 317	-46%
Metros	771 056	435 744	-335 313	-43%
South Africa	3 137 437	1 078 856	-2 058 581	-66%
South Africa (excluding metros)	2 366 381	643 112	-1 723 268	-73%

Source: Financial and Fiscal Commission's calculations and IHS Markit

Table 5.4 presents changes in the number of households without access to electricity from 2001 to 2022. Overall, the trend in the accessibility of electricity shifted positively as the number of households without electricity access decreased by 66 per cent over the last two decades. Furthermore, the analysis indicates that, in terms of basic electrification, government was able to achieve some relative success over the years. This can largely be attributed to the Integrated National Electrification Programme, which was first initiated in the 1990s, and its subsequent expansion, as well as the Free Basic Service Policy, which provided a certain threshold of free power to underprivileged families. Furthermore, this expansion can be felt in metros where the number of households without electricity dropped by 43 per cent. These numbers were much higher in secondary cities, at 46 per cent. In non-metro regions, the number fell by 73 per cent, showing the much-needed improvement in access to electricity.

Housing in urban areas

Difficulties facing communities living in informal dwellings are numerous. Seeliger and Turok (2014) note that "living in a shack without any security of tenure usually means a precarious existence because people are vulnerable to overcrowding, outbreaks of fire, disease, flooding and other social and environmental hazards." Better housing, however, creates a sense of security that increases resilience to shocks, self-respect and the health of the people (Collier & Venables, 2013). Characteristics of rapid urbanisation include an increase in the number of households in informal dwellings, which happens more in the metros compared to the rest of South Africa (Borel-Saladin & Turok, 2014). In South Africa, the number of households living in informal dwellings increased by approximately 81 000 to 1.6 million between 2001 and 2022 (Table 5.5).

Table 5.5: Number of households living in informal dwellings (2001 vs 2022)

Category	Informal housing 2001	Informal housing 2022	Absolute difference	Percentage change
Secondary cities	296 812	282 027	-14 785	-5%
Metros	932 421	915 081	-17 340	-2%
South Africa	1 609 242	1 690 152	80 910	5%
South Africa (excluding metros)	676 821	775 072	98 250	15%

Source: Financial and Fiscal Commission's calculations and IHS Markit

Table 5.6 shows that the number of households living in informal dwellings in metros decreased from 932 421 in 2001 to 915 081 in 2022, which represents a 2 per cent reduction. On the other hand, secondary cities experienced a decline of 5 per cent, from 296 812 in 2001 to 282 027 in 2022. However, when metropolitan areas are excluded from the overall figure, there appears to be a 15 per cent increase in the number of households living in informal dwellings in South Africa, from 676 821 in 2001 to 775 072 in 2022. This increase shows that the rise in informal settlements remains a persistent issue in South Africa and may be attributed to a combination of several factors, including urban sprawl, rural-urban migration pressures and migration patterns. The decrease in the number of households with informal housing structures in metros and secondary cities may reflect improvements in urban housing policies and urban development.

5.3.3 Urbanisation and service delivery

The Free Basic Service Policy was implemented in South Africa in 2000. According to this policy, municipalities must assess households' ability to pay for municipal services and subsidise those who are unable to pay.

Those who qualify for this subsidy receive the first 50 kWh of electricity free monthly. As more and more households qualify for free basic services, municipal costs also increase. There is a huge consensus among researchers that urbanisation will continue to rise (Asfaha & Jooste, 2006; Landau & Gindrey, 2008). The Free Basic Service Policy is then more likely to lead to the demand for these services exceeding supply. This mismatch between supply and demand impacts the municipality's ability to effectively provide services for communities.

