South African CitiesNetwork

Urban Resilience in South African Cities

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Foreword

For over a decade, municipalities have faced several shocks, including the 2008/09 global financial and economic crisis, water shortages due to droughts brought about by climate change, the health and socio-economic devastation of the ongoing COVID-19 pandemic. As well as the recent social unrest that was accompanied by an unprecedented level of looting and destruction of businesses and property in Gauteng and KwaZulu-Natal. These will not be the last crises that local governments will face.

These shocks and disruptive events underscore the urgent need to build city and municipal resilience by starting to tackle underlying systemic and structural problems in local government. Moreover, government alone cannot solve these problems that are complex and entrenched, and an all-of-society approach is needed to find long-term and sustainable solutions. In light of this, this publication has identified and interrogated the opportunities shocks and crises present with respect to developing bottom-up city led urban resilience strategies.

It is hoped that both the Research and Strategic Framework and Implementation Guide contained in this publication will provide a valuable reference document, articulating how various ecosystem partners can come together to build resilience in South African cities.

This Strategic Framework and Implementation Guide is not intended as an implementation plan; it should rather be regarded as a guideline document, to serve as a point of departure for cities to develop their own resilience strategies.

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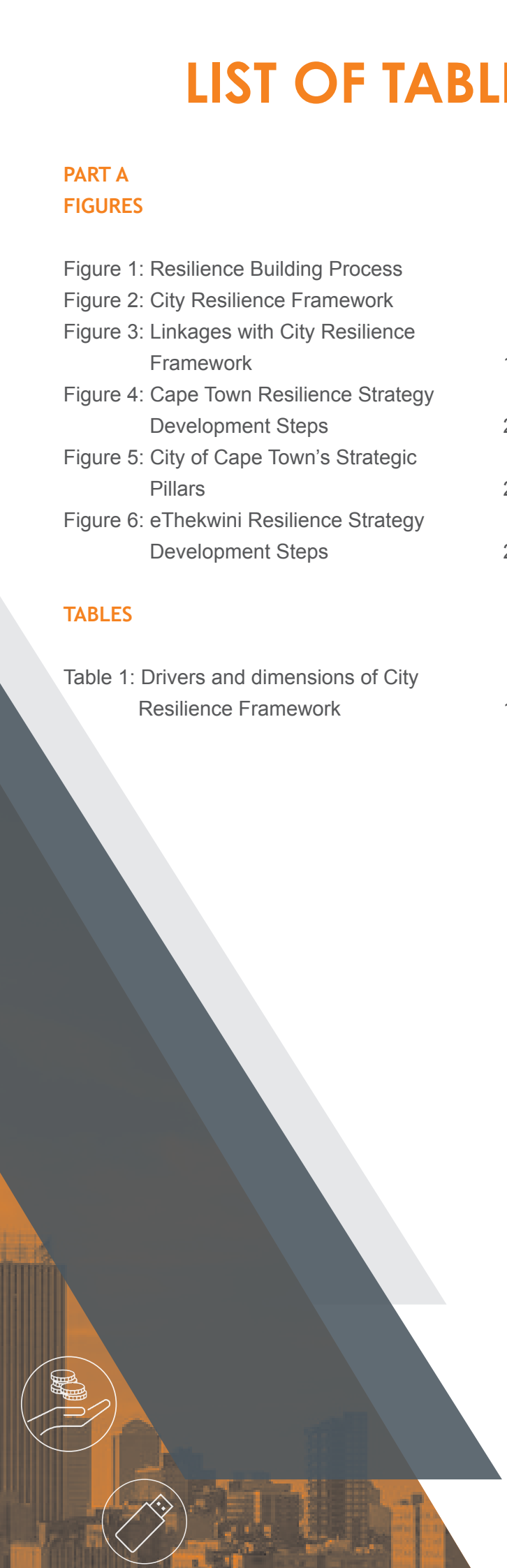

Part A: Research Report

1. Introduction

This report seeks to identify and interrogate the opportunities that crises may present in encouraging development of bottom-up, city-led urban resilience strategies. It also identifies and outlines various opportunities in the area of urban resilience. This report is complemented with an urban resilience strategy document which provides a guideline and serves as a point of departure for cities to develop their own resilience strategies.

1.1 Document Outline

The document consists of four sections:

Section 1: Introduction – This section introduces the study, including an introduction to the Productive Cities Programme within the South African Cities Network and its focus areas. It also describes the project background, the scope of the study, and related deliverables.

Section 2: Policy and Literature Review – This section is an overview of the existing policy and literature relating to urban resilience. It focuses on defining urban resilience, as well as describing it and how it differs from related topics such as sustainability. Further, it describes the ideal outcome of urban resilience, and the key national and international policies that inform it.

Section 3: Utilisation of Urban Resilience Strategies - This section is an overview of metros' approaches to building resilience. It reviews their intent in developing resilience within their respective contexts and provides examples of how metros approach and conduct their urban resilience strategies. Further, it analyses how metros have used their urban resilience strategies during times of crisis, and their perceptions of the success of these strategies.

Section 4: Key Learnings and Recommendations – This section is an overview of the key learnings and recommendations from the study that informed development of an urban resilience strategy for South African cities.

2. Policy and Literature Review

This section provides an overview of the existing policy and literature relating to urban resilience. It focuses on defining urban resilience, and describing what it is and how it differs from related topics such as sustainability. It also elaborates on the Urban Resilience Framework, including resilience building and the desired outcomes of urban resilience. Various resilience topics are discussed.

2.1. Defining Resilience

The sub-sections that follow elaborate on the various definitions of resilience and the multiple understandings thereof, as well as differentiating between resilience, sustainability, and disaster risk.

2.1.1 Resilience

There are multiple ways in which resilience can be understood. The Cambridge English Dictionary provides three broad definitions for 'resilience':

1. The ability to be happy, successful, etc. again after something difficult or bad has happened.

2. The ability of a substance to return to its usual shape after being bent, stretched, or pressed.

3. The quality of being able to return quickly to a previous good condition after problems.

In each of these definitions, resilience refers to returning to the original state after something 'difficult', 'bad' or 'problematic' has occurred. The common use of resilience, therefore, does not relate to creating change, but to the ability to resist external forces that create change.

Within the South African legislative context, resilience is applied in a manner such that change may be considered one of the outcomes. The Department of Environment, Forestry and Fisheries defines resilience in the National Climate Change Adaptation Strategy as "the ability of a social, economic or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity for self-organisation and the capacity to adapt to stress and change":

The definition implies that though small changes will occur after a disturbance, a semblance of 'normality' will remain within the systems and structures of society, the economy, or the natural environment. The definition further implies that capacity can be developed within the social, economic and the natural environment to absorb the disturbance and to return to normality.

Resilience can therefore be viewed as an approach used to address "environmental, socio-economic and political uncertainty, complexity and change. Cities, as a result of their concentration of the world's population, resource consumption, environmental risks and ability to be innovative, have become sites of experimentation for building resilience in both theory and practice."

2.1.2 Urban resilience

The Resilient Cities Network defines 'urban resilience' as "the capacity of individuals, communities, institutions, businesses and systems within a city to survive, adapt and grow, no matter what kinds of chronic stresses and acute shocks they experience".

This definition places resilience within a geographical location, namely cities. As with resilience, the definition of urban resilience suggests that to build resilience, a city must create capacity and systems to resist 'disturbances', which it classifies as chronic stresses and acute shocks. The Resilience Cities Network defines these two disturbances as follows:

- Chronic stresses weaken the fabric of a city on a day-to-day or cyclical basis; for example, high unemployment, inadequate public transport systems, endemic violence, food insecurity and substance abuse.

- Acute shocks are sudden sharp events that threaten a city; for example, drought, fires, floods, disease outbreaks and infrastructure failure.

The key difference between chronic stresses and acute shocks relates to the cycle of disturbance. Chronic stresses refer to regular or continuous disturbances, while acute shocks refer to sporadic disturbances.

As illustrated in Figure 1, it can be argued that within the South African context, the status quo of most cities is a state of chronic stress. In this context, urban resilience is a process focused on improving community capacity and systems to create a resilience dividend that will assist a city to survive, adapt and grow in the case of acute shocks, which further results in the improvement of the city's status quo (including chronic stresses).

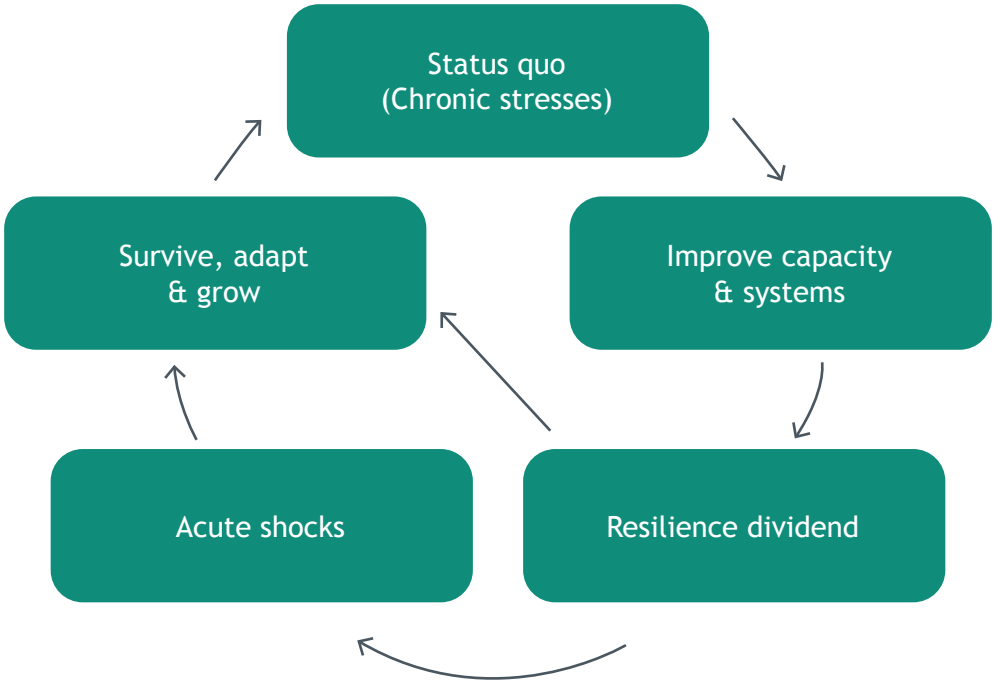

Figure 1: Resilience Building Process
Source: Urban-Econ, 2022

2.1.3 Urban Resilience compared to Sustainability and Disaster Risk Reduction

Urban resilience can be confused with the concepts of sustainability and disaster risk reduction (DRR). Although urban resilience incorporates certain concepts from sustainability and DRR, the terms are not synonymous. Urban resilience transcends these two concepts "with a holistic and proactive approach." In addition, while "sustainability works towards putting the world into long-term balance amid the depletion of natural resources, resilience looks for ways to make systems endure and thrive even in an imbalanced world". Similarly, DRR seeks to minimise the damage caused by natural hazards, while resilience has a broader scope, namely to develop a proactive and integrated plan to address both acute shocks and chronic stresses. "In essence, resilience involves not only coping mechanisms and adaptive strategies, but also transformative actions to make cities better, in good times and bad, in the short term and in the long term."

2.2 Contextualising the Need for Urban Resilience

Cities face numerous disturbances that may threaten their communities, infrastructure, natural environment or economy. Acute shocks are sudden, intense events such as the 2022 KwaZulu-Natal floods or the July 2021 riots. The impact of acute shocks is exacerbated by chronic stresses that weaken the fabric of a community over time, such as high levels of unemployment, limited social safety nets, and inequitable public transportation systems.

Urban resilience is the capacity of a city's systems, businesses, institutions, communities and individuals to survive, adapt and grow, no matter what chronic stresses and acute shocks they experience. By strengthening its underlying fabric and deepening its understanding of the risks that threaten its stability, a city can improve its overall trajectory and the well-being of its communities, infrastructure, natural environment and economy.

In the global context, the megatrends that affect urban resilience include climate change, urbanisation and globalisation. In a South African context, urban resilience also includes tackling the triple threat of unemployment, poverty and inequality, as well as a myriad of social ills, the spatial legacy of apartheid, and corruption and the misappropriation of state resources.

Through an urban resilience lens, cities must be viewed as systems made up of people and places, often experiencing rapid change. Urban resilience, therefore, demands that cities look holistically at their capacities and their risks, including through meaningful engagement with the most vulnerable members of their communities. It should plan for urban resilience by tackling challenges and creating solutions in a place-based, integrated, inclusive, risk-aware and forward-looking manner. Using an urban resilience approach allows cities to enjoy multiple benefits or 'resilience dividends' – maximising the value of every Rand spent; reducing and even helping to prevent the impact of shocks and stresses on the city's people, economy and physical environment; and improving quality of life.

2.3 The Urban Resilience Framework

Figure 2 illustrates the City Resilience Framework (CRF). This is a unique framework developed by Arup and supported by the Rockefeller Foundation, based on extensive research in cities. The CRF underpins the strategy development process as a method for understanding the complexity of urban systems and the drivers that contribute to a city's resilience.

The Urban Resilience Framework (URF) is promoted by the Resilient Cities Network, which consists of cities that are committed to building and investing in urban resilience. The URF framework has been used extensively by over 100 cities globally, including the City of Cape Town and eThekwini Metro.

As seen in Figure 2 the CRF comprises four critical dimensions of urban resilience, namely health and well-being; economy and society; infrastructure and environment; and leadership and strategy. Each dimension is underpinned by three key drivers.

The principles of the Resilient Cities Network approach include the following:

- Resilience is understood by viewing the city as a system.
- The City Resilience Framework (CRF) describes the common components of the city system that must be considered when building urban resilience.
- The CRF is used as the starting point for stakeholder engagement to develop a Resilience Strategy.

Figure 2: City Resilience Framework
Source: Resilient Cities Network. https://resilientcitiesnetwork.org/programs/urban-resilience-program/ Accessed on 11 May 2022.

The CRF does not explicitly state who is responsible for building resilience. Politics (implying a top-down approach to building resilience) and empowerment (implying a bottom-up approach to building resilience) are implied in a few of the drivers, but do not explicitly recognise or address this question. This implies that the CRF is promoting a systems-based approach, rather than a political or empowerment-based approach.

The CRF does suggest that multiple stakeholders must be well informed, capable, and have access to information; and that there must be communication between the state and its citizens aimed at knowledge transfer between the parties. The issue is therefore not whether a bottom-up or top-down development approach is better, but how the two approaches can be coordinated to achieve the best result. Ideally they would meet in the middle, with the bottom-up approach setting and implementing the framework, and the top-down approach helping to channel resources.

2.3.1 Resilience Building

The Resilient Cities Network iterates that for cities to become resilient, they must channel investments to solutions that maximise impact for every Rand spent. High-impact solutions yield multiple benefits, such as more equitable access to basic services, better employment, and climate-resilient infrastructure. Resilience is best understood as a process, encompassing aspects of sustainability such as climate change adaptation, smart city development, integrated risk management and disaster preparedness.

Essentially, resilience building refers to the process in which specific areas or issues are addressed simultaneously to reduce risk and enhance resilience in the city. Building urban resilience requires a holistic approach as a means to better understand the interdependencies between shocks and stresses. Though shocks and stresses cannot be predicted, the information and experience available can be utilised to identify vulnerabilities and potential vulnerabilities, so as to increase resilience and make the necessary adjustments.

The extent of an issue or challenge cannot be measured before a shock event, and is best understood in the aftermath of such an event. Using all available knowledge and with the best available predictive capabilities, a city can only strive to overcome its vulnerabilities in order to be increasingly resilient, adjusting as and when new realities emerge.

In the context of South African cities, chronic stresses are usually related to poverty, inequality and high levels of unemployment. In addition, factors such as basic service delivery and government effectiveness may also be viewed as chronic stressors. Therefore, building resilience in dealing with these systemic issues is essential in mitigating existing and future risks. Building resilience is a dynamic process, in a reality where the only thing that can be predicted with certainty is constant change. In this sense resilience differs from sustainability, for which there are objective measures of attainment.

Key ideas that were highlighted during eThekwini's 100RC process are that urban resilience is about how cities prepare for current and future change, and that preparing for this change requires the integration of agendas such as climate change adaptation, climate change mitigation, disaster risk reduction, biodiversity, equity, sustainable development and poverty reduction. Issues of politics and governance are also central to the resilience narrative. Given the chronic developmental and governance challenges facing cities such as eThekwini, this evolving understanding of resilience suggests that it should be seen not as an endpoint, but as a step in a broader journey towards transformation. Transformation may also require that resilience be increased in some systems and reduced in others. Such a systemic approach will require that multiple connected resilience issues are addressed simultaneously if meaningful and effective outcomes are to be produced.

2.3.2 Outcomes of Urban Resilience

The 'resilience dividend' is the return on resilience investments, whether it is a financial return or a more qualitative return such as reduced inequality or increased social cohesion. The resilience dividend captures the idea that building resilience realises benefits both in times of crisis and in times of calm. Additionally, a resilience dividend can be viewed as a specific intervention that starts with one purpose and adds other benefits to make the community stronger and more resilient.

2.4 Urban Resilience Topics

Interrogating the SACN urban resilience topics is not in the scope of this study; but a brief outline of these topics is required, in order to contextualise the study. The key research topics to be used as reference points when identifying opportunities, as outlined in the remainder of this subsection, include:

- Adaptive municipal governance and finance during crises in cities.
- Data-driven approaches to monitoring regression and progress towards spatial transformation in cities during times of crisis.
- Cities in crisis: leveraging innovation to respond to a crisis in the face of the crisis.
- Inclusive city economies: protecting livelihoods in times of crisis.
- Innovation in cities as a driver for adaptability in times of crisis.

2.4.1 Adaptive Municipal Governance and Finance

To absorb and better mitigate chronic and acute shocks at municipal level, there is a need for a more adaptive and flexible approach to governance and finance. Chronic stresses are then more easily predicted, and in some cases become an ongoing systemic problem. Therefore, preparation and foresight are essential in mitigating and alleviating these inherent risks. The truth of this may be seen in the dire effect the global COVID-19 pandemic has had on South African municipalities, especially with regard to financial resilience.

The chronic stresses plaguing South Africa have been exacerbated by the pandemic, bringing into question the ability of the government to react timeously to more acute stresses to the economy, and their socio-economic implications. The digitisation and e-governance of South African municipalities has the potential to provide several benefits and reduce some of the existing uncertainties.

e-Governance is regarded as the application of information and communications technology (ICT) to governance processes and decision-making, in ways that provide regular opportunities for citizens and communities to receive information about government activities and to participate in government decision-making at relatively low cost. However, due to the disparity in access to resources among South Africans, the transition towards e-Governance must follow a two-pronged approach, where less technologically advanced portions of society are not overlooked. e-Governance has a multitude of benefits for decision-making and enabling a swift response to issues, especially when a crisis strikes. A more informed approach towards municipal finance and governance can lead to numerous opportunities relating to resilience, particularly in the urban landscape. Opportunities may include swifter response to queries and applications, meeting basic service delivery needs and a general improvement in cybersecurity.

2.4.2 Data-Driven Approaches Towards Spatial Transformation

To react appropriately to predicted and unforeseen challenges, a data-driven approach can be taken. This entails the swift collection, transformation and sharing of key financial, economic and socio-economic indicators as a means to better understand the current situation in a particular urban area. The City of Cape Town has shown the value of using data and models to define their response strategy to crisis: both short- and medium-term measures were used to combat the negative implications of the COVID-19 pandemic.

The ability of technology to play a meaningful role in better assessing and mitigating urban shocks and stresses is steadily increasing, as new products and services are brought to market and then mature. Recent technological innovations include:

- Cloud computing
- Data analytics
- Mobile communications
- Social applications

These have come together to define the digital transformation of city operations and service delivery, and play a critical role in supporting urban resilience. Cities can leverage these new technologies to enhance decision-making, improve service delivery, crowdsource solutions, and engage with citizens more directly.

2.4.2.1 Urban Data & Indicators

With growing urbanisation meaning that most

people now live in metropolitan areas, monitoring the performance of cities is important. Urban data is critical to effective planning and management in increasingly complex urban contexts, and allows cities to proactively drive evidence-based decision-making for planning and policy development. Good urban data and indicator sets allow for comparison between cities, and over time, enable cities to see whether or not they are achieving their objectives. The SACN analyses data and assists cities in proactively managing their data and information, to achieve the following:

- Allow for effective planning and management in increasingly complex urban contexts.
- Simplify complicated information sets into easy-to-understand groups of urbanisation viewpoints.
- Enable easy current comparisons between different cities in South Africa.
- Give cities an accurate idea of how well each city is achieving its city development goals.

