



Local responses to climate change: Navigating mainstreaming and transformative adaptation

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ABSTRACT

This article is based on the study done to explore the mainstreaming of climate change adaptation into municipal planning. The study used the City of Cape Town Metropolitan Municipality and Thulamela Local Municipality as comparative case studies in South Africa. It identified six key factors that influenced the effectiveness of adaptation mainstreaming: leadership arrangements; networks and knowledge-sharing; information access and use; capacity, resources, and skills; institutional coordination structure and process; and intergovernmental relations and coordination. The study showed how organisational dynamics and institutional arrangements impacted on the integration of climate change adaptation into planning processes, and it indicated that balancing long-term transformative objectives with immediate concerns required a dual approach that strategically embedded transformational goals within existing systems. The study offered insights into the complexity of reconciling transformative adaptation and development priorities through mainstreaming and it expanded the current understanding of how municipalities could navigate effective mainstreaming within the context of practical governance.

1. Introduction

It is widely accepted among scholars and practitioners that it is imperative to mainstream climate change adaptation into decision-making processes, particularly into those that relate to development and planning (Intergovernmental Panel on Climate Change, 2022; Picketts et al., 2014; Runhaar et al., 2018; Street et al., 2022; Uittenbroek et al., 2013). There is also increasing support for transformative adaptation as a response to climate risk in an increasingly complex world (Pelling et al., 2015; Revi et al., 2014; Street et al., 2022; Wamsler & Osberg, 2022). As such, there is growing recognition of the need to address climate risks and underlying vulnerabilities through transformative adaptation and mainstreaming.

In this context, mainstreaming aims to make climate change adaptation part of other well-established planning programmes, frameworks, and instruments to limit the impacts of climate change and disasters (Hagen, 2016; Wamsler, 2015). Local government is well-placed to practice adaptation, but mainstreaming climate change adaptation is required across all levels and spheres of government before it can take effect at the local level (Rauken et al., 2015; Revi et al., 2014). Mainstreaming in municipal planning is widely advocated to drive

transformative adaptation at the local level, which would involve institutional changes in terms of municipal planning to change the approach to and management of risks and vulnerabilities, and to address root causes of risk. Adaptation mainstreaming is reported to create synergistic opportunities within planning, result in better organisational efficiency, promote innovative thinking, provide opportunities to build adaptive capacity, and better manage trade-offs between adaptation and other concerns (Rauken et al., 2015; Runhaar et al., 2018; Uittenbroek, 2016; Vincent & Colenbrander, 2018). However, mainstreaming has also been criticised for diluting policy and focus, depoliticising adaptation, and reproducing risk by making use of dominant and often inadequate development practices (Runhaar et al., 2018; Scoville-Simonds et al., 2020). Transformative adaptation (the focus of this study) triggers long-term systemic change, accommodates complexity and uncertainty, and addresses structural causes of vulnerability, whereas incremental adaptation responds to proximate causes of short-term vulnerabilities or risks (Filho et al., 2023; Intergovernmental Panel on Climate Change, 2018; Pelling et al., 2015; Street et al., 2022).

Transformative adaptation often requires a shift in mindsets and approaches, which can be difficult to achieve within existing policy and planning frameworks. Additionally, transformative adaptation requires

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collaboration across sectors, including government, private industry, research, and civil society, with an emphasis on transdisciplinary approaches that seek transformative change, address the interconnected challenges of climate change, and attempt to break down the barriers of traditional silos (Cundill et al., 2019).

Many accounts of the benefits of and need for mainstreaming and transformative adaptation have been given by local and international scholars, policymakers, and practitioners. However, there is also evidence that attempts to address climate-related risks and vulnerabilities are not effectively translated into concrete actions or outcomes, resulting in an ‘implementation gap’ (Preston et al., 2015; Runhaar et al., 2018) or an ‘operationalisation gap’ (Deubelli & Mechler, 2021; Hochrainer-Stigler et al., 2023). Further, there is evidence, although limited, that effective mainstreaming as we currently understand it has led to actual transformation (Reckien et al., 2019; Wamsler & Osberg, 2022).