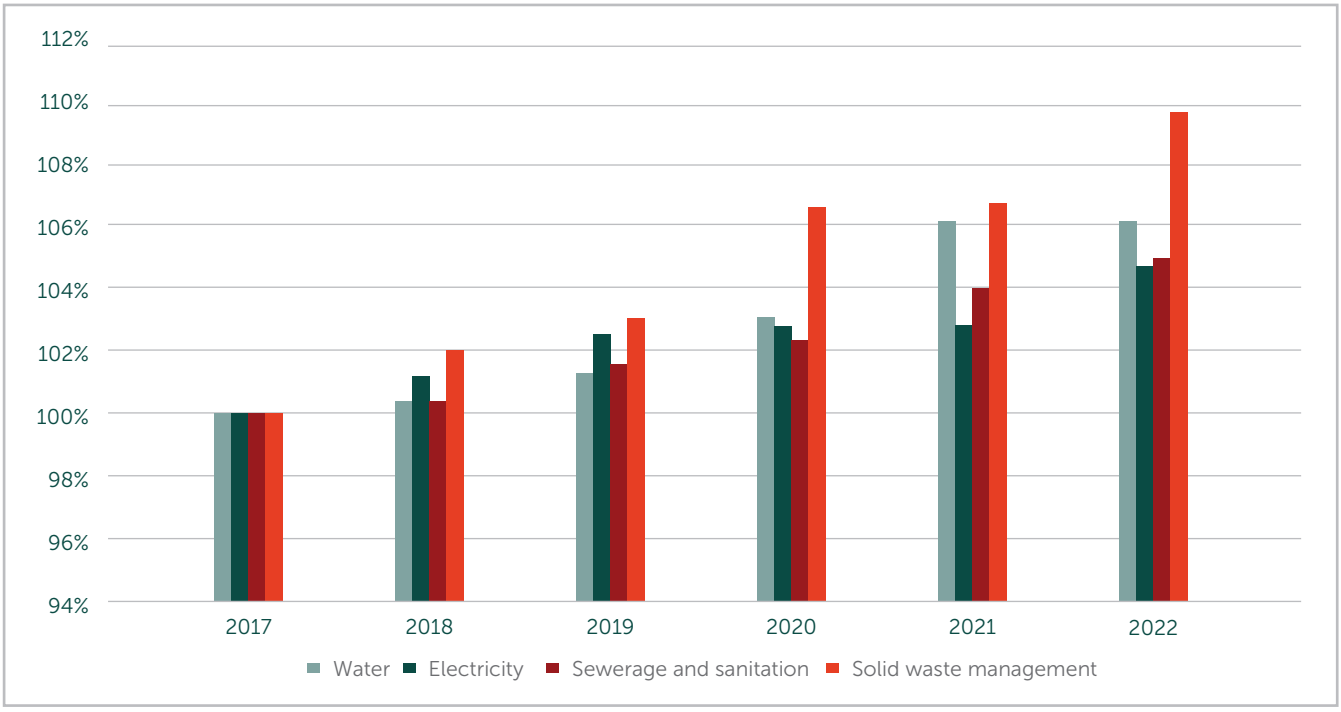
In this study, the assessment of access to services is done in terms of the number of consumer units (domestic and non-domestic) that have access to the basic services of water, electricity, waste removal, and sewerage and sanitation. Data from the non-financial census of municipalities from Stats SA is used to analyse whether there was an improvement regarding access to services provided by municipalities. The basic services' categories were indexed with 2017 as the base year. Indexing the data assists in measuring the status regarding access to basic services when comparing other years relative to the base year.

5.3.4 Access to basic services in the City of Cape Town

The population of the City of Cape Town in 2019 was 4 392 562 million, having grown from 3 478 914 in 2009, with the annual growth rate steadily declining from 2.7 per cent in 2011 to 2 per cent in 2019. The City of Cape Town is home to about 4.4 million people, making it the second-largest metro by population size in South Africa (CoGTA, 2020a).

Figure 5.6 shows the City of Cape Town's trends for access to the four basic services. The figure shows that there is a general improvement in access to basic services in the City of Cape Town. The number of consumer units with access to water increased slightly to 100.4 per cent in 2018 and to 101.2 per cent in 2019. This was followed by a further increase to 103.1 per cent in 2020, while the highest increase was a 106.2 per cent increase in 2021 and 2022, respectively.