High-quality data is essential for robust decision-making, particularly in complex urban environments confronted by rapid urbanisation, climate change, globalisation and fast-moving technological change. For decision makers to deal better with longstanding stresses and prepare for both known and unknown shocks to urban systems, data that generates rapid insight will play a key role in developing resilience strategies.

2.4.2.2 Urban Safety

For cities to maximise their role in improving lives, they must be safe. Rates of crime and violence are highest in cities, meaning that they cannot meet their developmental potential. It is important to define the policies, strategies and practices necessary for urban centres to be inclusive, allowing people from all walks of life to reap the benefits of living in cities. Having access to crime statistics and analysing the data trends may provide the opportunity for cities to better understand and mitigate against the negative effects of crime; allocation of resources relating to public safety, such as police 'boots on the ground' and CCTV monitoring, can be directed towards areas that typically experience higher levels of crime and social unrest.

2.4.2.3 Mobility and Transport

A key aspect of developing successful cities is ensuring that there is a safe, reliable and affordable public transport network to provide all urban citizens with the mobility needed to travel between their homes and workplaces, and to attend to their daily needs.

The South African Cities Network (SACN) has developed a Mobility and Public Transport programme which aims to deepen understanding of sustainable, integrated and equitable transport options in urban areas. The SACN has identified nine urban transport modes in South African cities:

- Walking
- Cycling
- Bus Rapid Transit (BRT) System
- Municipal Buses
- Metro Rail
- Gautrain
- Gautrain Bus
- Minibus Taxi
- Car (owned, metered taxis and 'Uber'-type taxis)

It is clear that South African cities provide citizens with several transport options. However, some citizens continue to struggle with ease of access to transport. There are several reasons, including the cost of transport, the availability of transport in certain areas and the perceived safety of transport modes. Having a data-driven approach to understanding these factors would allow cities the opportunity to identify shortfalls in the mobility of their citizens, and react and make provision accordingly. This is particularly important for achieving spatial transformation in the cities and urban areas of South Africa. In addition, not only will this mitigate against challenges and risks regarding mobility and transportation, it will also enable opportunities to be identified. Understanding the movement and accumulation of people will provide decision-makers with valuable information regarding the placement of economic infrastructure and services that better suit the needs of the population.

The City of Cape Town has made efforts to increase the availability of transport and reduce traffic congestion. Increased commitment from large institutions has alleviated congestion through innovative working arrangements and behavioural change, resulting in a reduction in single-occupancy vehicles on the roads during peak times, with a resilience dividend of decreased carbon emissions.

By applying a resilience lens to transport, cities can encourage sustainable mobility through planning for streets as well as street reserves (which include sidewalks) and prioritising public transport, while recognising the dependencies between transport infrastructure and other critical city systems such as water, energy and waste, the economy, and society.

2.4.3 Leveraging Innovation to Respond to Crisis

This leverages innovation to respond to crisis while in crisis, through design and planning for resilience within the context of climate change and other natural disasters.

2.4.3.1 Built Environment

'Built environment' refers to the physical entities (hard infrastructure) that make up the city. This includes roads, sidewalks, buildings, water pipes etc. Liveable places require good-quality infrastructure to be provided in a coordinated way to connect people to the places and services they require daily. The SACN focuses on integrated built environment outcomes – in both the physical form of infrastructure but also how the environment connects to peoples' lived experiences and aspirations, to create spatially transformed cities.

The Built Environment Performance Plan (BEPP) is guiding a variety of spatial targeting initiatives, public investment programmes and regulatory reforms to improve urban productivity and inclusivity.

2.4.3.2 City Institutions and Integration

The SACN's focus on institutions and integration in the built environment follows the recommendation from the State of Cities Report IV that spatial transformation is about more than understanding spatial relationships; it requires changes in power and politics, institutions, intergovernmental relations, management skills and capacity. This area of work is driven by a community of built environment city practitioners called the Built Environment Integration Task Team (BEITT).

2.4.3.3 Human Settlements and Housing

The spatial remnants of apartheid are still encountered, e.g. poor black people living far away from opportunities. This focus area documents and measures the correlation between where people are and their access to opportunities that could improve their well-being and increase sustainable livelihoods. Though informal settlements aren't usually classified as being part of an urban area, in the South African context, several informal settlements are located just outside the urban edge, primarily due to urban sprawl. Thus, in some cases informal settlements are viewed as being part of an urban area or city.

Durban has adopted a progressive approach to informal settlements, which in many ways shapes national government responses to informality and upgrading. The city accepts informal housing as part of the urban fabric, and has developed innovative processes to deal with it. These include extensive stakeholder engagement and the establishment of partnerships with relevant organisations. Through collaboration with multiple stakeholders, innovative solutions are reached regarding issues such as electricity access, ablution blocks and pathways.

2.4.3.4 Design and Planning – climate change and other natural disasters

The most prominent design and planning proxies influencing resilience include diversity, connectivity and modularity.

In urban form, geometrical diversity (at the various scales) sustains the changes to the urban space over time, balancing the need to preserve a unique identity and incorporate new elements in response to changing requirements, in order to succeed despite changes in economic conditions, demographic composition, technological innovation and culture.

Connectivity in terms of urban form is described as relative accessibility and ease of movement within and across different parts of an area. The role of connectivity in relation to resilience is to ensure that different components within the same system are linked to each other through multiple links, promoting robustness to random failure, streamlining recovery processes, and increasing adaptability.

'Modularity', in urban forms, describes morphologies where each unitary component fits together with similar-scale components to form higher-level coherent wholes; at the same time, it itself is a collection of lower-level elements.

2.4.4 Inclusive City Economies

Inclusive city economies protect livelihoods in times of crisis. This section is a review of the types of economic activities that have proven resilient and most beneficial to sustaining livelihoods for youth from disadvantaged households in times of crisis. The focus is on digital skills and digital work.

2.4.4.1 Productive and Inclusive Cities

Productive cities aim to boost their economic competitiveness by focusing on economic growth, job creation and infrastructure investment. The benefits to having skilled labour, capital and institutions in one locality in South African cities enable productivity and competitiveness for reaping the urban dividend. This programme addresses the challenges that cities face in making the local economy accessible and socially inclusive – creating pathways out of poverty.

From a global perspective, to make sure that tomorrow's cities provide opportunities and better living conditions for all, it is essential to understand that the concept of inclusive cities involves a complex web of multiple spatial, social and economic factors:

- Spatial inclusion: urban inclusion requires providing affordable necessities such as housing, water and sanitation. Lack of access to essential infrastructure and services is a daily struggle for many disadvantaged households.

- Social inclusion: an inclusive city needs to guarantee equal rights and participation for all, including the most marginalised. Recently, the lack of opportunities for the urban poor and greater demand for a voice from the socially excluded have exacerbated incidents of social upheaval in cities.

- Economic inclusion: creating jobs and allowing urban residents to enjoy the benefits of economic growth is a critical component of overall urban inclusion.

The spatial, social and economic dimensions of urban inclusion are tightly intertwined and tend to reinforce each other. On a negative path, these factors interact to trap people into poverty and marginalisation; working in the opposite direction, they can lift people out of exclusion and improve lives.

2.4.4.2 Sustaining Livelihoods for the Youth

For generating long-term economic inclusivity, it is important to focus on sustaining the livelihoods of the youth. A focus on youth development and the upliftment of the youth out of disadvantaged households or backgrounds will reap a multitude of positive economic benefits. Therefore, assessing the nature of the current economic activities in a city will allow for improved understanding of what types of activities tend to be more resilient in times of crisis. Considering the importance of the Fourth Industrial Revolution (4IR), the need for a more digitised society and the demand for digital skills and digital work are both increasing.

As an example, over three to four years the City of Tshwane has partnered with Microsoft and other industry partners to train over 400 youth in coding and other digital skills, such as how to use their cell phones to apply for jobs and manage their businesses. The city has also partnered with National Treasury on the City Procurement Programme, which addresses issues relating to digital skills development, especially within townships, where the youth are utilised to map the area (especially key nodes) to develop reference points for the city to improve the provision of emergency and other municipal services.

Therefore, advancing the skills of the youth within a city has the potential to benefit the youth as well as the objectives of the city, providing a long-term approach to inclusivity and sustainability.

2.4.5 Innovation as a Driver for Adaptation

Multiple key interventions have been identified to encourage innovation as a driver for adaptation. The most prominent are:

- Business development and innovation support: Innovation is applied as a tool to aid in network support and capacity building of various role players.

- Research and development support: Research and development within an area are often focused on identifying certain economic sectors with potential, and identifying special challenges or needs present.

- Investment in broadband networks: Government investment in broadband networks for lagging areas is prominent, with the support of local entrepreneurs

- Innovation and network expansion: Many NGOs and government-supported initiatives focus on strengthening the levels and quality of research and development in an exclusive place-based manner.

- Increased integration through mobility infrastructure: Investment in infrastructure, particularly transport infrastructure for increased regional integration, is a strong policy action for linking rural areas to economic opportunities.

- Improved social infrastructure: Improved quality of social infrastructure is seen as a device to retain residents and even entice others to more remote areas, supported by tax incentives in some cases.

- Clusters and centres of expertise: Area-specific or place-based tools feature prominently in the development of clusters and centres of expertise. Cluster development and the specialisation of sectors are especially promoted in rural areas with a comparative advantage in natural resources. Cluster policies include innovation clusters as well as SMME (Small, Medium and Micro-Enterprise) development.

- Skills development: Skills training is regarded as a means to attract and retain a qualified and skilled workforce, as an answer to the depopulation of many rural regions. The skills training of local government officials is a pressing issue in many areas. This intervention is often informed and supported by a strong focus on public participation and community-led growth approaches.

- Special Economic Zones (SEZs): SEZs target specific regions and places based on comparative advantage.

- Bulk services: Services are supported using large-scale infrastructure investment, as well as incentive schemes and grants to local authorities.

2.5 Key Policies & Plans

The following subsection elaborates on policies and plans deemed to be relevant to urban resilience. International policies and plans include the United Nations Sustainable Development Goals and New Urban Agenda. Local policies and plans most relevant to urban resilience include the Constitution, the National Development Plan 2030, the National Spatial Development Framework, and the Integrated Urban Development Framework.

To conduct the review of the identified policies and plans regarding urban resilience, the City Resilience Framework was used as a benchmark to determine the manner in which urban resilience or related themes are included in current policies and plans.

As discussed above (in Section 2.3 of this report), the City Resilience Framework is a tool used to investigate a city's resilience through the lens of four essential dimensions of urban resilience. Each of these dimensions contains three drivers, as captured in Table 1 below.

Table 1: Drivers and dimensions of City Resilience Framework

DIMENSION	DRIVER
Leadership & Strategy	Promote leadership & effective management Empower a broad range of stakeholders Foster long-term & integrated planning
Health & Well-being	Meet basic needs Support livelihoods & employment Ensure public health services
Economy & Society	Promote cohesive & engaged communities Ensure social stability, security & justice Foster economic prosperity
Infrastructure & Environment	Provide & enhance protective natural & man-made assets Ensure continuity of critical services Provide reliable communication & mobility

2.5.1 International Policy and Plans

Key international plans considered that relate to resilience are the UN's Sustainable Development Goals and New Urban Agenda.

2.5.1.1 Sustainable Development Goals

The Sustainable Development Goals (SDGs) were adopted by the United Nations in 2015 as a universal call to action to end poverty, protect the planet, and ensure that by 2030, all people will enjoy peace and prosperity. SDG11 speaks to "making cities inclusive, safe, resilient and sustainable".

The SDGs view resilience, sustainability and inclusive cities as separate yet interlinking topics. In the SDG these topics are described as follows:


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- 'Resilience' speaks to infrastructure, processes and mechanisms that enhance the resilience and adaptation strategies of cities to combat disaster risk, climate change and variability, and crisis.

- 'Sustainability' refers to meeting the development needs of cities today, without compromising the ability of future generations to do the same. Sustainability of cities in urban governance, therefore, relates to financial and human resources, energy, health, food, and environmental and political security; while taking into consideration economic, cultural, religious, racial, gender and inter-generational disparities, and the need for continuity in being sufficient.

- 'Inclusive cities' refers to the ability of all people to pursue urban, social and spatial freedoms. In other words, citizens must be empowered to participate in the planning, development and management of the city.

The SDGs describe resilience, sustainability and disaster risk reduction and management as separate, yet interlinking issues. They recognise resilience as a strategic outcome that can assist cities to overcome a variety of threats and disasters.

2.5.1.2 New Urban Agenda

The New Urban Agenda represents a shared vision for a better and more sustainable future – one in which all people have equal rights and access to the benefits and opportunities that cities can offer, and in which the international community reconsiders the urban systems and physical form of our urban spaces to achieve this.

The New Urban Agenda recognises that cities and human settlements face unprecedented threats from unsustainable consumption and production patterns, loss of biodiversity, pressure on ecosystems, pollution, natural and human-made disasters, and climate change and its related risks (Section 63). It further recognises cities' demographic trends and their central role in the global economy (Section 63).

The New Urban Agenda provides contextualisation for resilience, stating that resilience in cities and human settlements can be developed through the "development of quality infrastructure and spatial planning, by adopting and implementing integrated, age- and gender-responsive policies and plans and ecosystem-based approaches in line with the Sendai Framework for Disaster Risk Reduction 2015-2030 (Section 77).

Resilience is both an outcome that interlinks with other strategies, and an activity. Resilience can be achieved through the built environment, town planning, the economy, the natural environment, and municipal finance.

2.5.2 South African Policy and Plans

Although there are limited local policies and plans that refer directly to resilience, there are several that relate to resilience as defined and discussed in the context of this study. The most important of these policies and plans are discussed in the remainder of this subsection, and include the Constitution of South Africa, the National Development Plan 2030, the National Spatial Development Framework, and the integrated Urban Development Framework.

2.5.2.1 The Constitution of South Africa

The Constitution of South Africa ('the Constitution') does not refer directly to resilience. However, several sections do relate to resilience or have an impact on resilience as it relates to developing or enforcing stronger systems and building capacity within a municipality or among its communities.

The Constitution supports the notion that an urban resilience strategy should be a whole-of-government and a whole-of-society intervention. Although none of these sections relate directly to resilience, they do outline three basic concepts relevant to resilience, namely:

- Local governments and their communities must engage on local matters.
- Local governments are responsible for governance within a local area, implying that they are the sphere of government most suited for developing an urban resilience strategy to strengthen local systems and capacity.
- National and provincial governments are responsible for assisting local government to develop capacity.

2.5.2.2 National Development Plan, 2030

The National Development Plan is an overarching strategy for the development of South Africa. It takes into consideration all aspects of South Africa and provides an outcome-based response to the nine biggest challenges facing South Africa, namely:

1. Too few South Africans in work
2. The quality of school education for most black people is substandard
3. Poorly located and inadequate infrastructure limits social inclusion and faster economic growth
4. Spatial challenges continue to marginalise the poor
5. South Africa's growth path is highly resource-intensive and hence unsustainable
6. The ailing public health system confronts a massive disease burden
7. The performance of the public service is uneven
8. Corruption undermines state legitimacy and service delivery
9. South Africa remains a divided society.

Although the National Development Plan does not directly address resilience, its systematic approach towards building systems and capacity within government and communities aligns well with the notion of building resilience.

2.5.2.3 National Spatial Development Framework

South Africa has a suite of spatial policies which includes the National Spatial Development Framework (NSDF) and the Integrated Urban Development Framework.

The NSDF suggests that resilience can be enhanced through a polycentric system, where a functionally integrated system of settlements/nodes of varying sizes can co-exist and collaborate in mutually beneficial ways.

2.5.2.4 The Integrated Urban Development Framework

The IUDF is the institutional mechanism for implementing the NDP. Approximately 75% of the strategic priorities are focused on institutional and financial mechanisms for enhancing urban development. The IUDF is primarily focused on the 'software', making sure that the operating system works effectively. All levers and priorities are aligned with the NDP.

According to the IUDF, people are increasingly facing risks such as floods, earthquakes, infectious diseases, crime and fires, as well as transport and industrial accidents. These risks are increasing due to the high concentrations of people in urban areas. Urban growth and development generate and amplify these risks.

Urban areas contain homes, other buildings and infrastructure. If urban development is poorly managed, then new and existing human settlements or infrastructure will be exposed to additional risk.

These risks may undermine efforts to transform urban areas and to create spaces of opportunity, investment and safety. Increased risk may result in more losses to government, the private sector and communities. It is therefore prudent to reduce disaster risks that can protect the population, the built environment, infrastructure and national resources from these losses.

The IUDF Implementation Plan was developed during the COVID-19 pandemic. The pandemic challenged

the implementation of a national response in our cities and towns, especially in townships and informal settlements. During the implementation of the IUDF, it was recognised that dedicated focus needed to be applied to issues of resilience in our cities and towns, especially townships and informal settlements.

2.5.3 Linkages with City Resilience Framework

Each of the various policies and plans discussed in the preceding subsections relates to resilience in some manner, either directly or indirectly. Figure 3 below indicates the manner in which plans and policies indicate urban resilience and/or themes related to urban resilience.

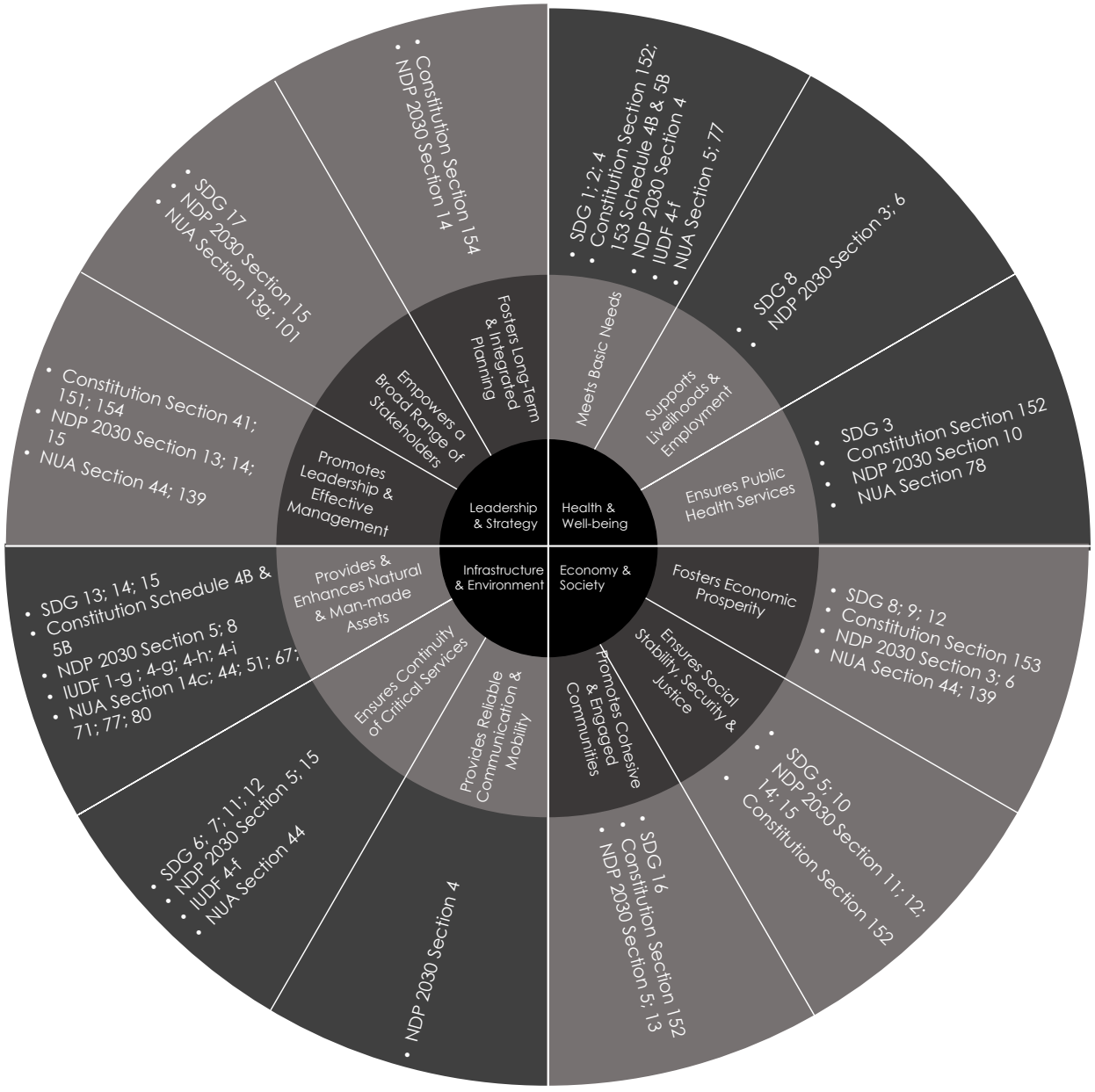

Figure 3: Linkages with City Resilience Framework


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3. Status Quo of Urban Resilience Strategies

3.1 Resilience Strategies within South African Metros

3.1.1 Status Quo of Resilience Strategies

This subsection outlines the current situation regarding urban resilience and urban resilience strategies adopted by South African cities and municipalities. It therefore considers existing urban resilience strategies and how they have been implemented.