Transformative adaptation and mainstreaming seek pragmatic solutions to real-world problems, employ flexibility, and encourage steps towards tangible outcomes. However, there are challenges in practically undertaking mainstreaming of transformative adaptation, as mainstreaming could either facilitate or hinder transformative adaptation. Street et al. (2022), with reference to their notion of the ‘mainstreaming—transformation paradox’, argue that tensions arise between adaptation actions that are aimed at addressing the broader and longer-term effects of climate change, and the constraints that are imposed by existing policies, norms, practices, and cultural paradigms. Concepts such as the ‘operationalisation gap’, the ‘implementation gap’, and the ‘mainstreaming—transformation paradox’ explain some of the challenges with realising adaptation mainstreaming and transformational adaptation. Understanding and addressing these challenges are critical to designing effective policies that can balance the complexity of translating short-term needs into long-term transformative goals. In this article we specifically focus on the challenging interplay between long-term transformative objectives and immediate concerns, and the role of adaptation in facilitating transformative adaptation. Other studies have found challenges similar to the ones we have identified, for instance, ambitions for transformational change are not translated into concrete transformative measures (Birchall & Bonnett, 2021; Deubelli & Mechler, 2021), short- to medium-term planning instruments do not reflect coherent approaches to addressing long-term impacts (Pieterse et al., 2021), and that long-term sustainability and transformation goals are often neglected in favour of immediate development needs (Broto, 2014; Faling et al., 2012).

Adaptation mainstreaming allows climate response to be routinely included in planning processes, and transformative adaptation illustrates how adaptation efforts could contribute to long-term systemic change. The tensions between the limitations of mainstreaming and the challenges of transformative adaptation underscore the complexity of translating theory into practical results and finding effective responses to climate change.

For a deeper understanding of the factors influencing climate change adaptation mainstreaming processes that could support transformation, this article gives an account of the experiences of two distinct South African municipalities, namely the City of Cape Town Metropolitan Municipality (henceforth also referred to as the City of Cape Town), and Thulamela Local Municipality (henceforth also referred to as Thulamela). The study looked at adaptation mainstreaming through a municipal planning lens, bringing some of the unique realities of municipal planning and local government institutions into the discourse on climate change adaptation mainstreaming. The findings offered critical insights into universal institutional processes within which six factors emerged that hindered and/or enabled the mainstreaming of adaptation. The two case studies underscored the crucial role of these factors in shaping the success and challenges faced by municipalities in integrating climate change adaptation into their planning processes and offered insights on identifying more proactive and effective

mainstreaming of climate change adaptation into municipal planning that could drive transformative adaptation.

This article provides an overview of the methodology, findings, results, and key insights of the study that was conducted.

2. Methodology

A qualitative research approach was followed to meet the objectives of the study. These objectives were to explore and understand mainstreaming as a complex phenomenon, the holistic context that influenced the mainstreaming process and transformative adaptation within local government. The study was framed within the critical realist paradigm, since it (a) reflected on the social, physical and political contexts and on the relations of power operating in such contexts (Zack, 2008), and (b) was concerned with process, outcomes, and real-world solutions (Forester, 2013). Adaptation and the process of mainstreaming were seen as part of the dynamics associated with society, and not just as a technical process of adjustment by society. In other words, adaptation planning and mainstreaming were seen as a socio-political process (Eriksen et al., 2015).