Figure 5.6: City of Cape Town's access to basic services, 2017–2022



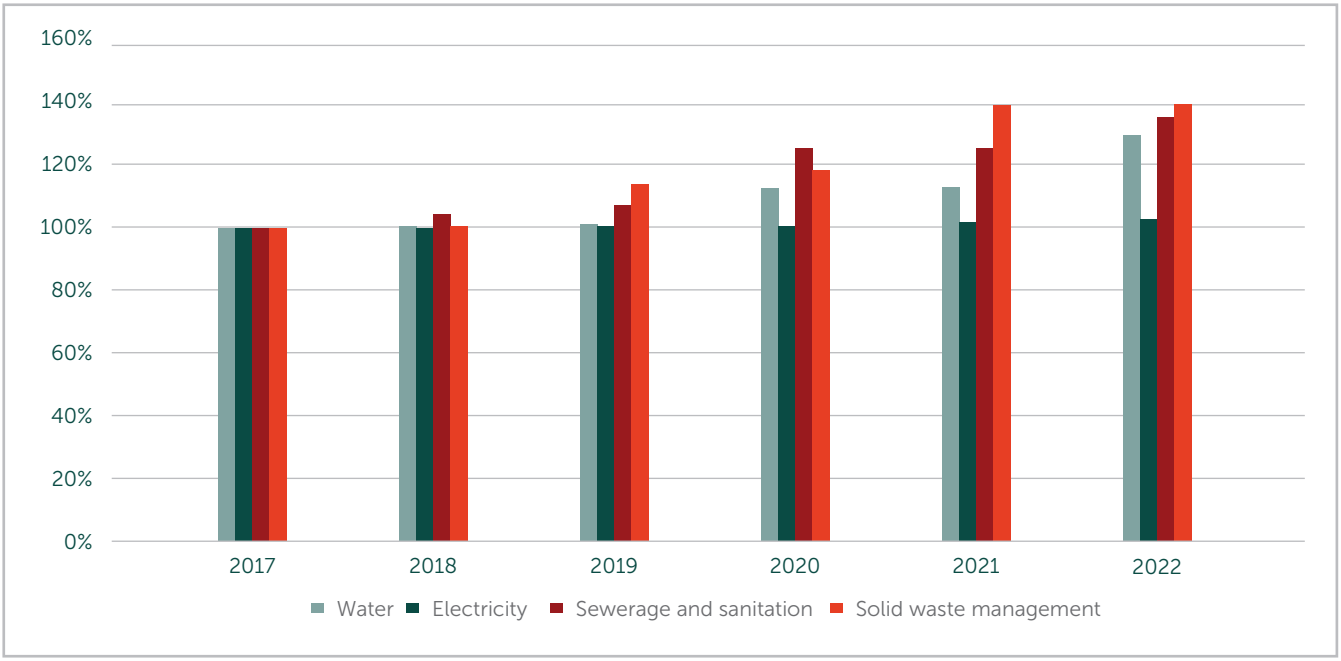
Source: Financial and Fiscal Commission's calculations based on StatsSA data

Figure 5.6 shows that access to electricity increased to 104.8 per cent from 2017 to 2022, while access to sewerage, sanitation and solid waste management increased to 105 per cent and 109.7 per cent, respectively. Generally, it appears that the City of Cape Town has made great strides in ensuring that the quality of life of the people is improved.

5.3.5 Access to basic services in the City of Johannesburg

Johannesburg is home to about 5.5 million people, making it the biggest metro by population size in South Africa. The metro prides itself in being the economic and financial hub of the country. In 2018, the city housed nearly 10 per cent of South Africa's total population. The provision of basic services to the community of Johannesburg is comparatively high, with the majority of households (both formal and informal) enjoying access to piped water (98.8 per cent), sanitation (96.4 per cent) and electricity (92.3 per cent). However, there continues to be a deficit, particularly in informal settlements, where less than half of the households have access to basic sanitation. This backlog is exacerbated by the high population growth and proliferation of informal settlements arising from land invasion that have resulted in 211 informal settlements between 2016 and 2020 (CoGTA, 2020b). Figure 5.7 shows trends for access to the four basic services in the City of Johannesburg metro from 2017 to 2022.