3.1.1.1 Existing Urban Resilience Response Strategies

South African cities range from having an overarching resilience strategy to having limited or no resilience strategies.

Two municipalities, the City of Cape Town and eThekwini, are members of the Resilient Cities Network and have developed city-level resilience strategies. An interesting contrast between the two is the variation in focus of their strategies. The Cape Town Resilience Strategy focused on building resilience among its communities, i.e. its interventions suggest a preference for a bottom-up approach. The Durban Resilience Strategy focused on building metro institutional resilience, i.e. its interventions suggest a preference for a top-down approach.

Metros such as Buffalo City, Tshwane and Johannesburg do not have overarching resilience strategies, and only refer to resilience within a single topic area, such as township or informal settlement development (Buffalo City), climate change (Tshwane) or food resilience (Johannesburg).

What stood out during stakeholder engagements were the variations between metros in their interpretation of 'resilience', and how their resilience strategies were applied.

- At the City of Cape Town and eThekwini, there are urban resilience officers that sit at Exco level. At Tshwane, resilience is not officially discussed at top-management level. It was further indicated by some metros that departments may have internally focused resilience strategies.
- In many metros, resilience is not viewed as a topic on its own, but rather as a cross-cutting theme within another strategy or plan, such as disaster management, climate change adaptation and mitigation strategies, business continuity (Tshwane), Climate Change and Green Economy Action Plan, etc.

3.1.1.2 Resilience Strategy Implementation

During engagements, several metros indicated that they had been found wanting during the recent COVID-19 lockdowns, the July 2021 riots, and the 2022 floods in KwaZulu-Natal and other parts of South Africa. However, most of the metros that did not have overarching resilience strategies indicated that their respective metros showed resilience through several key initiatives:

- The establishment of a multi-department response team that included high-ranking metro officials.
- This team was supported through the development of ward-level response teams that included local councillors.
- This hub-and-spoke operating model allowed the ward-level response teams to provide inputs into the immediate needs of the community to the multi-department response team, who in turn were responsible for prioritising interventions, re-allocating allocated funds and completing the administration to allocate funding to unfunded mandates, where applicable.
- Some metros indicated that they did not have to fund any unfunded mandates as they had managed to operate within their existing mandates. Others reported providing vouchers and funding to specific communities such as informal traders. In many of these cases, the metro received support from other spheres of government or public entities to help fund these interventions.
- Most metros agree that these crises were catalysts for improved cooperation and collaboration between various spheres of government and public entities.
- The level of cooperation and collaboration with the private sector varied, with some metros indicating high levels of goodwill and support,

while others indicated limited cooperation and collaboration.

- Most metros indicated low levels of direct engagement with local communities apart from through the ward-level response teams. Some metros indicated that local communities tended to have very high – and in some cases, unrealistic – expectations of the metro, which put significant strain on the levels of cooperation and collaboration between the metros and their communities.

- Metros further indicated that the information they had gathered during one crisis was useful during another; e.g. Johannesburg gathered contact details for informal traders during the COVID-19 lockdown which was used to contact and assess the need for support to these informal traders during and after the July 2021 riots. This enabled the City to identify and provide support to the affected informal traders allowing them to continue to trade and earn a livelihood.

- Most metros are considering ICT access and e-governance services as a priority. However, engagements indicated that not all participants had considered these interventions as part of resilience building. This is a strong indication that resilience has not been imbedded or institutionalised within these metros.

The key takeaway from the above is the diversity in implementation and focus areas between the various metropolitan municipalities. Additionally, cities are largely reactive, and rely heavily on the emergence of a crisis to build or bolster resilience. Resilience strategies in South African cities are therefore unique to the objectives of each city, and to the current socio-economic situation experienced in each city,

Case Studies: Metro Resilience Strategies

This section will focus on the process followed by the City of Cape Town and eThekwini Metropolitan Municipality for the development of the Cape Town and Durban resilience strategies.

3.1.1.3 City of Cape Town

The City of Cape Town has a dedicated urban resilience strategy. This section will discuss the process that was used to develop the Cape Town Resilience Strategy.

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Goals

The Cape Town Resilience Strategy is a commitment to ensure that the city thrives in the future, regardless of its challenges. The strategy does not in itself seek to direct how resilience should be built across all systems or thematic areas in the city, or to replace any existing City government strategy. It is a commitment to work together, with a common vision, across government departments, different spheres of government and with individuals and organisations across the city as a whole.

Through the Cape Town Resilience Strategy, the City of Cape Town calls on all spheres of government, business, academia and community-based organisations to pledge to build their capacity to understand and manage vulnerabilities, interdependencies and risks for everyone in Cape Town, by:

- Investigating and understanding how shocks and stresses create city-wide and local place-based risks for their organisation.

- Engaging with the people in the city who are most impacted by their decisions.

- Clarifying their role in building Cape Town's resilience.

- Engaging in training and capacity building across their organisation.

- Developing an action plan for their organisation and adopting the directions for resilience.

- Undertaking action and investment in initiatives which strengthen resilience.

The Strategy calls on Capetonians to participate actively in building resilience, by:

- Establishing a quick and easy network of support with three key contacts and neighbours.
- Volunteering to support your community by joining a local community group or neighbourhood watch.
- Using checklists of actions to make an emergency plan and sharing it with their support network.
- Organising or participating in a community or neighbourhood event and getting to know someone they do not already know.
- Learning new skills, such as first aid, that could help them, their family and community during a shock event.

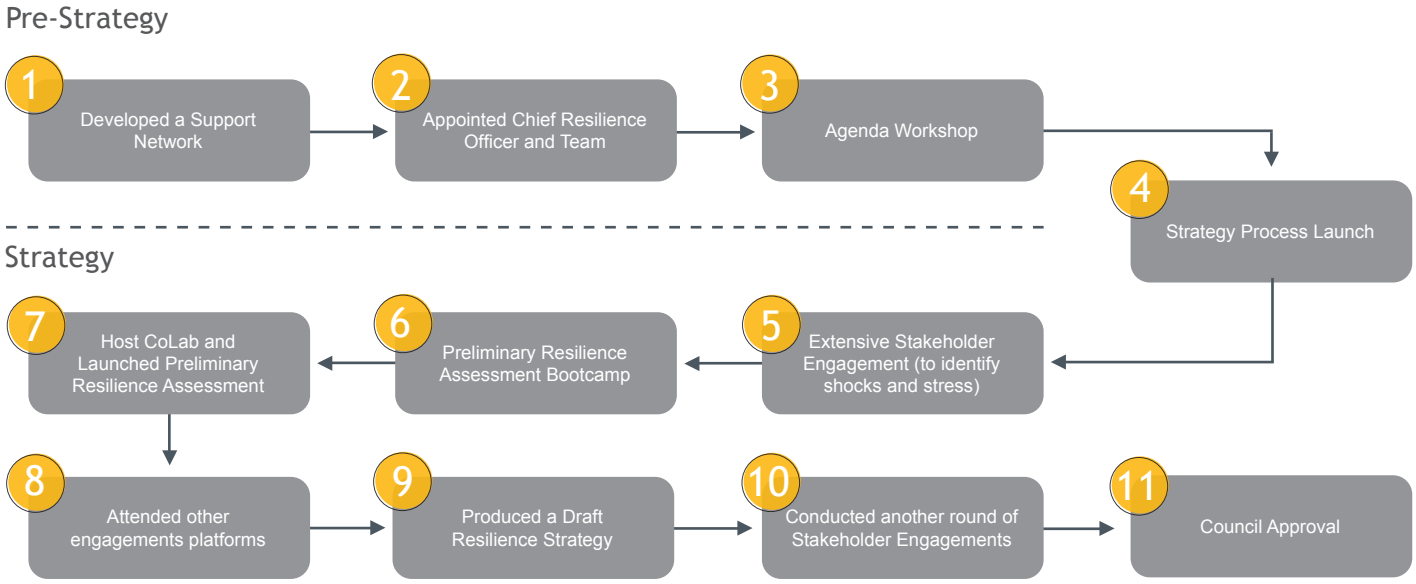

Figure 4: Cape Town Resilience Strategy Development Steps

Figure 4 above illustrates the process that was followed during the development of the Cape Town Resilience Strategy.

As can be seen above, one of the most prominent actions in the process of developing the Cape Town resilience strategy was the need for continuous stakeholder engagement. Engaging with various stakeholders ensures the strategy is inclusive of various parties' interests and concerns, and that the strategy identifies and takes into consideration the various stresses and shocks experienced across the city.

Pre-Strategy Development

The Cape Town Resilience Strategy was inspired by the 100 Resilient Cities. The City of Cape Town learned from the development of previous city resilience strategies. It also developed a partnership with The Hague, and engaged and collaborated with other cities through CoLab (a collaboration laboratory) to share knowledge and learnings.

Strategy Development

The City of Cape Town appointed a chief resilience officer to serve on the executive management team of the city and lead the resilience department. The resilience department launched the strategy process by hosting an agenda-setting workshop.

During the development of the strategy several stakeholder engagements were held, including but not limited to:

- Extensive public engagement to develop the Preliminary Resilience Assessment (PRA) and the City Resilience Index.
- Over 11 000 face-to-face interviews (focusing on informal settlements and backyard dwellings).
- Engaging with over 140 thematic experts across nine focus groups and a number of one-on-one interviews.
- Two community conversations were held to obtain insights into how resilience challenges may differ from community to community.

The purpose of the first rounds of stakeholder engagements were to identify potential chronic stresses and acute shocks within the city. During these stakeholder engagements some critical questions were asked, including:

- How can we become a more welcoming and accepting city to people who differ from ourselves in one way or another?
- What can we do to increase equality in our city?
- What can each one of us do to mitigate the many continuous stresses – such as crime, food insecurity and unemployment – that weaken the fabric of our society?
- How can we learn from previous challenges (e.g. the drought of 2015-2018) to become a permanently shock-ready city?
- How can we replicate the same collective effort we displayed in responding to the shock of previous challenges (the drought) to respond to continuous stresses such as poverty and unemployment?

The inputs of the stakeholder engagements were collected and assessed during a preliminary resilience assessment (PRA) boot camp. The PRA was presented to the Executive Management Team, the Section 79 committee and the Mayoral Committee.

The city hosted a CoLab where the PRA was launched. The PRA identified four enablers and four discovery areas. This framework laid the foundation for the work conducted in the subsequent phase, during which resilience-building actions and pillars were identified and prioritised. By using the City Resilience Framework, four dimensions, 12 drivers and 50 sub-drivers were identified for consideration.

In addition to hosting the CoLab, the resilience department also attended CoLabs hosted by other resilient cities with similar potential chronic stresses as Cape Town. In addition, the resilience department attended other engagement platforms such as opportunity assessment workshops and informal network exchanges.

Figure 5: City of Cape Town's Strategic Pillars
Source: Cape Town Resilience Strategy

The city produced a draft Resilience Strategy by overlaying the city's strategic pillars (as outlined in Figure 5) over the PRA. Goals were developed for each city strategic pillar, from which resilience interventions were identified.

Another round of public participation was conducted, including validation workshops with many of the stakeholders who had been engaged with at the start of the strategy process. The Cape Town Resilience Strategy was then approved by Council.


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3.1.1.4 eThekwini Metropolitan Municipality

eThekwini Metropolitan Municipality has a dedicated urban resilience strategy. This subsection will discuss the process that was used to develop the Durban Resilience Strategy. Figure 6 below illustrates the process that was followed during the development of the eThekwini Resilience Strategy.

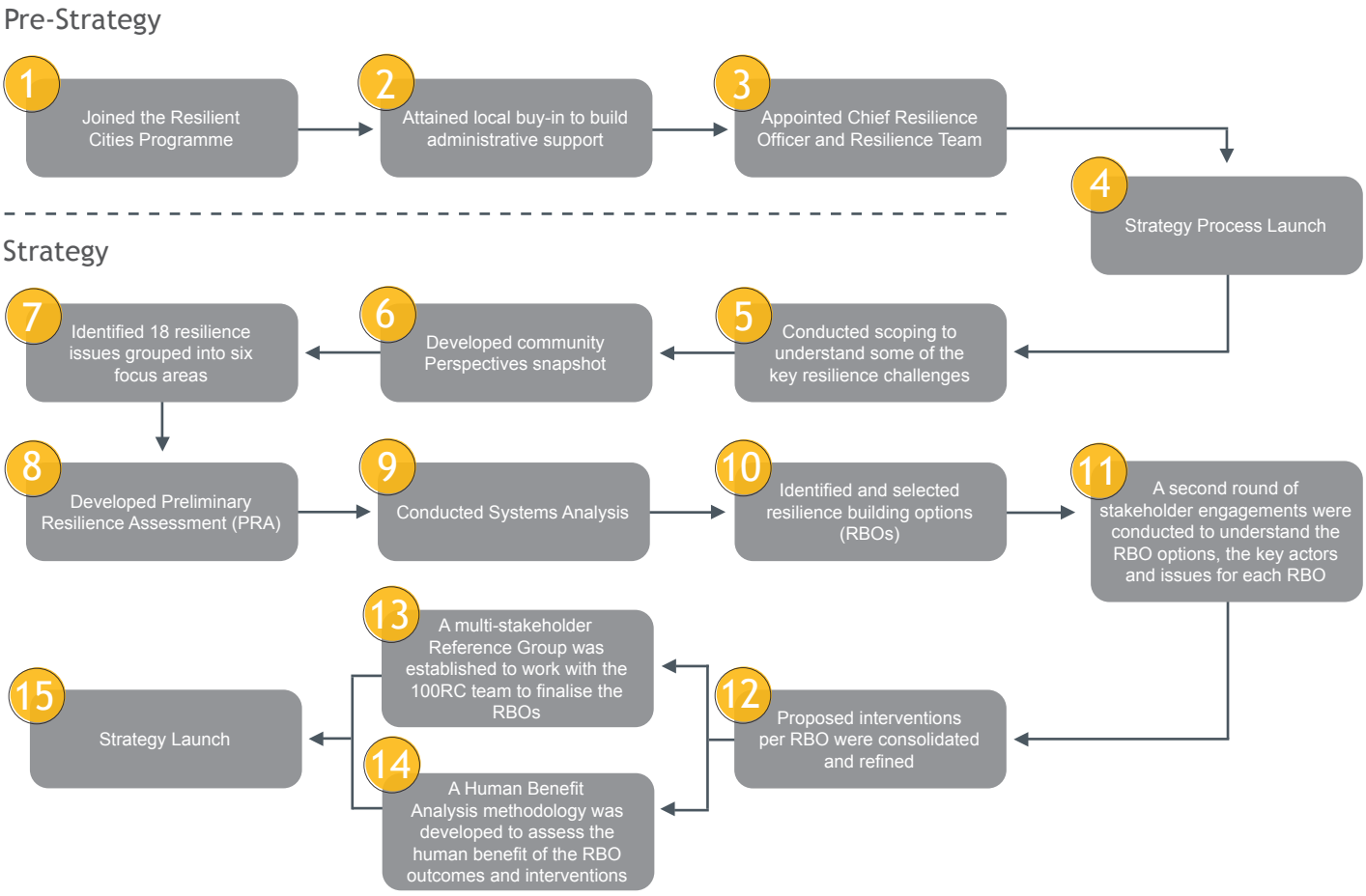

Figure 6: eThekwini Resilience Strategy Development Steps

Pre-Strategy Development

In December 2013, Durban was selected as one of the first 32 cities to be included in the Rockefeller Foundation's international 100 Resilient Cities Programme. The eThekwini Municipality's Durban Team convened with several local government technical departments to secure support for Durban's potential participation in the programme. The aim was to attain local buy-in and to build administrative support for 100RC in Durban. In addition, a three-member resilience team was created, including a Chief Resilience Officer (CRO).

Strategy Development

The resilience team conducted a scoping phase to understand some of the key resilience challenges in Durban. The team engaged with Durban stakeholders, including:

- Cross-sectoral Municipal Technical Team
- City and political leadership
- A group of 'critical thinkers' from within and outside the Municipality
- A range of 'other' stakeholders such as tertiary institutions, NGOs, business organisations and members of the public

The engagements focused on the development of a community perspectives snapshot. The snapshot included 18 resilience issues. These issues were

grouped into six focus areas according to their interconnectedness. Based on this, Durban's Preliminary Resilience Assessment (PRA) was developed.

The resilience team conducted systems analyses of the resilience focus areas to identify systemic intervention points that could have catalytic impact across multiple resilience focus areas. Through this process, six cross-cutting resilience 'levers for change' were identified.

Specific resilience-building options (RBOs) for Durban were identified. Stakeholders were asked to focus on RBOs that could address multiple levers simultaneously, be transformative in their impact, and be implemented practically.

Some RBOs were prioritised after stakeholder endorsement, and two RBOs were identified as strategic entry points into the complex resilience landscape in Durban that could facilitate a focused testing of what is required in these two specific contexts to address the six resilience levers for change in a systemic way.

A second round of stakeholder engagements was conducted to understand the RBO options, the key actors and the issues for each RBO.

- A series of conversations with a cross-section of stakeholders was convened.
- An actor map was created for each RBO.
- Key issues per RBO and possible interventions were captured.

The proposed interventions per RBO were consolidated and refined through further local government and multi-stakeholder engagement.

Public meetings were held to confirm the outcomes and interventions and a multi-stakeholder Reference Group was established to work with the 100RC team to finalise the RBO 1 outcomes and interventions for the Durban Resilience Strategy. In a parallel workstream, a Human Benefit Analysis methodology was developed to assess the human benefit of the RBO outcomes and interventions.

A wide range of stakeholders were engaged with during the development of the Durban Resilience Strategy. This included a consultation process with:

- Municipal Technical Team, City Planning Commission and public `to finalise the System Analysis Process.
- Municipal Technical Team, City Planning Commission and public to develop the levers for change.
- Critical thinkers, a cross-sectoral Municipal Technical Team and the Environmental sectors to discuss the outcomes of the systems analysis and to identify the RBOs.
- The public, to share the final outcomes of the systems analysis and to confirm the RBOs.
- A cross-section of stakeholders to explore the RBOs.
- A cross-section of stakeholders to confirm the issues and to identify interventions for the RBOs.
- The Municipal Technical Team, to refine the outcomes and interventions for the RBOs.
- A Multi-Stakeholder Working Group and the public to refine the outcomes and interventions for the RBOs.
- The Reference Group for RBOs and the public to finalise outcomes and interventions for the RBOs.
- The Reference Group for RBOs and cross-sectoral stakeholders to apply the Human Benefit Analysis to outcomes.
- The Municipal Technical Team, the public, and city and political leadership for Durban's draft Resilience Strategy.

3.1.2 Best Practices

The Resilient Cities Network has identified four key pathways for cities to create resilience. These are:

- Creating resilience champions
  - Create a resilience office and embed it in the metro.
  - Cultivate a diverse range of resilient champions within the city.
  - Leverage the resilience strategy development process to create champions.
  - Leverage the city leadership.
  - Enforce resilience by communicating the strategy to media and other entities.

- Changing the way cities plan and act
  - Use their limited resources in innovative ways and for greater benefit.
  - Be better organised and more coordinated, and implement more effective projects that are inclusive and risk-aware in their design.
  - Be better prepared to deal with future challenges, both foreseen and unexpected.
  - Be better able to engage with and serve their residents in both good times and bad.

- Finding funding and financing for resilience
  - Enhance city creditworthiness.
  - Build institutional and local capacity.
  - Financially, prioritise resilience in a city, developing financial products that enable resilience.
  - Create benefits addressing the data gap to articulate the value of resilience.

- Leveraging partnerships and working at scale
  - Create a network of city resilient officers and other city practitioners.
  - Build resilience across metropolitan regions.
  - Strengthen components of successful city-partner collaborations.
  - Utilise the power of collective action and the role of global institutions.

3.2 Examples of Urban Resilience Interventions

This sub-section will outline several examples of urban resilience interventions identified during stakeholder engagements, from the Cape Town and Durban Resilience Strategies and from the Resilient Cities Network Best Practices, focusing on the five topic areas of this study.