Figure 5.7: Access to services in the City of Johannesburg, 2017–2022



Source: Financial and Fiscal Commission's calculations based on Stats SA data

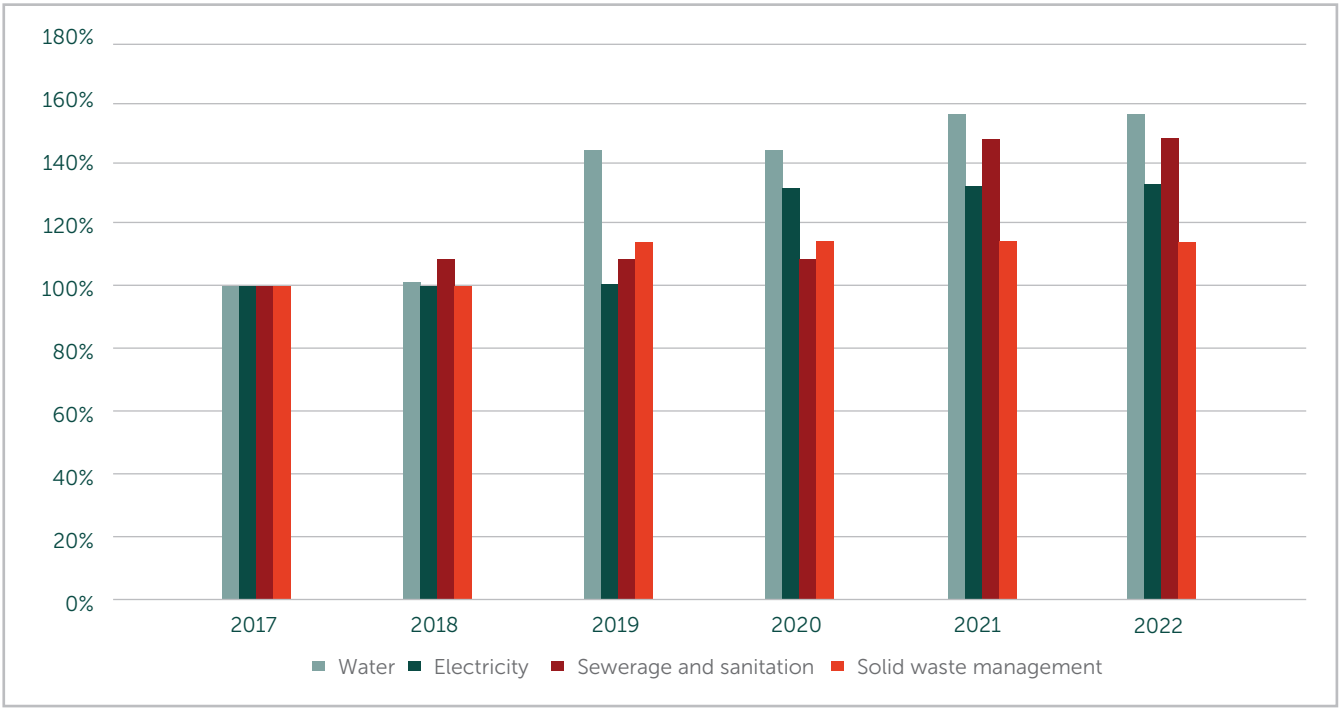
Figure 5.7 shows that there was a general improvement in access to basic services from 2017 to 2022 in the City of Johannesburg. The number of consumer units with access to water, sanitation and waste management increased consistently during the period under review. The highest increase recorded was sewerage and solid waste (139.8 per cent), followed by sewerage and sanitation (136.4 per cent) and water (130 per cent). The consistent increased access to these services shows progress regarding access to basic services in the City of Johannesburg.

Electricity, however, showed a marginal increase of 102.6 per cent from 2017 to 2022. Although this reflects an increase, it also reflects the mounting pressure that was brought about by the rolling blackouts that were implemented across the country to deal with the shortage of electricity.

5.3.6 Access to basic services in the City of Mangaung

Mangaung is one of the eight metropolitan municipalities in South Africa. It is based in the Free State. There are 276 905 households in Mangaung. This is an increase from 265 560 households in 2016 to 231 921 households in 2011. There are 74 per cent of households who reside in a house, and 11.7 per cent who reside in informal shacks. This is slightly higher than the provincial average of 13.99 per cent (CoGTA, 2020c).

Figure 5.8: Access to services in the Mangaung Metropolitan Municipality, 2017–2022



Source: Financial and Fiscal Commission's calculations based on Stats SA data

The Mangaung Metropolitan Municipality also appears to have made improvements in delivering water, electricity, sanitation and waste removal services to its citizens. Figure 5.8 shows that access to the four services has been on an upward trend from 2017 to 2022, with access to water increasing by over 50 per cent during the period. Overall, the city has made great strides in ensuring that the quality of life of the people is improved.

5.3.7 Effects of urbanisation on service delivery

This section presents empirical results obtained using the panel fixed squares regression approach. The section begins by discussing the descriptive statistics of the data. It then moves on to the panel fixed effects regression, followed by the Granger causality test, and concludes with some diagnostic tests. Descriptive statistics are important for understanding the variation in the data.

Table 5.6: Descriptive statistics

	Service delivery	Urbanisation	Density	Unemployment	Gini	Income	Expenditure
Mean	0.239	0.017	2.425	25.877	0.668	4.781	9.777
Median	0.120	0.017	2.212	25.404	0.669	4.682	9.638
Maximum	0.894	0.035	3.465	49.074	0.781	5.765	10.873
Minimum	0.000	0.003	1.636	11.231	0.541	3.931	8.885
Standard deviation	0.263	0.006	0.543	7.766	0.060	0.486	0.537
Skewness	1.048	0.146	0.499	0.4735	-0.269	0.401	0.508
Kurtosis	2.467	3.414	1.890	3.2456	2.006	2.031	1.882
Jarque-Bera	42.897	2.349	20.415	8.774	11.718	14.509	20.917
Probability	0.000	0.309	0.000	0.0124	0.003	0.001	0.000
Sum	52.795	3.862	533.571	5692.855	146.924	1051.859	2151.032
Sum Sq. Dev.	15.211	0.009	64.524	13206.27	0.791	51.678	63.058
Observations	220	220	220	220	220	220	220

Source: Financial and Fiscal Commission's calculation

Panel fixed effects

Table 5.7 presents the results of the panel ordinary least squares. The dependent variable is service delivery, which is represented by a weighted index of the number of consumer units with access to water, electricity, sanitation and waste removal. The independent variables are urbanisation, population density, unemployment, the Gini coefficient, household income and municipal expenditure.

Table 5.7: Panel fixed effects

Variable	Coefficient	Standard error	t-statistic	Probability
Population growth	1.422	0.798	1.782	0.076
Population density	0.052	0.017	3.051	0.003
Unemployment rate	-0.004	0.0007	-5.897	0.000
Gini coefficient	-0.875	0.091	-9.629	0.000
Income	0.509	0.032	15.767	0.000
Expenditure	-0.027	0.027	-0.987	0.325
C	-1.399	0.166	-8.440	0.000
R-squared	0.941	Mean dependent variable		0.239
Adjusted R-squared	0.939	Standard deviation		0.263
Standard error of regression	0.065	Dependent variable		-2.597
Sum squared resid	0.900	Akaike Info Criterion		-2.489
Log likelihood	292.679	Schwarz Criterion		-2.553
F-statistic	564.288	Hannan-Quinn Criterion		0.574
Prob(F-statistic)	0.000	Durbin-Watson statistic		