3.2.1 Adaptive Municipal Governance and Finance

Regarding adaptive municipal governance and finance, the following interventions from the case studies and stakeholder engagements have been identified as relevant:

- Durban Resilience Strategy
  - Research relevant best practice in Durban and internationally, promote the management and dissemination of knowledge, and use this to inform implementation: The Project Preparation Trust (PPT) and the University of KwaZulu-Natal (UKZN) are already involved in several research initiatives, and the Slum Dwellers International (SDI) Secretariat can provide guidance regarding international research sources. However, it is important to be clear on what the focus of research needs to be, and how this is used as a tool to build new knowledge about informal settlements.
  - Create a transversal local government working group that promotes appropriate statutory and regulatory flexibility and revision: This may be undertaken by the transversal local government working group, or it may be a subgroup within that larger body.
  - Identify current or potential bottlenecks created by the existing statutory and regulatory context, and take steps to address them: Collaboratively identify whether blockages are related to policy intention (for example, is the policy intention to prevent development in unsafe areas such as floodplains?) or application (for example, understanding the process that needs to be followed to apply the policy), and address accordingly.
  - Identify innovative procedures for upgrading and service delivery for informal settlements within the existing legislative and policy context: Further work will be needed to understand the options available in this regard.
- Cape Town Resilience Strategy
  - Collaborate with other spheres of government to ensure the safe and reliable operation of local trains: Increased confidence in a safe, reliable and efficient Metrorail as a commuting option for Capetonians and a reduction in vandalism and arson attacks, thus contributing to improved productivity, an increased number of train commuters and less traffic congestion.

- **Roll out the Precinct Management Model to multiple areas of Cape Town:** Precincts that are improved in a sustainable manner to make them clean, safe, functional and attractive, increasing economic activity and decreasing crime in the area.

- Use a resilience lens in the development of new district plans: Improved robustness of district plans for the purpose of better informing public and private investment initiatives that can adapt to and thrive in the context of relevant acute shocks and chronic stresses.

- Protect water sources by supporting the Greater Cape Town Water Fund: Increased collective support by a range of stakeholders to clear alien invasive vegetation from the catchments around the large dam system for the purpose of augmenting water supply in the bulk water system.

- Explore alternative, innovative and financially feasible mechanisms of service delivery in informal settlements which are acceptable to local residents: Innovative means of provision of basic services in informal settlements, including energy, water and waste services, that have multiple resilience dividends including empowering residents, improving health outcomes and reducing the occurrence of shocks such as fire and flooding.

- Develop city-wide collaboration to reduce the risks of cyberattacks: Secure systems across government, utilities, SOEs, business and households able to prevent cyberattacks and capable of responding when they do occur, for the purpose of maintaining the optimal functioning of the city at all levels.

- Develop and deploy the Neighbourhood Resilience Assessment: Greater awareness at a local level of shocks and vulnerabilities, more prepared communities for shock events, and the production of standardised data which will assist vulnerable groups to have a greater voice in Cape Town's resilience planning.

- Screen for resilience in the management of capital project portfolios: Improved alignment of major infrastructure programmes so that the resilience dividend in the built urban environment is maximised over the long-term.

- Improve intergovernmental relations for resilience: Effective and streamlined intergovernmental relations for the purpose of building resilience to prioritised shocks and stresses, particularly where the effectiveness of Cape Town's responses relies on powers and competencies beyond the control of the City government.

- Adaptive management capabilities for resilience: A cohort of leaders in the city government capable of managing in volatile, uncertain, complex and ambiguous environments, who are acutely aware of the shocks and stresses that confront Cape Town and how these affect their functional responsibilities, and who are committed to finding solutions to problems rooted in reflective learning and adaptation.

- Engage in inclusive public participation processes that empower Capetonians: Improved methods of public participation and engagement that empower Capetonians to actively contribute to City decision-making processes, and which result in the co-design and co-ownership of projects and plans that have multiple resilience dividends.

- Use data for resilient decision-making: Enhanced use of data science to improve decision support systems, helping to make more informed decisions in a future which is expected to be increasingly complex with regard to the intersection of shocks and stresses.

- Utilise robust scenario planning for improved resilience: Improved anticipation of a multitude of futures when considering the development of strategies and plans for the purpose of developing resilient actions in the urban environment.

• Stakeholder Engagements

  - City of Tshwane

    • Digitalisation: Previously, everything was manual (physical), but COVID ensured

that the City would move towards using digital platforms; the City is in the process of establishing e-payments, electronic submissions of building plans, zoning applications, etc. Most meetings are virtual.

3.2.2 Data-Driven Approaches to Spatial Transformation

The following examples of interventions have been identified relating to data-driven approaches to spatial transformation in eThekwini, the City of Cape Town and through stakeholder engagements with other key informants.

- Durban Resilience Strategy
  - Review and understand existing information sources and other initiatives to collect information: The National Housing Needs Register is a national database to register households and informal settlements, and completion of this register will become a national requirement for all local governments. However, the current survey questions that must be completed for the National Housing Needs Register would need to be modified to include questions about access to (and the need for) social amenities, as well as other needs that may not already be covered by the survey. Community-collected data could feed into this process. Other processes exist in eThekwini Municipality that may be useful in assisting with the data collection process (e.g. the Municipal Services and Living Conditions Survey).
  - Collaboratively prioritise the type of data and knowledge required from informal settlements: To secure buy-in from communities, it is important to gather the information that matters to them. It will also be important to ensure that the data collected are relevant in informing the work of eThekwini Municipality officials and other processes such as the Housing Needs Register described above.
  - Establish a relevant platform to consolidate and share information regarding informal settlements: There is currently very limited information on informal settlement communities, and the information that exists is often not accessible to all stakeholders. The challenge of a lack of accessible information has consistently been raised by stakeholders as an obstacle to collaborative informal settlement action.
  - Develop, in collaboration with communities, a range of accessible communication products in both English and IsiZulu to share the results of the data-collection process: One example would be to create livelihood opportunities for youth in informal settlements to produce video and multimedia content on life in informal settlements, to assist with the communication of the results.
- City of Cape Town
  - Create a live database of referral networks: Easily accessible, up-to-date information regarding referral networks for at-risk individuals, victims of crime, and Capetonians living with substance abuse or mental illness.
  - Increase the number of 'walking buses' across the city: A greater number of children in vulnerable communities are able to walk safely to and from school without being affected by crime, gang activity or sexual violence, through the joint efforts of community members to occupy space.
  - Grow partnerships with local employers to change commuter behaviour and deliver sustainable mobility: Increased commitment from large institutions to alleviating traffic congestion through innovative working arrangements and behavioural change, resulting in a reduction in single-occupancy vehicles on the roads during peak times, with a resilience dividend of decreased carbon emissions.
  - Leverage data and mapping applications to improve integration of informal transportation systems: Improved integration of all forms of transport in Cape Town, with an emphasis on integrating informal minibus taxis with rail, bus, cycling and walking routes in order to bring down the cost of public transport and lure more commuters away from private cars.
  - Launch a borehole data capture and owner awareness project: Responsible use of boreholes and well-points by private owners

for the purpose of protecting and sustaining groundwater by using innovative data and awareness campaigns, and collective action during times of shock to leverage individual resources for the public good.

- Deploy smart technology and predictive analytics to inform pre- and post-disaster planning: Better early-warning systems for shock events, and better information on response measures following shock events by utilising smart technology, empowered by stronger predictive analytics.
- Develop a vulnerability index for each ward in the city: Practical, data-driven insights into ward-level determinants of relative vulnerability to shocks and stresses for the purpose of improved planning and assignment of resources.

- Stakeholder Engagements
  - City of Tshwane
    - Digital Skills Development: The city has partnered with National Treasury on the City Procurement Programme, which addresses issues relating to digital skills development – especially within townships, where youth were contracted to map the area (especially key nodes) and then to develop reference points for the city in order to improve the provision of emergency and other municipal services.
  - City of Johannesburg
    - Digital Skills Development: The University of the Witwatersrand is supporting the metro through the development of Jozi Digital Ambassadors who train first-time internet users on how to access the City's free Wi-Fi and make use of online services. These Ambassadors gain both income and entrepreneurial awareness during the programme, which helps them to start their own micro enterprises. The metro has partnered with an ICT company that provides coding training to the youth at their opportunity centres.

3.2.3 Leveraging Innovation to Respond to Crisis

With regard to leveraging innovation in response to crisis as outlined in Section 2.4.3, the following examples of interventions are relevant. The interventions were identified from resilience strategies of the City of Cape Town and eThekwini, as well as from various stakeholder engagements.

- Durban Resilience Strategy
  - Explore relevant mechanisms to facilitate mutual learning and improved relationships between eThekwini Municipality and informal settlement communities: In order to facilitate productive partnerships, there is a need for informal settlement communities to understand how eThekwini Municipality functions, and for the Municipality to better understand the informal settlement communities in which they work.

- Cape Town Resilience Strategy
  - Rejuvenate our rivers and the spaces around them to create liveable urban waterways: Healthy, safe and productive urban waterways which produce multiple resilience dividends, including flood attenuation, new work and recreation opportunities, improved water quality and crime reduction.
  - Establish transversal public spaces work group: increased private investment and collaboration in the design and use of public spaces for the purpose of realising multiple resilience dividends, including adaptation to climate change and improved social cohesion.
  - Strengthen the capacity to interpret and integrate climate impacts into planning: Improved data and insights of likely climate change impacts and projections applicable to the city-region level, for the purpose of improving the robustness of long-term planning and the associated benefit of reducing vulnerability and increasing adaptive capacity to climate change.
  - Co-design for informal settlement upgrading projects with local residents: Empowered

residents of informal settlements working in collaboration with the City government and other societal partners to design acceptable, safe and dignified informal settlement upgrading projects.

- Expand the reach of digital literacy programmes so that Capetonians are able to adapt to rapid technological change: A greater number of Capetonians capable of participating in the digital economy as entrepreneurs, workers and customers, and able to adapt to rapid change when it occurs, in order to build economic resilience.

- Develop and implement a comprehensive city-wide heat plan: Decreased impact of heat waves when they occur through a city-wide plan, understood and owned by individuals, households, communities and businesses, allowing for the city and its economy to thrive under the circumstances, and for human life to be protected.

- Develop 'build back better' protocols for infrastructure damaged in shock events: Transversal commitments across City departments and other spheres of government that build infrastructure and homes in Cape Town to ensure that infrastructure damaged by shock events is built back stronger, as well as supporting the recovery of vulnerable people.

- Implement innovative solutions to reduce the devastation of fire in informal settlements: The implementation of a multifaceted range of interventions to improve detection and prevention of and recovery from fires in informal settlements and backyard dwellings.

- Roll out simulations to prepare for shock events: Increased awareness of and preparation for a wide range of shock scenarios by a broad range of Capetonians resulting in improved business continuity and recovery plans.

- Explore innovative insurance products for catastrophic shock events: Reach an understanding on the efficacy, viability and practicality of investing in innovative insurance products for catastrophic shock events such as long-term drought or city-wide flooding, for the purpose of generating emergency funding; and use insights gained to determine whether or not such products should be pursued.

- Lobby national government for budget flexibility for shock events: Increased ability of the City of Cape Town metropolitan municipality, in cases of extreme emergency during or following a shock event, to commit to unforeseeable and unavoidable expenditure for the purposes of protecting human life and improving the adaptive responses of the city.

- Incorporate resilience considerations into integrated risk management: Productive use of the data generated by the City's extensive Integrated Risk Management System to generate a multitude of new resilience-building actions, and strong consideration by City risk champions of how the wide variety of shocks and stresses relevant to Cape Town can impact operations.

- Explore innovative, climate-smart approaches to informal settlement upgrading: Informal settlements in Durban are at high risk from extreme weather. Climate changes that have been projected for Durban include increased temperatures and more variability in rainfall, with associated implications for human health, safety and well-being. Innovative, climate-smart approaches to upgrading informal settlements are required.

• Stakeholder Engagements

  - City of Tshwane

    • Business Continuity Plan: Assisting the metro as an organisation to continue operating during a time of crisis.

3.2.4 Inclusive City Economies

The following interventions have been identified as relevant to inclusive city economies, as outlined in section 2.4.4. The interventions were sourced

out of the City of Cape Town and eThekwini's resilience strategies, as well as various stakeholder engagements.

- Durban Resilience Strategy
  - Facilitate the introduction of a range of community finance facilities to leverage resources from informal settlement communities and development partners: Community finance facilities offer affordable finance and/or grants to organised informal settlement communities for the purpose of community-managed interventions for upgrading informal settlements. National Treasury is spearheading an initiative to pilot such funds in South Africa's metropolitan areas. Financial facilities should not be limited to loan financing; they could also include initiatives such as community saving schemes.
  - Create employment opportunities and skills development in informal settlements linked to upgrading: Wherever possible, the processes associated with upgrading should create employment and skills development opportunities for informal settlement communities. This could include facilitating access to Wi-Fi in informal settlements and the creation of job link centres.
  - Estimate the financial costs associated with the implementation of priority interventions: A key challenge to the implementation of collaborative informal settlement action is the inadequacy of financial resources to implement a comprehensive programme across all informal settlements in Durban. The first step in securing sufficient financial resources is understanding the costs associated with implementation.
- Cape Town Resilience Strategy
  - Utilise a screening tool to identify youth at risk: Improved identification of individuals who have been subject to adverse childhood experiences, for the purpose of identifying the most appropriate interventions that can be made to improve well-being and decrease trauma, and for prioritising scarce resources.
  - Address social ills and create opportunities in Manenberg through a Youth and Lifestyle Campus: Increased economic opportunities and decreased social ills such as gangsterism, crime, violence and substance abuse for the youth of Manenberg, by way of improved placemaking, infrastructure upgrades and social support, which achieves multiple resilience dividends.
  - Mainstream sustainable procurement in supply chain management: An increase in public spending on green goods and services, ensuring that public procurement becomes increasingly environmentally and socially responsible, thus contributing to market innovation and potentially the increased local production and provision of green goods and services, with associated benefits for job creation.
  - Build a business commitment to resilience in the city: Increased commitment by businesses to partner with the City government in building resilience both for their businesses and for their employees, so that they can collectively and rapidly respond to shocks and stresses.
  - Future casting for just transitions in a rapidly changing global economy: Improved insights and scenarios for proactive societal responses to the changing drivers of local and regional economies, in the face of (among other things) rapid technological change, the global response to climate change, and variances in international trade regimes.
- Stakeholder Engagements
  - City of Tshwane
    - Industry Partners: The city has partnered with Microsoft and other industry partners to train over 400 youth over three to four years on coding and other digital skills, such as how to use their cell phones to apply for jobs and manage their businesses.

3.2.5 Innovation as a Driver for Adaptation

This subsection outlines the various interventions relevant to innovation as a driver for adaption, as outlined in section 2.4.5. The interventions were sourced out of the City of Cape Town and eThekwini's resilience strategies, as well as various stakeholder engagements.

- Durban Resilience Strategy
  - Develop and implement a collaborative monitoring and evaluation system that involves eThekwini Municipality, communities, civil society, the private sector, non-governmental organisations and research organisations: Oversight and implementation of the collaborative monitoring system would be through relevant institutional structures (to be developed as part of Outcome 1 following the institutional review).
  - Establish a collaborative monitoring and evaluation system for the 'Collaborative informal settlement action' resilience-building option: The evaluation system should incorporate the original 'levers for change' that were identified as critical in building resilience in Durban, in order to assess the extent to which RBO 1 is contributing towards achieving these goals and building broader resilience. Communities should be involved in the feedback of information and in how the information they provide is used.
- Cape Town Resilience Strategy
  - Enhance partnerships for improved water governance and holistic water resilience: Strengthened relationships with large water users in the Western Cape Water Supply System (WCWSS) and ongoing collaboration and engagement with civil society, academic and business partners in the urban water system, for the purpose of collective ownership of roles and responsibilities in water governance.
  - Create multiple coastal management forums: Empowering partnerships between coastal stakeholders to co-own risks related to impacts on the coast and surrounding infrastructure, and networks of resources able to both prepare for and respond to coastal shocks.
  - Undertake a waste economy study to understand the opportunities of the circular economy: Detailed understanding of the multitude of waste streams in the city-region, including type, quantity and projected changes over time, for the purpose of identifying risks to the sustainability of the waste service and new opportunities in the economy that can build resilience to resource constraints.
  - Develop an open-source reflective learning tool for deployment after shock events: A culture of reflective learning after shock events to allow decision makers and affected stakeholders to outline what happened, how decisions were made and their consequences, and lessons learnt – for the purpose of improving performance the next time a similar shock occurs.
  - Determine progress towards attainment of improved water resilience: Production of a fully populated city water resilience framework for Cape Town, outlining relative strengths and vulnerabilities of the city water system against the drivers of water resilience, for the purpose of supporting decision making.
- Stakeholder Engagements
  - City of Tshwane
    - Renewable energy: The city has a programme to assist it to transition away from coal into new renewable energy, green energy and diversifying energy resources.


NO
JOB
ACCESS
SECURITY
SYSTEMS

4. Key Learnings and Recommendations

This section will provide a summary of the key learnings, as well as recommendations for the development of urban resilience strategies.

4.1. Key Learnings

4.1.1 Definition and Application of Resilience

Based on the research, resilience is a broad, cross-cutting theme with various interpretations and applications. A person's opinion of resilience is rooted in the perspective from which it is considered. As such, there is currently no consensus on the definition of 'resilience' in the South African context.

Considering the case studies and accompanying literature, clearly there is no standardised approach to resilience strategies. In addition, due to resilience being locale-based with different needs, the outcomes of the different resilience strategies focus on vastly different themes.

4.1.2 Policies and Plans Relating to Resilience

In contrast to the South African context, resilience is clearly defined in international plans and policies. These provide an overarching context for resilience. South African policies and plans do not specifically speak to resilience but do relate to resilience topics. Some of these policies and plans have an impact on resilience.

4.1.3 Resilience Applied in a South African Context

The following key learnings were identified after reviewing resilience in the South African context:

- Resilient Cities Network Urban Resilience Framework:
    - Few cities in South Africa have resilience strategies. The only cities with overarching resilience strategies are Cape Town and Durban. However, their approach varies, in that the City of Cape Town's strategy has a broader focus than the Durban Resilience Strategy.
    - The Resilient Cities Network Urban Resilience Framework has been used successfully by Cape Town and Durban.
    - Both cities' resilience strategies indicate the need for extensive stakeholder engagement in the development of their resilience strategies.
    - Various best practices and examples of urban resilience intervention have been identified that are considered applicable and attainable.
    - Metros found that local community organisations are instrumental in times of crisis.
- Case study key learnings:
    - A resilience strategy is locale-based, meaning that although there is an internationally accepted framework, outcomes will be different, due to unique local needs and priorities.
    - Resilience strategies apply to systems that are required to be resilient during chronic stresses and acute shocks; however, the systems are not clearly defined.
    - The key role of the Chief Resilience Officer is to remind and encourage departments to coordinate their efforts, to ensure the implementation of a project has multiplier effects on several desired resilience outcomes. i.e. a project must achieve multiple goals, including goals that are not the primary purpose of the project.
    - The main purpose of the Resilience Team is to build and improve systems and capacity in their city, including the city's communities, institutions and government structures.
    - Resilience is about multiple issues that are interconnected.
    - In evolving socio-institutional contexts, chronic systemic challenges are likely to emerge more strongly as resilience issues than shocks or extreme events.
    - Developmental issues are a critical part of resilience.

- Systemic challenges will require systemic solutions, and there is a need to understand the connections that exist between resilience issues to understand where interventions will be most effective.

- Considering the 'entry point' for resilience action will be important in maximising the catalytic impact of interventions. Investment needs to maximise the ability of the city to respond to the broadest range of resilience issues in locally appropriate and innovative ways, and in ways that generate the greatest good for the greatest number of people.

4.2 Recommendations

Based on the various key learnings as discussed above, the following recommendations can be made:

- A standardised definition of resilience should be developed for the South African context, to aid in the correct understanding of the term; subsequently, the correct application of resilience in a strategy will follow.

- A resilience strategy should form an integral part of other strategies and plans, rather than being a 'stand-alone' strategy.

- A system analysis should be followed in terms of resilience strategies in cases where a singular application could hold multiple benefits across various areas of requirement.

- Local interventions must be considered, i.e. municipal institutions should consider already established community networks to guide intervention strategies.

- Interventions should strengthen communities and engage at various levels.

- A hub-and-spoke model should be considered an integral part of the resilience strategy. This refers to a method in which a centralised resilience 'hub' exists in each municipality, where all key issues are sent and then distributed to other departments.

- A department or unit is required to manage the resilience strategy process and to continuously manage the city's resilience strategy.

- The Chief Resilience Officer should become an Exco member.

- Education and awareness building regarding resilience should be prioritised, to ensure that all stakeholders have a clear understanding of what resilience entails.

- Resilience strategies should provide a vision for specific areas of concern.

- Local communities should address concerns though suggested interventions or through own interventions, where the same outcome should be reached.