Source: Financial and Fiscal Commission's calculations

The estimated panel regression is captured in the following equation:

$$Service = -1.48C + 1.42Pop_{it} + 0.05Dens_{it} - 0.004Unemp_{it} - 0.87Gini_{it} + 0.51Income_{it} - 0.03Exp_{i}$$

Where, *Service* is service delivery, which is a computed index of the number of consumer units with access to the four basic services of water, electricity, waste removal and sanitation; *Pop* is population growth and represents the rate of urbanisation; *Dens* is population density; *Unemp* is the unemployment rate; *Gini* is the Gini coefficient; *Income* is average household income; and *Exp* is municipal expenditure.

The empirical findings reveal that there is a positive and significant relationship between urbanisation and access to the basic services of water, sanitation, electricity and waste removal, i.e. a 1 per cent increase in urbanisation leads to a 1.42 per cent increase in service delivery. This finding is consistent with findings from the literature and our a priori expectation. This shows that, as urbanisation occurs, either naturally or through migration, the demand for basic services also increases. The findings are also consistent with the analysis observed in Figure 5.5, which showed that the number of households with access to piped water and electricity, and to improved sanitation has improved considerably in the past two decades in both metros and secondary cities.

The findings also reveal that high unemployment and inequality (the Gini coefficient) have a negative impact on service delivery. This is not surprising as the relationship between service delivery, consumers and municipal revenue takes the form of the principle of social contract in which municipalities are responsible for delivering services for which consumers are expected to pay an agreed price. Although municipalities are obliged to provide services to indigent households, certain areas, especially informal settlements, are still without access to services such as electricity and waste removal due to the inability of the residents to pay for those services. These areas are characterised by high levels of unemployment. In the case of municipal expenditure, the results present an alarming finding as municipal expenditure is expected to bolster service delivery. However, the negative relationship may be attributable to a number of factors, Firstly, poor infrastructure project planning can lead to resource wastage and delayed service delivery. Secondly, neglecting the maintenance of existing infrastructure and overemphasising new projects may result in the deterioration of infrastructure and reduced service delivery in urban areas. Resource wastage through fruitless and wasteful expenditure might explain this relationship.

5.4 CONCLUSION

Urbanisation is an important phenomenon, with far-reaching implications for service delivery, as well as social, economic and environmental implications for South Africa. This study investigates the relationship between urbanisation and municipal service delivery in South Africa. The main question addressed is whether there is a corresponding improvement in service delivery when urbanisation occurs and what the implications would be for municipalities.

The paper highlights several key findings. Firstly, population trends across metropolitan municipalities and secondary cities have tended to coincide with employment growth over the last two decades. This is an important finding as it means that those who migrate to the large cities have better prospects of finding employment and can therefore pay for basic services. However, unemployment is still a concern, even in the big cities, just as it is in other parts of South Africa.

Secondly, the study highlights that the provision of urban infrastructure such as water and electricity has kept pace with urbanisation in metropolitan municipalities and secondary cities. Service delivery has improved over the last two decades, with a higher proportion of households than before living in decent conditions. Both metros and secondary cities have shown that they are able to absorb the pressures that emanate from rising populations; hence, their residents are better off compared to other areas.

However, this should, by no means, translate into complacency, as a sizeable number of urban citizens are still without access to basic services. There is still huge room for improvement.

Lastly, the relationship between urbanisation and service delivery was estimated. The econometric model revealed that there is indeed a positive relationship between urbanisation and service delivery in South Africa. This means that a 1 per cent population growth leads to a 1.42 per cent increase in service delivery in urban areas. The results also show that socioe-conomic factors such as the unemployment rate and inequality have a negative impact on service delivery.