5. Picture Credits

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Part B: Strategy Framework and Implementation Guide

Introduction

In the last few years, this strategy document is not intended as an South African cities and municipalities have been impacted by several disruptions brought on by crises. In most cases, these crises caught the cities and municipalities off guard.

Economic activity can be restricted by crises, affecting the income and livelihood of many individuals and businesses, with poor households often experiencing the effects most. Even after a crisis is over, the expected increase in productivity is often not inclusive due to redistributive burdens and unproductive spatial patterns, further increasing inequality in the country. Resilient cities are those that can withstand, recover from, and prepare for future shocks.

A resilient city can plan for and minimise the negative effects of crises, from natural disasters to civil unrest. Having strategic and adaptable plans in place for different categories of disaster potentially enables a city to reduce physical and financial losses, unlock economic and social potential, and in extreme cases even save the lives of its citizens.

Contextualising urban resilience

The Resilient Cities Network defines urban resilience as "the capacity of individuals, communities, institutions, businesses and systems within a city to survive, adapt and grow, no matter what kinds of chronic stresses and acute shocks they experience".

This definition places resilience in a geographical location, namely cities. As with resilience, the definition of urban resilience suggests that to build resilience a city must create capacity and systems to resist 'disturbances', which it classifies as chronic stresses and acute shocks.

Acute Shocks & Chronic Stresses

The key difference between chronic stresses and acute shocks relates to the cycle of the disturbance. 'Chronic stresses' refers to regular or continuous disturbances, while 'acute shocks' refers to sporadic disturbances.

- Chronic stresses weaken the fabric of a city on a day-to-day or cyclical basis; for example, high unemployment, inadequate public transport systems, endemic violence and food insecurity.
- Acute shocks are sudden events that threaten a city, for example, drought, fires, floods, disease outbreaks and infrastructure failure.

In the South African context, the status quo of most cities is a state of chronic stress. Within this context, urban resilience is a process focused on improving community capacity and systems to create a resilience dividend that will assist a city to survive, adapt and grow in case of acute shocks, which further results in the improvement of the city's status quo (including during chronic stresses).

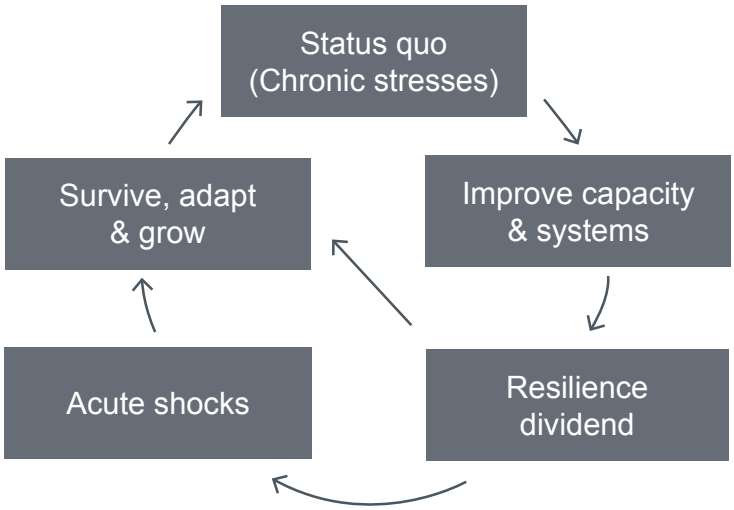


Figure 1: Resilience Building Process
Source: Urban-Econ, 2022

Prioritised shocks & stresses

The following shocks and stresses are prioritised in terms of resilience interventions applied:

SHOCKS

INFRASTRUCTURE FAILURE
A balance is needed between constructing new infrastructure and maintaining existing infrastructure.

CIVIL UNREST
A lack in service delivery often results in civil unrest. Protests often occur due to basic services not being provided.

CYBERATTACK
In an increasingly connected world, we face the reality of exponential advances in the mechanisms of cyberattacks.

POWER OUTAGE
Most areas receive all electrical power from ESKOM; due to the strain on the national supply, many areas are left vulnerable in times of load shedding

DROUGHT
Droughts put multiple persons and entities at risk and are occurring more often, due to extreme weather conditions brought on by climate change

FLOODING
Many people live in informal settlements and are extremely vulnerable to floods. As climate change continues, more frequent and more severe flooding will happen.

ECONOMIC CRISES
The direct impacts of financial crises in a globalised world are most acutely experienced by the poorest segments of our population, through job losses and inflation.

FIRE
The threat and impact of fires are most acutely experienced in informal settlements; fires displace large portions of these communities.

HEATWAVES
Due to climate change, extreme weather conditions are occurring more frequently. It is probable that heatwaves will occur more often. Heatwaves have a significant impact on vulnerable groups.

STRESSES

CLIMATE CHANGE
Climate change impacts cities in many ways and leads to extreme weather events.

FOOD INSECURITY
For many, the ability to provide food is a challenge. Climate change contributes to weather conditions such as droughts that disrupt the supply of food.

URBANISATION
More and more people are migrating to urban areas in search of opportunities. The mass migration of people places strain on infrastructure and housing.

UNEMPLOYMENT
Unemployment levels remain very high, and are a constant concern.

TRAUMA
Because of crime, violence and poverty being a common occurrence, those left most vulnerable are at greater risk of trauma and mental health conditions.

TRAFFIC CONGESTION
Traffic congestion occurs often due to heavy reliance on private vehicles, because of a lack of public transportation; it is worse in rain and other extreme weather conditions

SOCIAL DIVISION
In many cities, a lack of social cohesion is a legacy of apartheid spatial planning and inequalities associated with income levels. These inequalities make interaction between people of various races and socio-economic classes more challenging.

INFORMAL SETTLEMENTS
Informal settlements continue to expand, and their residents are particularly prone to the negative impacts of shock events.

MUNICIPAL FUNDS
The availability of municipal funds to be allocated to viable projects remains challenging

CRIME & VIOLENCE
Crime and violence are common occurrences in South Africa, especially in informal settlements and certain areas of metropoles.

POVERTY & INEQUALITY
Poverty and inequality are constantly present in South Africa. Multiple factors contribute to and exacerbate poverty and inequality. The most prominent factors are unstable income and poor living conditions.

INADEQUATE PUBLIC TRANSPORT
A lack of public transport causes over-dependence on private modes of transportation, which puts stress on infrastructure and other resources.

City Resilience Framework

This is a unique framework developed by Arup and supported by the Rockefeller Foundation, based on extensive research in cities. The CRF underpins the strategy development process, as a method for understanding the complexity of urban systems and the drivers that contribute to a city's resilience.

The Urban Resilience Framework (URF) is promoted by the Resilient Cities Network, which consists of cities committed to building and investing in urban resilience. The URF framework has been used extensively by over 100 cities globally, including Cape Town and Durban.

The CRF contains four critical dimensions of urban resilience, namely health and well-being; economy and society; infrastructure and environment; and leadership and strategy. Each dimension is underpinned by three key drivers.

The principles of the Resilience Cities Network approach include:

- Resilience is understood by viewing the city as a system.
- The City Resilience Framework (CRF) describes the common components of the city system that must be considered when building urban resilience.
- The CRF is used as the starting point for stakeholder engagement to develop a resilience strategy.

The CRF does not explicitly state who is responsible for building resilience. Politics (implying a top-down approach to building resilience) and empowerment (implying a bottom-up approach to building resilience) are implied in a few of the drivers but do not explicitly recognise or address this question. This implies that the CRF is promoting a systems-based approach, rather than a political or empowerment-based approach.

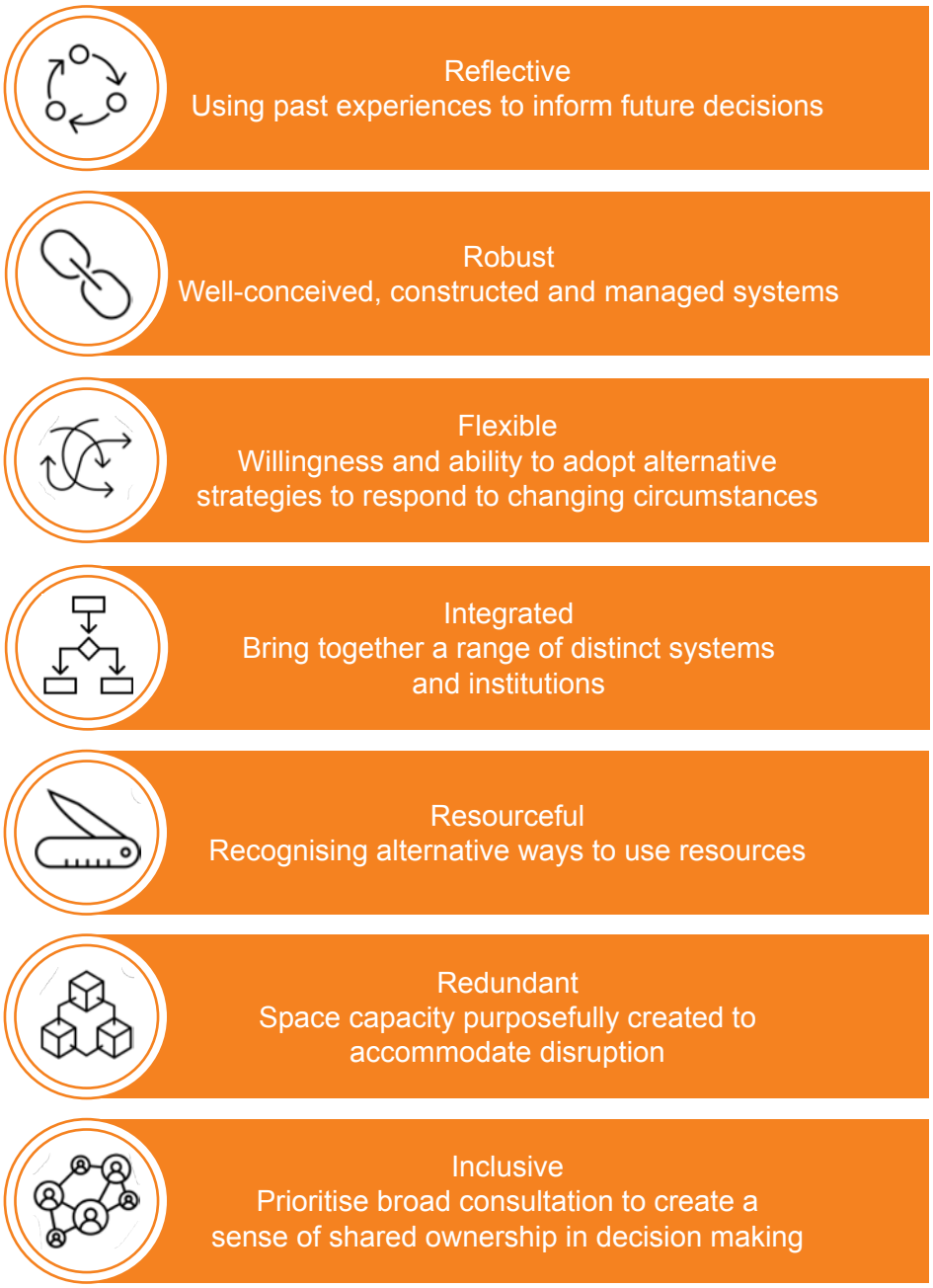
Figure 2: City Resilience Framework
Source: Resilient Cities Network. https://resilientcitiesnetwork.org/programs/urban-resilience-program/ Accessed on 11 May 2022.

The CRF does suggest that multiple stakeholders must be well informed, capable and have access to information, and that there must be communication between the state and its citizens aimed at knowledge transfer between the parties. The issue is therefore not whether a bottom-up or a top-down development approach is better, but how the two approaches can be coordinated to achieve the best result. Ideally they should meet in the middle, with the bottom-up approach setting and implementing the framework, and the top-down approach helping to channel resources.

Qualities of a Resilient City

A resilient city works to enhance, preserve or build the qualities of resilience listed below into the numerous complex systems that make up the urban environment. Identifying the presence of these qualities and incorporating them into programmes and projects is important for all decision makers, both inside and outside government, who make decisions that impact on the city.

The qualities are:



South African policies and plans

Although there are not many local policies and plans that refer directly to resilience, there are several that relate to resilience as defined and discussed in the context of this study. The most important of these policies and plans are the Constitution of South Africa, the National Development Plan 2030, the National Spatial Development Framework, and the integrated Urban Development Framework.

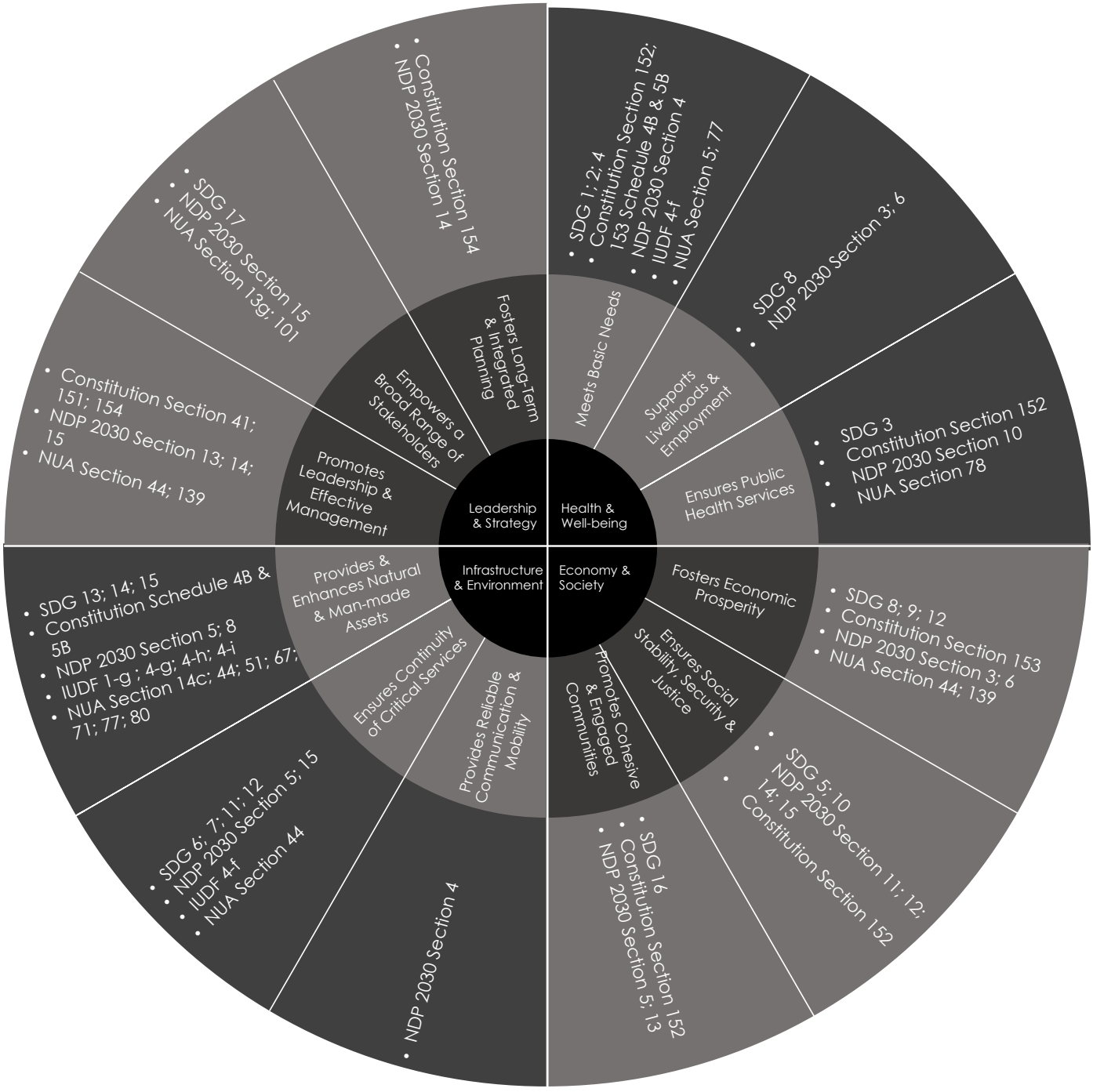
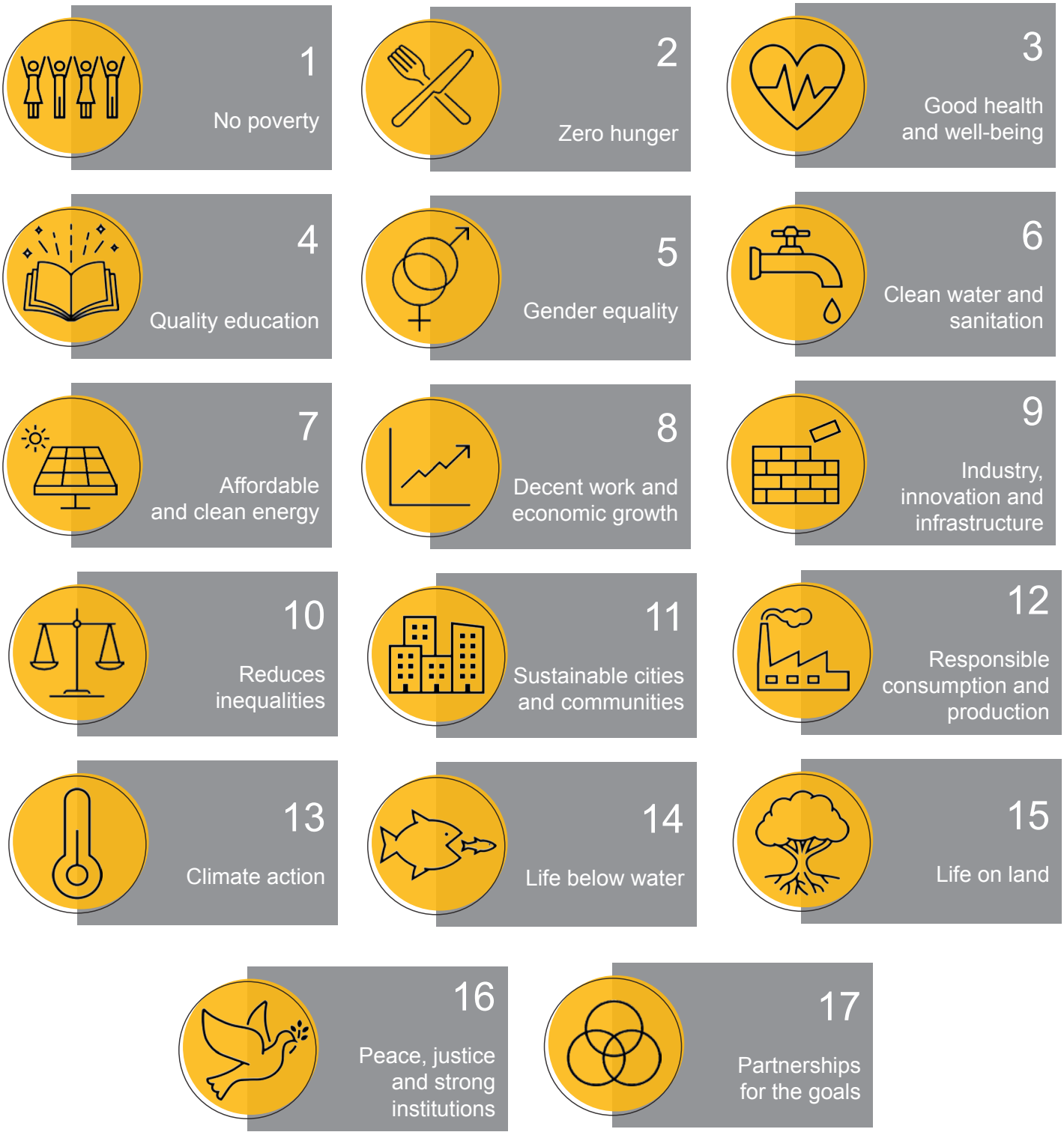


Figure 3: Linkages with City Resilience Framework

Sustainable Development Goals

Urban resilience is often confused with sustainability. Sustainability works towards putting the world into long-term balance amid the depletion of natural resources, while resilience looks for ways to make systems endure and thrive even in an unbalanced world.

The United Nations Sustainable Development Goals (SDGs) are a call to action uniting multiple countries around the world to ensure sustainability by 2030. By addressing resilience with relevant interventions, some of the SDGs will also be addressed.



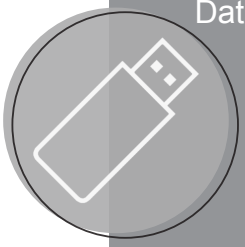
Themes of resilience

Five themes of resilience may be linked with the focus areas of the SACN:

Adaptive municipal governance and finance

- Digitalisation
- E-governance

To absorb and beter mitigate chronic and acute shocks at the municipal level, there is a need for a more adaptive and flexible approach to governance and finance. Chronic stresses are more easily predicted, and in some cases become an ingoing systemic problem. Therefore, preparation and foresight in mitigating and alleviating these inherent risks are essential.



Data-driven approaches toward spatial transformation

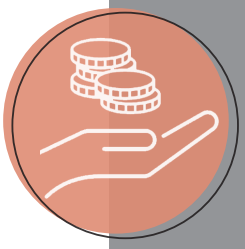
- Urban data and indicators
- Urban safety
- Transport and mobility
- Housing

To react appropriately to predicted and unforeseen challenges, a data-driven approach can be taken. This entails the swift collection, transformation, and sharing of key financial, economic, and socio-economic indicators as a means to better understand the current situation within a particular urban area

Leveraging innovation to respond to crisis

- Urban design and planning
- Built environment
- City adaptability

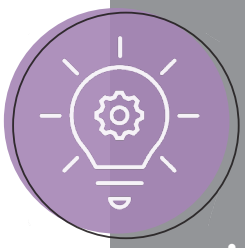
Cities in Crisis, leveraging innovation to respond to crisis in the face of crisis through the design and planning for resilience whithin the conntext of climate change and other natural disasters.



Inclusive city economies

- Sustaining livelihoods for the youth
- Digital Skill and work

Protecting livelihoods in times of crisis: a review of the types of economic activities that have proven resilient and most beneficial to sustaining livelihoods for youth from disadvantaged households in times of crisis. With a focus on digital skills and digital work.



Innovation as a driver for adaptation

- Business development
- Research and
- development support
- Interest in broad networks
- Improved social infrastructure
- Skills development

Innovation as the main driving force for adaptation from the perspective of resilience focuses on various aspects of development and research.

Types of interventions

There are three types of interventions included as part of this strategy document.

The interventions are:

Pioneering

Interventions that could drastically alter an entire system's resilience value.

Showcasing

Interventions that indicate the resilience value of the applied intervention that can be duplicated and adjusted in future.

Facilitating

Interventions that attempt to approach existing systems from a resilience perspective.

Decision-making model

The Strategy Document lists five themes of resilience identified and addressed by the SACN, each of which is broken down into specific focus areas and interventions as captured in the Decision-making Model below. Some interventions align with more than one theme and are indicated as such. There are links embedded in the model which when selected will direct the user to the specified interventions.

	Adaptive Municipal Governance & Finance	Data-driven Approaches to Spatial Transformation	Leveraging Innovation to Respond to Crises	Inclusive City Economies	Innovation as a Driver for Adaptation
1.1 Creation of trans-disciplinary committee focused on public spaces	x				
1.2 Development of improved district plans from a resilience perspective	x				
1.3 Investigation of alternative methods for financially feasible service delivery in informal settlements	x				
1.4 Intergovernmental relations focused on resilience	x				
1.5 Flexible administration capabilities related to resilience	x				
1.6 Inclusive public participation to ensure resilience dividends	x				
1.7 Data science as part of resilience decision making	x	x			
1.8 Applying scenario planning to ensure enhanced resilience	x	x			x
2.1 Comprehension of current information sources and other systems of collection		x	x		x
2.2.Prioritisation of types of data and knowledges collected via community participation		x			x
2.3 Platforms for information sharing regarding informal settlements		x			x
2.4 Development and implementation of a precinct management model in applicable areas	x	x			

	Adaptive Municipal Governance & Finance	Data-driven Approaches to Spatial Transformation	Leveraging Innovation to Respond to Crises	Inclusive City Economies	Innovation as a Driver for Adaptation
3.1 Development of databases of referral networks			x		x
3.2 Implementation of a screening tool to identify at-risk youth			x		x
3.3 Interpretation & integration of climate change into planning	x		x		
3.4 Creation of heat plans at city level	x		x		x
3.5 Large-scale partnerships to diminish risk of cyberattacks	x		x		x
3.6 Deployment of solutions to mitigate and reduce impacts of fires in informal settlements			x		x
3.7'Build back better' after shock events damage infrastructure	x		x		x
3.8 Roll out simulations to prepare for shock events	x		x		
3.9 Facilitate disaster planning by means of smart technology and methods of predictive analysis			x		
4.1 Conventionalise sourcing sustainable methods for supply chain management				x	x
4.2 Conduct a waste economy study to comprehend the opportunities offered by the circular economy				x	x
4.3 Predicting transitions for changing global economy				x	x
4.4 Introducing community finance facilities to utilise resources in communities and developmental partnerships	x			x	
4.5 Development of employment and skills development opportunities in informal settlements				x	x
5.1 Provision of more walking buses			x		x

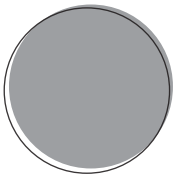
	Adaptive Municipal Governance & Finance	Data-driven Approaches to Spatial Transformation	Leveraging Innovation to Respond to Crises	Inclusive City Economies	Innovation as a Driver for Adaptation
5.2 Collaboration with employers to alleviate traffic congestion				x	x
5.3 Development of safe passenger rail services	x				x
5.4 Utilisation of geospatial information systems to support informal transport modes				x	x
5.5 Community engagement as part of informal settlement upgrade projects					x
5.6 Implementation of digital literacy programmes			x	x	x
5.7 Facilitation of local resilience assessments				x	x
5.8 Mitigation of groundwater over-extraction			x		x
5.9 Incorporating resilience objectives in infrastructure projects					x
5.10 Enhancing accessibility of community engagement outcomes					x
5.11Efficient monitoring & evaluation systems supported by all governmental spheres & local communities					x

How to read the interventions

The interventions included in this Strategy Document are uniform in format. The following infographic provides detail on the various elements that comprise each intervention.

The interventions are grouped primarily according to the theme of resilience, with which there is the most prominent alignment.

Name of Intervention



Which of the 5 themes of resilience the intervention aligns with

Type of intervention (indicated by number), as a key/legend relating to the table above

Indication of the type of intervention

DESCRIPTION OF INTERVENTION

Detailed description of the intervention

SHOCK ADDRESSED

Acute shock that the intervention seeks to address

STRESS ADDRESSED

Chronic stress that theintervention seeks to address

SDG

SDG alignment of the intervention

TIME FRAME

Time frame for intervention to be implemented

Short term: 1-3 years
Medium term: 3-5 years
Long term: 5+ years

OUTCOME OF INTERVENTION

Elaboration on outcome of intervention

RESILIENCE VALUE

Resilience value of the intervention to indicate the alignment of each intervention with drivers of City Resilience Framework

INTERVENTION ALIGNMENT

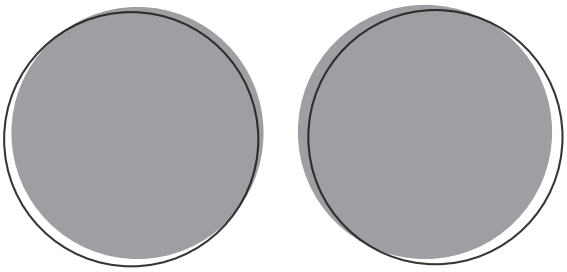
Other interventions as included in this Strategy Documents that align with the intervention

RESILIENCE QUALITY

Which of the 7 qualities of resilience is most relevent to the intervention

CASE STUDY REFERENCE

Case study intervention applicable for further insight & contextualisation



Theme alignment

Visual indication of theme alignment

1. Adaptive Municipal Governance & Finance

1.1 Creation of trans-disciplinary committee focused on public spaces

Pioneering intervention

DESCRIPTION

The creation of a trans-disciplinary committee that focuses on public spaces should aid in the development of systems and networks used to collect private investment and collaborate in place making and investment in public spaces.

SHOCK

Heat wave, flooding

STRESS

Municipal finance, crime & violence, social division, climate change

SDG

11 - Sustainable cities & communities

TIME FRAME

Short term

OUTCOME

An increase in private investment and investors, as well as cooperative design and use of various public spaces to actualise numerous resilience dividends such as adaptation to climate change and reduced social division

RESILIENCE VALUE

- Promotes cohesion and engaged communities
- Ensures social stability, security and justice
- Fosters economic prosperity

RESILIENCE QUALITY

Integrated

CASE STUDY REFERENCE

Cape Town 2.2.3

This intervention aligns with Adaptive municipal governance & finance

1.2 Development of improved district plans from a resilience perspective

Pioneering intervention

DESCRIPTION

District plans are 10-year plans that guide spatial development and land use management within the identified districts of a city. These plans incorporate the Municipal Spatial Development Framework in more detailed plans.

SHOCK

All

SDG

11 – Sustainable cities & communities

STRESS

Municipal funds, climate change, urbanisation, informal settlements

TIME FRAME

Medium term

OUTCOME

Improved and more robust plans will lead to public and private investment initiatives that are better informed and more adaptable when shocks and stresses occur.

RESILIENCE VALUE

- Promotes leadership and effective management
- Fosters long-term and integrated planning
- Empowers a broad range of stakeholders

INTERVENTION ALIGNMENT

3.3
5.6

RESILIENCE QUALITY

Robust

CASE STUDY REFERENCE

Cape Town 2.2.6

This intervention aligns with Adaptive municipal governance & finance

1.3 Investigate alternative methods for financially feasible service delivery in informal settlements

Showcasing intervention

DESCRIPTION

The number of new dwellings built in informal settlements nearly equals the number of dwellings built in the private and public sectors. Due to the need for basic service delivery to informal settlements and these settlements often being located on private, unserviced land far from bulk infrastructure, municipal finances must be allocated in a sensible manner to provide basic services. Innovation and various methods of service delivery in informal settlements must be prioritised to ensure consistent delivery of basic services.

SHOCK

Fire, power outages, flooding

SDG

11 - Sustainable cities & communities

STRESS

Informal settlements, urbanisation, poverty & inequality

TIME FRAME

Medium term

OUTCOME

Innovation in terms of delivery of basic services (water, energy, sanitation) that have multiple resilience dividends including empowering residents, improving health outcomes, and reducing the occurrence of shocks.

RESILIENCE VALUE

- Meets basic needs
- Provides and enhances natural and man-made assets
- Ensures continuity of critical services

INTERVENTION ALIGNMENT

3.6
4.2
4.3
5.5

RESILIENCE QUALITY

Resourceful

CASE STUDY REFERENCE

Cape Town 2.4.1

This intervention aligns with Adaptive municipal governance & finance

1.4 Intergovernmental relations focused on resilience

Facilitating intervention

DESCRIPTION

'Intergovernmental relations' refers to the relations between different governments or between organs of state from different governments in the conduct of their affairs, and is governed by the Intergovernmental Framework Act, Act 13 of 2005.

SHOCK

All

STRESS

All

SDG

11 – Sustainable cities & communities

TIME FRAME

Short term

OUTCOME

Improved and focused intergovernmental relations for the purpose of building resilience to address shocks and stresses, especially in areas where the effectiveness of responses is reliant on powers and competencies beyond the reach of the various authorities involved.

RESILIENCE VALUE

- Promotes leadership and effective management
- Ensures continuity of critical services
- Promotes social stability, security and justice

RESILIENCE QUALITY

Integrated

INTERVENTION ALIGNMENT

3.9
3.10
4.1
4.3
5.3

CASE STUDY REFERENCE

Cape Town 5.2.2

This intervention aligns with
Adaptive municipal governance & finance

1.5 Flexible administration capabilities related to resilience

Facilitating intervention

DESCRIPTION

'Flexible administration capabilities' refers to the changes that can be made in a system by improving the existing framework or by altering the framework in its entirety.

SHOCK

All

STRESS

All

SDG

11 - Sustainable cities and communities

TIME FRAME

Short term

OUTCOME

Authorities within governments and municipalities that are capable of managing uncertain areas and environments affected by the shocks and stresses that impact the resilience of a city

RESILIENCE VALUE

- Empowers a broad range of stakeholders
- Promotes leadership and effective management
- Ensures continuity of critical services

INTERVENTION ALIGNMENT

3.8

RESILIENCE QUALITY

Flexible

CASE STUDY REFERENCE

Cape Town 5.2.3

This intervention aligns with Adaptive municipal governance & finance

1.6 Inclusive public participation to ensure resilience dividends

Facilitating intervention

DESCRIPTION

Residents engaging in public participation should be thoroughly educated on resilience, shocks and stresses, to ensure that co-design and co-ownership of initiatives can occur optimally. Public participation should only occur once residents have a clear understanding of which plans and policies affect them. Instances of engagement should occur throughout planning and project cycles to improve trust-building and ensure that sufficient time is invested in achieving the best possible outcomes.

SHOCK

All

STRESS

All

SDG

11 - Sustainable cities and communities

TIME FRAME

Medium term

OUTCOME

Improved methods of public participation and engagement that empower residents to contribute actively to decision-making processes, and which result in the co-design and co-ownership of projects and plans that have multiple resilience dividends.

RESILIENCE VALUE

- Promotes leadership and effective management
- Empowers a broad range of stakeholders
- Promotes cohesive and engaged communities

INTERVENTION ALIGNMENT

1.2
5.5

RESILIENCE QUALITY

Inclusive

CASE STUDY REFERENCE

Cape Town 5.2.5

This intervention aligns with Adaptive municipal governance & finance

1.7 Data science as part of resilience decision making

Pioneering intervention

DESCRIPTION

Data science has great potential to assist in resilience-building initiatives, especially since it can be used to determine the likelihood of certain occurrences. It can be utilised in determining risks associated with the use of certain networks or systems and can aid in the generation of the early warnings required when dealing with shocks that can be disruptive to resilience building.

SHOCK

All

STRESS

All

SDG

11 - Sustainable cities and communities

TIME FRAME

Short term

OUTCOME

Enhanced use of data science to improve decision support systems, helping to make more informed decisions in a future which is expected to be increasingly complex regarding the intersection of shocks and stresses.

RESILIENCE VALUE

- Ensures continuity of critical services
- Provides and enhances natural and man-made assets
- Fosters long-term and integrated planning

INTERVENTION ALIGNMENT

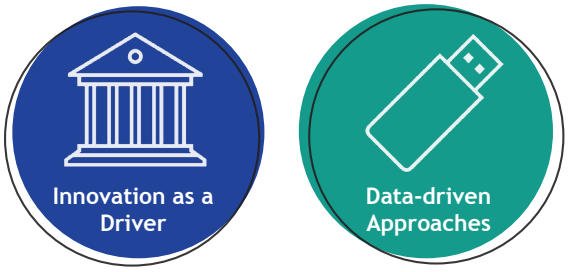
5.5

RESILIENCE QUALITY

Resourceful

CASE STUDY REFERENCE

Cape Town 5.3.1



This intervention aligns with
Adaptive municipal governance & finance &
Data-driven approaches to spatial transformation

1.8 Applying scenario planning to ensure enhanced resilience

Facilitating intervention

DESCRIPTION

To plan properly for a variety of possibilities, scenario planning should be part of the decision making, to ensure that plans, policies and strategies are robust and will endure all potential future shocks and stresses

SHOCK

All

STRESS

All

SDG

11 - Sustainable cities & communities

TIME FRAME

Short term

OUTCOME

Enhanced anticipation of a variety of outcomes after shocks or stresses should occur and aid in the successful planning and implementation of policies and plans related to the urban environment

RESILIENCE VALUE

- Promotes leadership and effective management
- Fosters long-term and integrated planning
- Empowers a broad range of stakeholders

INTERVENTION ALIGNMENT

1.2
1.8
3.3
4.3

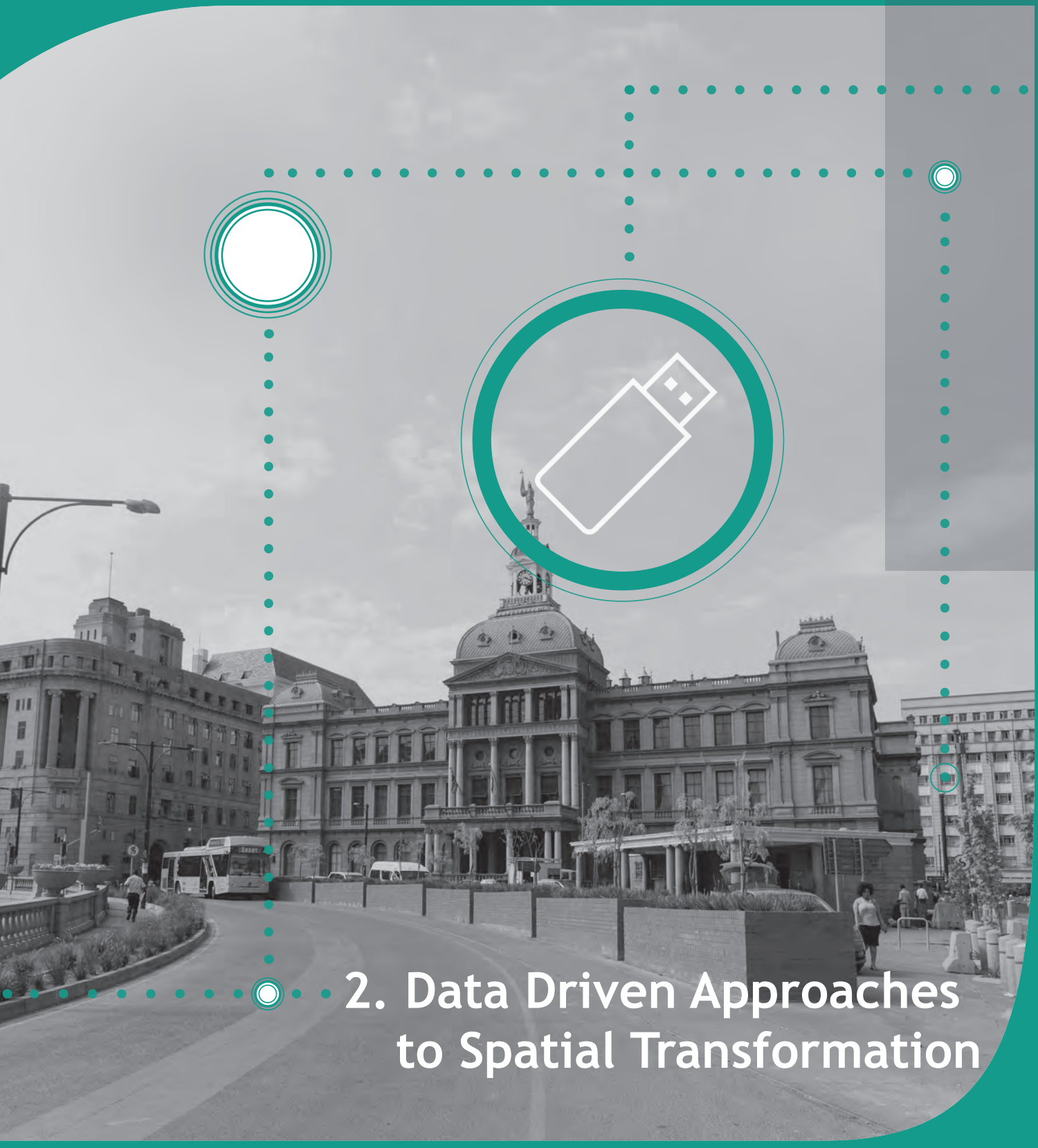
RESILIENCE QUALITY

Robust

CASE STUDY REFERENCE

Cape Town 5.3.3

This intervention aligns with
Adaptive municipal governance & finance &
Data-driven approaches to spatial transformation



2. Data Driven Approaches to Spatial Transformation

2.1 Comprehension of current information sources and other systems of collection

Showcasing intervention

DESCRIPTION

This relates to the National Housing Needs Register. Completion of the register will depend on the modification of existing questions to fully assess social amenities and other needs not currently specified in the survey questions. Community engagement is an important part of community-collected data, and processes should be mainstreamed to enable efficiency and accuracy.

SHOCK

Civil unrest, infrastructure failure

STRESS

Urbanisation, social division, informal settlement

SDG

11 – Sustainable cities & communities

TIME FRAME

Short term

OUTCOME

Easily accessible and frequently updated data source containing qualitative and qualitative data captured by municipalities and communities

RESILIENCE VALUE

- Promotes leadership and effective management
- Empowers a broad range of stakeholders
- Fosters long-term and integrated planning
- Ensures continuity of critical services
- Provides reliable communication and mobility

RESILIENCE QUALITY

Resourceful

CASE STUDY REFERENCE

Durban RBO 1: Outcome 2

This intervention aligns with
Data-driven approaches to spatial transformation &
Leveraging innovation to respond to crisis &
Innovation as a driver for adaptation

2.2 Prioritisation of types of data and knowledges collected via community participation

Facilitating intervention

DESCRIPTION

Ensuring participation and approval from communities in terms of municipal plans and development is dependent on accurate and efficiently gathered information. All collected data must be relevant in order to efficiently inform municipal officials and other applicable processes.