5.5 RECOMMENDATIONS

The Commission makes the following recommendations:

1. *The Commission reiterates its recommendation from the 2018/19 Submission on the Division of Revenue that the Minister of Finance should create an awareness of the land value capture fiscal instruments among large cities and extend the scope of the Financial Management Grant to cater for capacity building in the design and implementation of land value capture mechanisms.*

   Land value captures are a major source of revenue for local governments. Apart from development charges, the South African local government sector is yet to fully exploit land value capture. Land value capture mechanisms have potential in the South African local government system because local authorities and other spheres of government invest significant amounts of public resources in infrastructure.

2. *The Minister of Cooperative Governance and Traditional Affairs, in conjunction with the Minister of Finance, should speed up the review of the local government equitable share formula. The new formula must reflect growth in urban populations, as well as the rising cost of service delivery and the unique challenges faced by urban municipalities.*

   As highlighted elsewhere in the report, urban municipalities play a crucial role in the economic growth of South Africa, with the metros accounting for 47 per cent of the country's GDP. However, their finances are under increased pressure from the rapidly growing population. The fiscal framework needs to respond to the unique challenges faced by individual municipalities, while also considering the rising costs of providing basic services.

3. *Municipal councils should introduce innovative ways for their municipalities to generate revenue. This can be done through the modernisation of the property tax collection system through digital valuation and automated billing systems*.

   This will be particularly important to mitigate against the municipal financial and fiscal pressures that emanate from growing populations in municipalities. It is important that, when urbanisation occurs, municipalities also grow their revenue bases to reflect the growth in population.

5.6 REFERENCES

Asfaha, T.A. and Jooste, A. (2006). The agricultural input elasticity of rural-urban migration in South Africa. *Agrekon 45*(1), 89–105.

Borel-Saladin, J. & Turok, I. (2014). *The growth of backyard shacks in South African cities*. Human Sciences Research Council, Mimeo.

Collier, P. & Venables, A. (2013). Housing and urbanisation in Africa: Unleashing a formal market process. *Centre for the Study of African Economies Working Paper WPS 2013-01*. University of Oxford.

Department of Cooperative Governance and Traditional Affairs (2020a). *Profile: City of Cape Town – September 2020.* Available at: https://www.cogta.gov.za/ddm/wp-content/uploads/2020/11/City-of-CT-September-2020.pdf.

Department of Cooperative Governance and Traditional Affairs (2020b). *Profile: City of Johannesburg – September 2020.* Available at: https://www.cogta.gov.za/ddm/wp-content/uploads/2020/11/City-of-Johannesburg-October-2020.pdf.

Department of Cooperative Governance and Traditional Affairs (2020c). *Profile: City of Mangaung – September 2020.* Available at: https://www.cogta.gov.za/ddm/wp-content/uploads/2020/08/DistrictProfile_MANGAUNG.01072020.pdf.

Glaeser, E. (2011). Cities, productivity, and quality of life. *Science 333*(6042), 592–594.

Jha, S. & Kremen, C. (2013). Urban land use limits regional bumble bee gene flow. *Molecular Ecology 22*(9), 2483–2495.

Landau, L. & Gindrey, V. (2008). Migration and population trends in Gauteng province 1996–2055. *Migration Studies Working Paper Series 42*.

Seeliger, L. & Turok, I. (2014). Averting a downward spiral: Building resilience in informal urban settlements through adaptive governance. *Environment and Urbanization 26*(1), 184–199.

Storper, M. (2013). Keys to the city: How economics, institutions, social interaction, and politics shape development. Princeton University Press.

Turok, I. (2014). *Linking urbanisation and development in Africa's economic revival. Africa's urban revolution*, 60–81. Zed Books.

Turok, I. & Mykhnenko, V. (2007). The trajectories of European cities, 1960–2005. *Cities 24*(3), 165–182.

United Nations Environment Programme (UNEP) (2013). *Integrating the environment in urban planning and management*. UNEP.

United Nations Population Division (2012). *World urbanization prospects: The 2011 revision*. United Nations.

UN-Habitat (2012). *State of the world's cities 2012/13: Prosperity of cities*. UN-Habitat.

World Bank (2013). *Planning, connecting and financing cities – now*. World Bank.

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