SHOCK

Civil unrest, infrastructure failure

STRESS

Urbanisation, poverty & inequality, municipal funds

SDG

11 - Sustainable cities & communities

TIME FRAME

Short term

OUTCOME

Easily accessible and frequently updated data source containing quantitative and qualitative data captured by municipalities and communities.

RESILIENCE VALUE

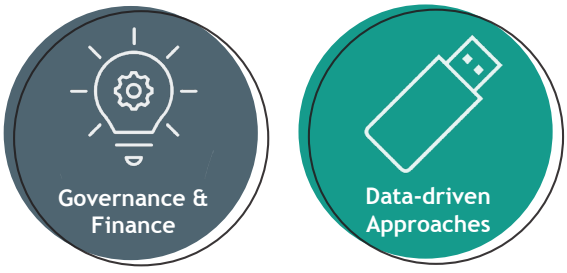
- Promotes leadership and effective management
- Empowers a broad range of stakeholders
- Fosters long-term and integrated planning
- Ensures continuity of critical services
- Provides reliable communication and mobility

RESILIENCE QUALITY

Resourceful

CASE STUDY REFERENCE

Durban RBO 1: Outcome 2



This intervention aligns with
Data-driven approaches to spatial transformation &
Innovation as a driver for adaptation

2.3 Platforms for information sharing regarding informal settlements

Pioneering intervention

DESCRIPTION

This relates to the National Housing Needs Register. Completion of the register will depend on the modification of existing questions to fully assess social amenities and other needs not currently specified in the survey questions. Community engagement is an important part of community-collected data, and processes should be mainstreamed to enable efficiency and accuracy.

SHOCK

Civil unrest, infrastructure failure

STRESS

Informal settlement, social division, urbanisation

SDG

11 – Sustainable cities & communities

TIME FRAME

Short term

OUTCOME

Easily accessible and frequently updated data source containing qualitative and qualitative data captured by municipalities and communities

RESILIENCE VALUE

- Promotes leadership and effective management
- Empowers a broad range of stakeholders
- Fosters long-term and integrated planning
- Ensures continuity of critical services
- Provides reliable communication and mobility

RESILIENCE QUALITY

Integrated

CASE STUDY REFERENCE

Durban RBO 1: Outcome 2

This intervention aligns with Data-driven approaches to spatial transformation & Innovation as a driver for adaptation

2.4 Develop and implement a precinct management model in applicable areas

Showcasing intervention

DESCRIPTION

Development of a precinct management model will address urban decay in identified areas, which will lead to a decrease in crime and other social ills.

SHOCK

All

STRESS

Unemployment, crime & violence, social division

SDG

11 - Sustainable cities & communities

TIME FRAME

Short term

OUTCOME

Precincts impacted by the development of a precinct management model will benefit by becoming cleaner, safer, more functional, and attractive to economic investment.

RESILIENCE VALUE

- Promotes cohesion and engaged communities
- Ensures social stability, security, and justice
- Fosters economic prosperity

INTERVENTION ALIGNMENT

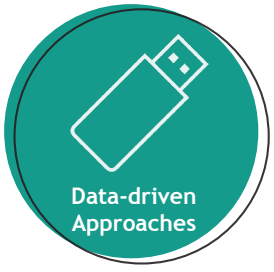
1.1

RESILIENCE QUALITY

Innovative

CASE STUDY REFERENCE

Cape Town 2.2.3



This intervention aligns with
Adaptive municipal governance & finance &
Data-driven approaches to spatial transformation

3. Leveraging Innovation to Respond to Crisis

3.1 Development of databases of referral networks

Facilitating intervention

DESCRIPTION

A centralised, coordinated referral network across cities is required to enable stakeholders and role players to source information required by certain actors and for certain scenarios such as frontline responders, police, health and social services etc. This referral network also needs to be accessible to citizens to ensure usefulness of the database.

SHOCK

All

STRESS

Crime & violence, trauma

SDG

3 - Good health & well-being

TIME FRAME

Short term

OUTCOME

Easily accessible, up-to-date information regarding referral networks for at-risk individuals, victims of crime and persons living with mental illness.

RESILIENCE VALUE

- Ensures social stability, security, and justice
- Promotes cohesive and engaged communities
- Promotes leadership and effective management

INTERVENTION ALIGNMENT

5.1

RESILIENCE QUALITY

Resourceful

CASE STUDY REFERENCE

Cape Town 1.2.3

This intervention aligns with Leveraging innovation to respond to crisis & Innovation as a driver for adaptation

3.2 Implementation of a screening tool to identify at-risk youth

Facilitating intervention

DESCRIPTION

All types of traumas negatively influence the general safety, health and well-being of a person. As traumas accumulate over time and become more complex, already severe consequences can become dire. It is important to intervene in traumas impacting children and young adults to ensure a safe and healthy community. Health and mental health screenings should be implemented and partnerships with societal authorities should inform decision making to determine areas of need

SHOCK

All

SDG

3 - Good health & well-being

STRESS

Trauma, poverty & inequality, crime & violence

TIME FRAME

Medium term

OUTCOME

Enhancement of identification process of persons who have been subjected to various traumatic experiences. Most appropriate interventions can be recommended to improve health and general well-being

RESILIENCE VALUE

- Promotes public health
- Empowers a broad range of stakeholders
- Promotes cohesive and engaged communities

INTERVENTION ALIGNMENT

3.1

RESILIENCE QUALITY

Resourceful

CASE STUDY REFERENCE

Cape Town 1.4.4

This intervention aligns with Leveraging innovation to respond to crisis & Innovation as a driver for adaptation

3.3 Interpretation & integration of climate change into planning

Facilitating intervention

DESCRIPTION

Information regarding various and most prominent climate patterns in certain areas is needed in order to guide prioritisation and investment for bringing about the mitigation measures most suited to current contexts

SHOCK

Drought, floods, heatwave

STRESS

Climate change, unemployment, informal settlements, poverty & inequality

SDG

13 - Climate action

TIME FRAME

Short term

OUTCOME

To ensure that planning relating to climate change is robust and includes most-probable scenarios, improved methods of utilising available data and generating more data will aid long-term planning and increase adaptivity.

RESILIENCE VALUE

- Fosters long-term and integrated planning
- Ensures continuity of critical services
- Empowers a broad range of stakeholders

INTERVENTION ALIGNMENT

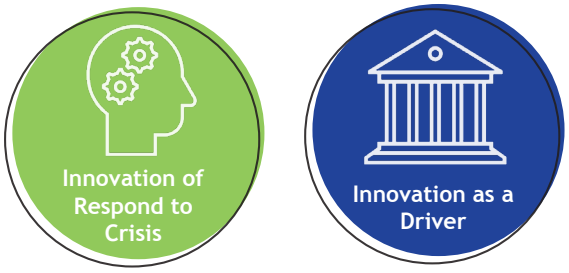
1.2
5.6

RESILIENCE QUALITY

Robust

CASE STUDY REFERENCE

Cape Town 2.3.1



This intervention aligns with
Leveraging innovation to respond to crisis &
Adaptive municipal governance & finance

3.4 Creation of heat plans at city level

Facilitating intervention

DESCRIPTION

Heatwaves are considered dangerous as they can disrupt economic activity, damage infrastructure and cause fatalities (especially in poverty-stricken areas). Heat plans should indicate which actions should be taken should heatwaves occur. Knowledge gaps should be identified, and areas of significant vulnerability should be identified to ensure proper mitigation can occur.

SHOCK

Heatwave, infrastructure failure, climate change, fire

STRESS

Social division, climate change, poverty & inequality, informal settlements

SDG

13 - Climate action

TIME FRAME

Medium term

OUTCOME

Utilising heat plans should lead to heat waves having diminished impact when they occur, and allowing economic activities to continue as normal as well as decreased infrastructure damages and fatalities.

RESILIENCE VALUE

- Provides and enhances natural and man-made assets
- Ensures continuity of critical services
- Empowers a broad range of stakeholders

INTERVENTION ALIGNMENT

1.1
3.3
3.7
3.8
3.9
5.5
5.7

RESILIENCE QUALITY

Resourceful

CASE STUDY REFERENCE

Cape Town 4.1.1

This intervention aligns with
Leveraging innovation to respond to crisis &
Adaptive Municipal Governance & Finance &
Innovation as a driver for adaptation

3.5 Large-scale partnerships to diminish risk of cyberattacks

Facilitating intervention

DESCRIPTION

Cyberattacks are detrimental to the South African economy, costing billions of rands annually. Cyberattacks result in damaged or lost data, loss of revenue and damaged reputations. The risks of attacks of this nature should be properly understood to be able to raise awareness about the likelihood of cyberattacks. Additionally, regular screening and assessments relating to vulnerability to cyberattacks should be undertaken.

SHOCK

Cyberattacks, infrastructure failure, power outage

STRESS

Crime & violence

SDG

11 - Sustainable cities & communities

TIME FRAME

Short term

OUTCOME

Partnerships to prevent cyberattacks should lead to prevention of cyberattacks occurring, as well as swift and capable response and reaction should cyberattacks occur.

RESILIENCE VALUE

- Provides and enhances natural and man-made assets
- Ensures continuity of critical services
- Empowers a broad range of stakeholders

RESILIENCE QUALITY

Robust

CASE STUDY REFERENCE

Cape Town 4.1.2

This intervention aligns with Leveraging innovation to respond to crisis & Adaptive municipal governance & finance

3.6 Deploy solutions to mitigate and reduce impacts of fires in informal settlements

Facilitating intervention

DESCRIPTION

Fires happen often in informal settlements and backyard dwellings. Fires lead to destruction, devastation and loss of lives, possessions and incomes. Authorities, stakeholders and role players should attempt to reduce fire risks in the most vulnerable areas.

SHOCK

Fire, heatwave

STRESS

Informal settlements, urbanisation, poverty & inequality

SDG

1 - No poverty

TIME FRAME

OUTCOME

Improved methods of detection, prevention and recovery from fires in informal settlements.

RESILIENCE VALUE

- Ensures continuity of critical services
- Empowers a broad range of stakeholders
- Meets basic needs

INTERVENTION ALIGNMENT

1.4
3.3
3.5
5.5

RESILIENCE QUALITY

Innovative

CASE STUDY REFERENCE

Cape Town 4.1.5

This intervention aligns with Leveraging innovation to respond to crisis & Innovation as a driver for adaptation

3.7 ‘Build back better’ after shock events damage infrastructure

Facilitating intervention

DESCRIPTION

After damage and destruction to public infrastructure and informal settlements occurs, there is a unique opportunity to rebuild in an improved and strengthened manner. Informal settlements are especially vulnerable to damage after shock events. ‘Build back better’ events and protocols should be developed and included as part of shock recovery and mitigation approaches. Green design and improved engineering solutions should be included in the applied approaches.

SHOCK

All

STRESS

Municipal funds, climate change

SDG

9 - Industry, innovation & infrastructure

TIME FRAME

Medium term

OUTCOME

Collaboration across various spheres of government should occur to ensure that infrastructure and informal settlements damaged because of shock events occurring are not only repaired but built stronger and able to withstand any future shock events.

RESILIENCE VALUE

- Provides and enhances natural and man-made infrastructure
- Fosters long-term and integrated planning
- Fosters economic prosperity

INTERVENTION ALIGNMENT

1.5
3.3
3.5

RESILIENCE QUALITY

Robust

CASE STUDY REFERENCE

Cape Town 4.1.6

This intervention aligns with Leveraging innovation to respond to crisis &
Adaptive Municipal Governance & Finance &
Innovation as a driver for adaptation

3.8 Launch replications of shock events to ensure preparedness

Facilitating intervention

DESCRIPTION

Uncertainty regarding the impacts of shocks and stresses causes residents to not be fully prepared to survive, adapt and thrive when shocks do occur. Replication of shock events allows residents to practise operations during shocks and subsequently improve on current approaches and plans as needed.

SHOCK

All

STRESS

All

SDG

11 - Sustainable cities & communities

TIME FRAME

Short

OUTCOME

Increasing awareness of and preparation for various shocks, which leads to improved business continuity plans and recovery strategies.

RESILIENCE VALUE

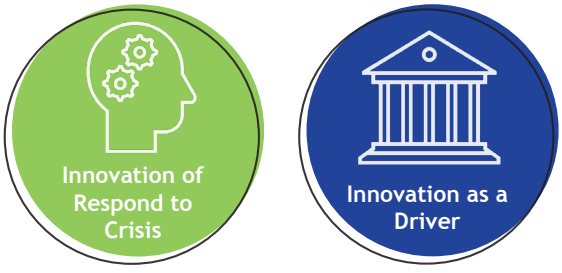
- Empowers a broad range of stakeholders
- Promotes leadership and effective management
- Fosters long-term and integrated planning

RESILIENCE QUALITY

Robust

CASE STUDY REFERENCE

Cape Town 4.1.7



This intervention aligns with
Leveraging innovation to respond to crisis &
Adaptive municipal governance & finance

3.9 Facilitate disaster planning by means of smart technology and predictive analysis methods

Facilitating intervention

DESCRIPTION

The ability to forewarn residents of areas impacted by shocks should be improved to ensure better preparedness and greater reach. Communication methods before, during and after disaster should be optimised to include various means of communication in real time through the development of a risk alert and emergency information system linked to an app.

SHOCK

All

STRESS

All

SDG

13 - Climate action

TIME FRAME

Medium term

OUTCOME

Improved early-warning systems for disasters and shock events to be developed, of which better information on post-disaster measures should form a part.

RESILIENCE VALUE

- Empowers a broad range of stakeholders
- Provides leadership and effective management
- Promotes cohesive and engaged communities

INTERVENTION ALIGNMENT

3.6
5.7

RESILIENCE QUALITY

Integrated

CASE STUDY REFERENCE

Cape Town 4.2.3

This intervention aligns with
Leveraging innovation to respond to crisis

4. Inclusive City Economies

4.1 Conventionalise sourcing sustainable methods of supply chain management

Facilitating intervention

DESCRIPTION

Opportunities for end-to-end digitisation of procurement as well as procurement specialists in supply chains should be optimised and leveraged towards the creation of demand for green goods and services. This will influence the market greatly, by mainstreaming lifecycle approaches to products, resources and other services.

This can be done in part by ensuring systems and processes can support sustainable procurement and developing guidelines and approaches to further facilitate development of sustainable supply chains.

SHOCK

Economic crises, power outage, drought

STRESS

Unemployment, climate change, food insecurity, poverty & inequality

SDG

12 - Responsible consumption & production

TIME FRAME

Short term

OUTCOME

Increasing funds allocated to green goods and services will ensure that public procurement increases in an environmental and responsible manner, which in turn will ensure innovation, and subsequently increased local production leading to job creation.

RESILIENCE VALUE

- Fosters economic prosperity
- Supports livelihoods and employment
- Provides and enhances natural and man-made assets

RESILIENCE QUALITY

Resourceful

CASE STUDY REFERENCE

Cape Town 3.1.2

This intervention aligns with Inclusive city economies & Innovation as a driver for adaptation

4.2 Conduct a waste economy study to comprehend the opportunities of the circular economy

Facilitating intervention

DESCRIPTION

By increasing their knowledge of waste streams and waste generation, authorities will be able to make more informed decisions in collaboration with relevant partners to minimise waste production, improve methods of recycling, optimise waste diversion and maximise the use of benefits available within the economy.

Increased knowledge of waste streams will result in a common understanding of economic and environmental risks, specifically concerning climate change and urbanisation. Knowledge of important thematic areas will contribute to the utilisation of opportunities within the circular economy, and the possibility of job creation

OUTCOME

Detailed understanding of the multitude of waste streams, including type, quantity, and projected changes over time, for the purpose of identifying risks to the sustainability of the waste service and new opportunities in the economy that can build resilience to resource constraints.

SHOCK

Infrastructure failure, economic crises

STRESS

Unemployment, climate change, urbanisation, informal settlements

RESILIENCE VALUE

- Ensures continuity of critical services
- Supports livelihoods and employment
- Fosters economic prosperity

RESILIENCE QUALITY

Resourceful

SDG

11 - Sustainable cities and communities

TIME FRAME

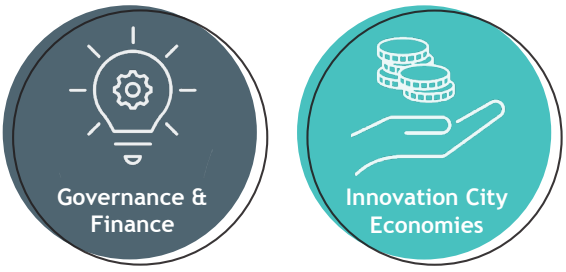
Short term

INTERVENTION ALIGNMENT

1.4
4.1

CASE STUDY REFERENCE

Cape Town 3.1.4



This intervention aligns with Inclusive city economies & Innovation as a driver for adaptation

4.3 Predicting transitions for changing the global economy

Facilitating intervention

DESCRIPTION

To achieve carbon neutrality by 2050, in line with the Paris climate agreement, authorities and leaders must comprehend the challenges and opportunities accompanying the economy of a carbon-neutral city. Consumer patterns and regulatory changes are also bound to occur; this is an important consideration as it forms part of many sectors such as tourism, production and technological change.

SHOCK

Economic crises, cyberattacks, power outages, drought

STRESS

Climate change

SDG

8 - Decent work & economic growth

TIME FRAME

Short term

OUTCOME

Improved insights and scenarios for proactive societal responses to changing drivers of the local and regional economies, in the face of (among other things) rapid technological change, the global response to climate change, and variations in international trade regimes.

RESILIENCE VALUE

- Fosters economic prosperity
- Supports livelihoods & employment
- Empowers a broad range of stakeholders

RESILIENCE QUALITY

Integrated

CASE STUDY REFERENCE

Cape Town 3.4.4

This intervention aligns with Inclusive city economies & Innovation as a driver for adaptation

4.4 Introducing community finance facilities to utilise resources in communities and developmental partnerships

Facilitating intervention

DESCRIPTION

Ensuring the availability of grants and affordable financing opportunities to organised informal settlement communities, towards the objective of upgrading informal settlements by utilising community-managed incentives. Financial facilities should not be limited to loan financing, but could also include initiatives such as community saving schemes.

SHOCK

Civil unrest

STRESS

Poverty & inequality

SDG

10 - Reduced inequalities

TIME FRAME

Medium term

OUTCOME

The relevant authorities should secure the human and financial resources required to undertake collaborative, city-wide informal settlement upgrading

RESILIENCE VALUE

- Fosters economic prosperity
- Supports livelihoods & employment
- Empowers a broad range of stakeholders

RESILIENCE QUALITY

Resourceful

CASE STUDY REFERENCE

Durban RBO: Outcome 4

This intervention aligns with Inclusive city economies & Adaptive municipal governance & finance

4.5 Development of employment & skills development opportunities in informal settlements

Showcasing intervention

DESCRIPTION

Improvement and upgrading of any area, service or infrastructure should be associated with the creation of opportunities for employment and skills development.

SHOCK

Civil unrest

STRESS

Informal settlements

SDG

10 - Reduced inequalities

TIME FRAME

Long term

OUTCOME

Informal settlements should report improved well-being in terms of social, economic and environmental aspects to further enhance resilience.

RESILIENCE VALUE

- Fosters economic prosperity
- Supports livelihoods & employment
- Empowers a broad range of stakeholders

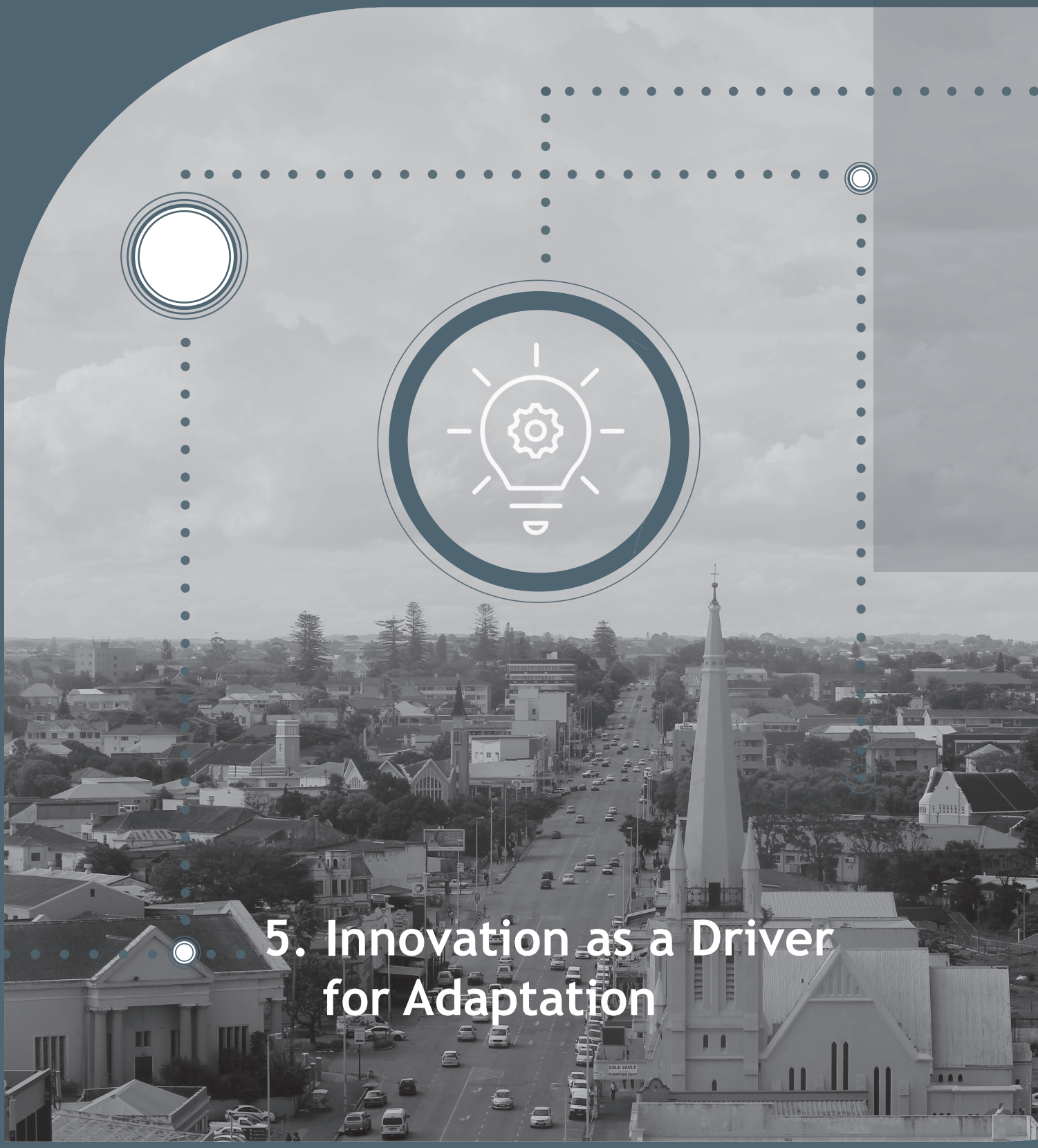
RESILIENCE QUALITY

Robust

CASE STUDY REFERENCE

Durban RBO 1: Outcome 8

This intervention aligns with
Inclusive city economies &
Innovation as a driver for adaptation



5. Innovation as a Driver for Adaptation

5.1 Provision of more walking buses

Facilitating intervention

DESCRIPTION

While walking to school may be the only transport mode for some children, this may make them vulnerable to crime if they walk in isolation.

SHOCK

Civil unrest

STRESS

Crime & violence, social division

SDG

16 - Peace, justice, and strong institutions

TIME FRAME

Short term

OUTCOME

More schoolchildren take part in walking buses that include other members of the community as well. This innovation will increase the number of walking buses, and the communities in which they operate support the number and training of the volunteers who form part of these buses.

RESILIENCE VALUE

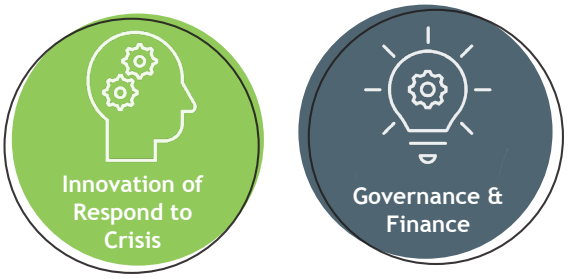
- Ensures social stability, security and justice
- Promotes leadership and effective management
- Promotes cohesive and engaged communities

RESILIENCE QUALITY

Resourceful

CASE STUDY REFERENCE

Cape Town 1.2.6



This intervention aligns with Innovation as a driver for adaptation & Leveraging innovation to respond to crisis

5.2 Collaboration with employers to alleviate traffic congestion

Facilitating intervention

DESCRIPTION

Due to a lack of investment in various public transport systems there is over-reliance on private vehicles, causing significant traffic congestion especially in metropolitan areas.

SHOCK

Infrastructure failure, flooding, power outage

STRESS

Traffic congestion, climate change, inadequate public transport systems

SDG

11 - Sustainable cities & communities

TIME FRAME

Medium term

OUTCOME

Partnering with business and the public sector to implement innovative solutions that reduce peak-hour traffic in city centres.

RESILIENCE VALUE

- Provides reliable communication and mobility
- Promotes cohesive and engaged communities
- Ensures continuity of critical services

INTERVENTION ALIGNMENT

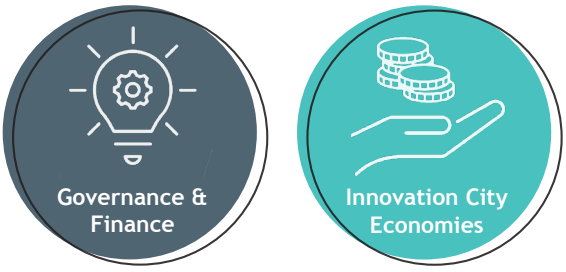
1.1
2.4
5.3
5.4

RESILIENCE QUALITY

Resourceful

CASE STUDY REFERENCE

Cape Town 2.1.1



This intervention aligns with Inclusive city economies & Innovation as a driver for adaptation

5.3 Development of safe passenger rail services

Pioneering intervention

DESCRIPTION

Improve the utilisation of rail services by local commuters to reduce road traffic congestion, by ensuring a safe environment where criminality, sabotage and vandalism of infrastructure is proactively combated by governmental intervention.

SHOCK

Infrastructure failure

STRESS

Inadequate public transport, crime & violence, traffic congestion

SDG

11 - Sustainable cities & communities

TIME FRAME

Medium term

OUTCOME

Reduce delays and safety concerns associated with the use of passenger trains to improve the experience of the portion of the population that considers this a viable public transport mode.

RESILIENCE VALUE

- Ensures social stability, security and justice
- Fosters economic prosperity
- Provides reliable communication and mobility

INTERVENTION ALIGNMENT

1.1
2.4
5.2

RESILIENCE QUALITY

Integrated

CASE STUDY REFERENCE

Cape Town 2.1.2

This intervention aligns with
Adaptive municipal governance & finance

5.4 Utilise geospatial information systems to support informal transport modes

Facilitating intervention

DESCRIPTION

Capture geospatial data on formal and informal transport modes, with the former including the public transport sector regulated by government, while the latter includes minibus taxi networks predominantly.

SHOCK

Infrastructure failure

STRESS

Inadequate public transport, traffic congestion, poverty & inequality

SDG

11 - Sustainable cities & communities

TIME FRAME

Medium term

OUTCOME

Utilising all forms of transport (including rail, bus, cycling and walking) will allow cost of public transport to be as cost efficient as possible.

RESILIENCE VALUE

- Provides reliable communication and mobility
- Fosters economic prosperity
- Provides leadership and effective management

INTERVENTION ALIGNMENT

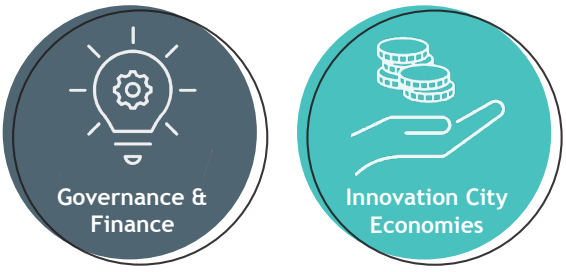
5.2

RESILIENCE QUALITY

Resourceful

CASE STUDY REFERENCE

Cape Town 2.1.3



This intervention aligns with Inclusive city economies & Innovation as a driver for adaptation

5.5 Community engagement as part of informal settlement upgrading projects

Facilitating intervention

DESCRIPTION

Increased urbanisation leads to the proliferation of informal settlements. An important government instrument in formal housing provision is to upgrade informal settlements. Effective projects require the input of local communities and non-sector partners to identify shared objectives and workable interventions, and ensure successful project completion.

SHOCK

Flooding, fire, civil unrest

STRESS

Informal settlements, poverty, municipal finances

SDG

11 - Sustainable cities & communities

TIME FRAME

Short term

OUTCOME

Local communities play a central role in the creation of sustainable, integrated and resilient human settlements, in collaboration with government and other stakeholders.

RESILIENCE VALUE

- Empowers a broad range of stakeholders
- Promotes cohesive and engaged communities
- Fosters long-term and integrated planning

INTERVENTION ALIGNMENT

1.4
1.7
3.6
3.7

RESILIENCE QUALITY

Inclusive

CASE STUDY REFERENCE

Cape Town 2.4.2

This intervention aligns with Innovation as a driver for adaptation

5.6 Implementation of digital literacy programmes

Facilitating intervention

DESCRIPTION

The knowledge economy is growing in prominence, with technological changes as part of the Fourth Industrial Revolution set to fundamentally change production processes and the nature of the skills required in the modern economy. There is a need to develop and implement digital literacy programmes to support the skills adaptation of labour, to ensure their absorption into the new industries and sectors that are replacing existing ones. There is a need to work with local stakeholders, including business and communities, in designing these programmes, developing the relevant skills, and implementing the programmes effectively.

OUTCOME

Contribute to alleviating existing socio-economic challenges faced, including unemployment, poverty and inequality, as workers learn new skills, create new businesses, and drive the development of technologically advanced sectors.

SHOCK

Economic crisis, cyberattack, infrastructure failure

STRESS

Unemployment, poverty & inequality

RESILIENCE VALUE

- Empowers a broad range of stakeholders
- Promotes cohesive and engaged communities
- Fosters long-term and integrated planning

RESILIENCE QUALITY

Integrated

SDG

8 - Decent work & economic growth

TIME FRAME

Medium term

CASE STUDY REFERENCE

Cape Town 3.3.1

This intervention aligns with Innovation as a driver for adaptation & Inclusive city economies & Leveraging innovation to respond to crisis

5.7 Facilitation of local resilience assessments

Facilitating intervention

DESCRIPTION

Local communities are the most reliable sources of information regarding factors that may influence their resilience during times of disturbance. Government should facilitate cooperation and engagement with local communities to identity these factors, whether they are environmental, social, political or economic, and develop tangible interventions in support of adaptation and adaptability. Non-sector stakeholders such as community-based organisations (CBOs) may also form part of the process of local resilience assessment.

SHOCK

All

STRESS

All

SDG

1 - No Poverty

TIME FRAME

Short term

OUTCOME

Communities participate in delineating the vulnerabilities in their area and which disturbances are especially relevant, while also being empowered in identifying potential interventions to support local resilience.

RESILIENCE VALUE

- Empowers a broad range of stakeholders
- Promotes cohesive and engaged communities
- Fosters long-term and integrated planning

INTERVENTION ALIGNMENT

1.2
3.3
3.6
3.9
5.5

RESILIENCE QUALITY

Integrated

CASE STUDY REFERENCE

Cape Town 4.2.1

This intervention aligns with Innovation as a driver for adaptation & Inclusive city economies

5.8 Mitigate groundwater overextraction

Showcasing intervention

DESCRIPTION

Capture and monitor data on boreholes to analyse groundwater extraction patterns. This data can be used to support interventions (e.g. awareness campaigns) to protect groundwater resources from depletion, which could exacerbate environment disturbances (e.g. droughts).

SHOCK

Drought, infrastructure failure

STRESS

Climate change, municipal funds, social division

SDG

6 - Clean water & sanitation

TIME FRAME

Medium term

OUTCOME

Sustainable extraction of groundwater by the diverse stakeholders that depend on this resource, with the objective of supporting resilience of water resources.

RESILIENCE VALUE

- Provides and enhances natural and man-made assets
- Meets basic needs
- Empowers a broad range of stakeholders

RESILIENCE QUALITY

Redundant

CASE STUDY REFERENCE

Cape Town 4.3.1

This intervention aligns with Innovation as a driver for adaptation & Leveraging innovation to respond to crisis

5.9 Incorporate resilience objectives in infrastructure projects

Pioneering intervention

DESCRIPTION

The current isolated approach to infrastructure development, upgrading and maintenance must be replaced by a holistic, cross-cutting consideration of specific resilience outcomes related to the vulnerabilities of urban areas (e.g. flooding). Infrastructure investment must be planned over the long term, and consider the diverse stakeholders who will feed into the infrastructure provision process.

SHOCK

All

STRESS

All

SDG

11 - Sustainable cities & communities

TIME FRAME

Medium term

OUTCOME

Consolidation of infrastructure investment initiatives to align with resilience outcomes, and mitigation of the specific vulnerabilities of the urban area over an extended period of time.

RESILIENCE VALUE

- Promotes leadership and effective management
- Fosters long-term and integrated planning
- Fosters economic prosperity

INTERVENTION ALIGNMENT

1.2

RESILIENCE QUALITY

Robust

CASE STUDY REFERENCE

Cape Town 5.1.1

This intervention aligns with Innovation as a driver for adaptation

5.10 Enhance accessibility of community engagement outcomes

Facilitating intervention

DESCRIPTION

Ensure that the outcomes of community engagement initiatives (including data collection and related findings) are sufficiently accessible to the local community, with reference to the information being available in their home language. Alternative media (such as video and multimedia) created by members of the local community may also support information transfer.

SHOCK

Civil unrest

STRESS

Social division

SDG

10 – Reduced inequalities

TIME FRAME

Short term

OUTCOME

Community engagement information accessible by all stakeholders in the process of identifying, developing, implementing and monitoring interventions centred on supporting resilience outcomes.

RESILIENCE VALUE

- Empowers a broad range of stakeholders
- Promotes cohesive and engaged communities
- Fosters long-term and integrated planning

RESILIENCE QUALITY

Inclusive

CASE STUDY REFERENCE

Durban RBO 1: Outcome 2

This intervention aligns with Innovation as a driver for adaptation

5.11 Efficient monitoring & evaluation systems supported by all governmental spheres & local communities

Pioneering intervention

DESCRIPTION

All resilience-related interventions should be monitored and evaluated based on their ability to support associated indicators with input from all governmental spheres. Local communities should be able to provide feedback and suggest alterations.

SHOCK

All

STRESS

All

SDG

13 - Sustainable cities & communities

TIME FRAME

Long term

OUTCOME

The creation of a monitoring and evaluation system that is supported by collaboration between diverse stakeholders, including local communities and the local, provincial and national governments.

RESILIENCE VALUE

- Promotes leadership and effective management
- Empowers a broad range of stakeholders
- Provides reliable communication and mobility

RESILIENCE QUALITY

Robust

CASE STUDY REFERENCE

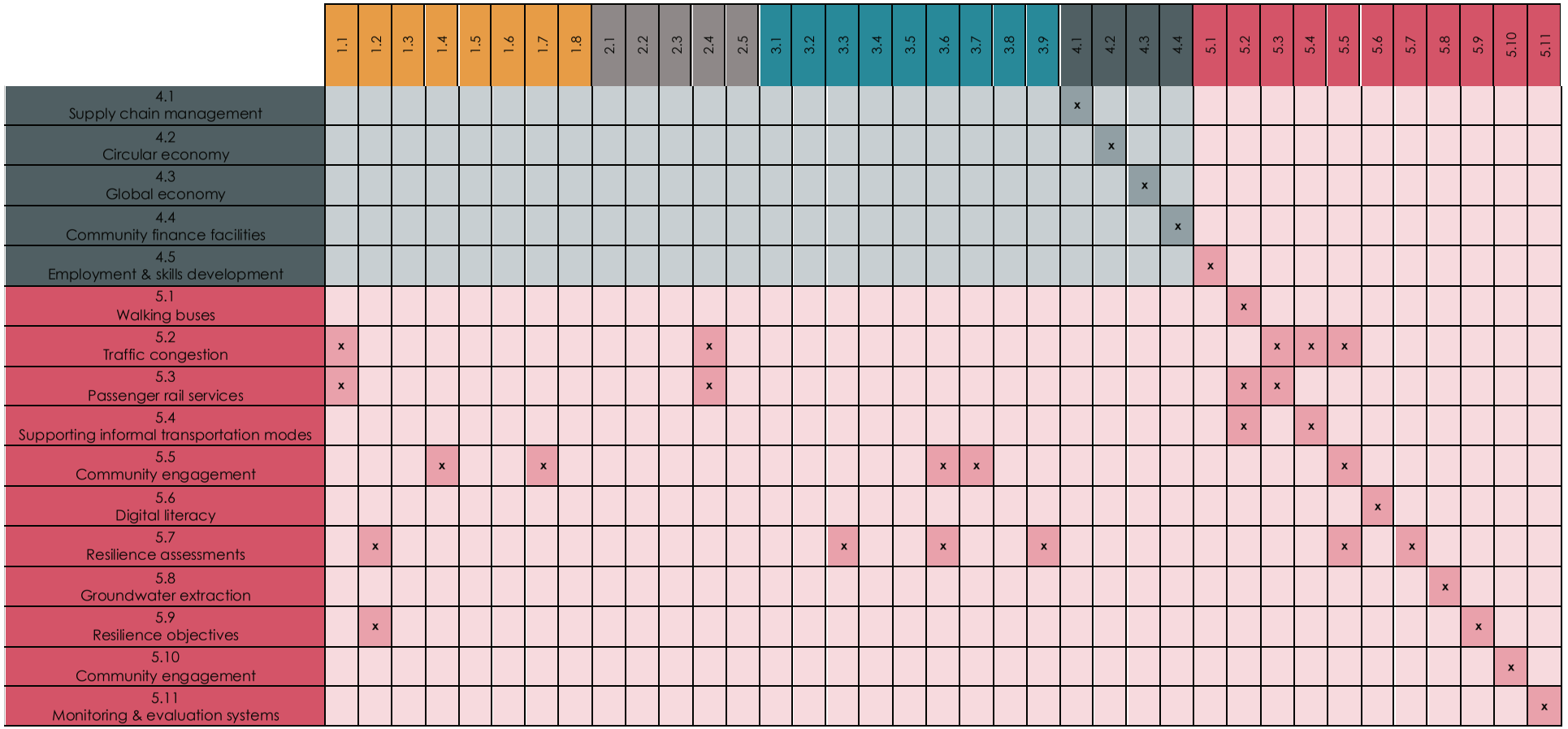
Durban RBO 1: Outcome 6

This intervention aligns with Innovation as a driver for adaptation

Intervention Alignment Matrix

The Strategy Document indicates various interventions to be used to further resilience, some of which align further with other interventions, as captured in the Intervention Alignment Matrix below. There are links embedded in the model that will direct the user to the specified interventions once selected.

	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	2.1	2.2	2.3	2.4	2.5	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.1	4.2	4.3	4.4	5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9	5.10	5.11
1.1 Public spaces	x																																				
1.2 District plans		x														x																	x					
1.3 Service delivery			x																x					x	x							x					
1.4 Intergovernmental relations				x																		x	x		x				x								
1.5 Flexible administration					x																x																
1.6 Public participation		x				x																									x						
1.7 Data science							x																								x						
1.8 Scenario planning		x						x								x									x												
2.1 Information sources									x																												
2.2 Prioritisation of data										x																											
2.3 Information sharing											x																										
2.4 Precinct management model	x											x																									
3.1 Referral networks													x														x										
3.2 At-risk youth														x	x																						
3.3 Climate change		x														x																x					
3.4 Heat plans	x															x	x			x	x	x									x		x				
3.5 Cyberattacks																		x																			
3.6 Fires in informal settlements				x												x		x	x												x						
3.7 'Build back better'					x											x		x		x																	
3.8 Replication of shock events																					x																
3.9 Facilitate disaster planning																			x			x												x			



	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	2.1	2.2	2.3	2.4	2.5	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.1	4.2	4.3	4.4	5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9	5.10	5.11
4.1 Supply chain management																							x														
4.2 Circular economy																								x													
4.3 Global economy																									x												
4.4 Community finance facilities																										x											
4.5 Employment & skills development																											x										
5.1 Walking buses																												x									
5.2 Traffic congestion	x											x																	x	x	x						
5.3 Passenger rail services	x											x																x	x								
5.4 Supporting informal transportation modes																												x		x							
5.5 Community engagement				x			x												x	x											x						
5.6 Digital literacy																																x					
5.7 Resilience assessments		x														x			x			x										x		x			
5.8 Groundwater extraction																																		x			
5.9 Resilience objectives		x																																	x		
5.10 Community engagement																																				x	
5.11 Monitoring & evaluation systems																																					x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