A comparative case study design (which was used in this study) allows one to gain an in-depth understanding of a small number of cases and their unique contexts (Leedy & Ormrod, 2021, p. 266). Two local municipal cases were purposefully selected, the one to representing a South African metropolitan municipality, and the other a rural local municipality. The two cases, namely the City of Cape Town and Thulamela, provided examples and experiences of climate change adaptation mainstreaming, each from its own distinct context. These two cases were selected as atypical or extreme cases which could activate more actors and mechanisms and offer insight into the deeper causes of the phenomenon of adaptation mainstreaming, rather than merely offering descriptions (Flyvbjerg, 2001, 2006; Leedy & Ormrod, 2021). The City of Cape Town is a well-resourced metropolitan government that has driven mainstreaming internally and is generally recognised as having reached a certain level of success in this regard (Carmin & Anguelovski, 2009; Mukheibir & Ziervogel, 2007; Pasquini et al., 2015; Ziervogel & Parnell, 2010). Thulamela is a largely rural municipality. It has received support from national government to enable and drive mainstreaming, but, although it has attempted to implement mainstreaming for some time, it is generally poorly capacitated and not widely recognised for its mainstreaming practices (Lethoko, 2016; Sithole, 2016). Notably, the two cases have different climate risk profiles as they are in different climatic regions of South Africa and they also have different internal capacities and resources to support mainstreaming. Some of the main climate risks faced by the City of Cape Town include drought and water scarcity, whereas Thulamela faces exposure to heat extremes and wildfires (Council for Scientific and Industrial Research, 2023).

Participant sampling was driven by representation of the relevant functions within each of the municipalities, again using purposive sampling. Participants needed to be broadly representative of spatial and development planning, environmental planning, and infrastructure and services planning as these are the municipal functions most likely to undertake adaptation and mainstreaming in the South African context. Ethical clearance was obtained from the Research Ethics Committee of the University of Pretoria's Faculty of Engineering, Built Environment and Information Technology (EBIT/6/2018).

In-depth interviews and focus group discussions were the primary data collection methods. However, the number of participants available to take part in the research and also the data collection approach were constrained by the practical realities of local government. These constraints influenced the data collection. Officials in both cases had limited time and capacity to participate in the research and the data collection process was adapted to accommodate these practical and logistical limitations. In the case of the City of Cape Town, one group interview with four key participants was held. In the case of Thulamela, two municipal officials were interviewed. For the former, a semi-structured

group interview was thought to be appropriate considering the number of participants. It was considered especially useful to have group conversations where certain topics and themes could be explored in a more dynamic way. For the latter, because of the limited number of participants, it was considered appropriate to have individual in-depth, semi-structured interviews with key individuals involved in planning and adaptation. In both cases the interviews and discussions were semi-structured, and the broad themes that guided these included the activities and impact of climate change adaptation mainstreaming, needs for continued mainstreaming, and reflections on and suggestions regarding the mainstreaming process. Informed by relevant literature, the interview schedule was designed to gather information on how the case had approached mainstreaming and what had contributed to the hindering and/or enabling of mainstreaming in the specific context of each case. By having in-depth semi-structured interviews and focus group discussions, it was possible to gather nuanced and contextualised information, as well as gain insight into participants' understanding and experience of climate change adaptation mainstreaming in practice. The structure also allowed insight into respondents' relationship with the topics being discussed, which supported the interpretation and discussion of the findings (Neuman, 2011).

An inductive approach was used to derive concepts and themes from the interview data. Multiple rounds of coding were performed using computer-aided qualitative data analysis software (AtlasTi) to organise and systematically sift through the detailed data collected from the voice-recordings and notes made during the interviews. After the voice-recorded data had been coded, the researcher made notes on each of the codes and linked analytical memos to quotations. The analytical memos recorded, for instance, the researcher's thoughts, interpretations, and reflections, and these were used as a basis for discussing the findings and linking the findings to literature and theory. To account for subjective biases, findings were validated against published plans and strategies of the two cases. During the final coding process, selective coding was performed where codes were further refined and grouped into six main themes that offered critical insights into universal institutional processes within which factors emerged that hindered and/or enabled mainstreaming of adaptation.

The shortcomings of the research methodology should be acknowledged. Given the qualitative and inductive nature of the research, insights were limited to the gaining of a better understanding of mainstreaming and transformative adaptation, and no predictions were made about outcomes across municipalities. Although the contextual description of findings may not be generalisable to all local governments, the emerging factors and lessons learned are relevant to similar local governments in South Africa as well as other countries facing similar challenges.

3. Findings

The interviews conducted in the City of Cape Town and Thulamela explored the approach that was followed to mainstream climate change adaptation into planning processes. The data analysis revealed six factors that hindered and/or enabled adaptation mainstreaming within municipal planning as (1) leadership arrangements, (2) networks and knowledge-sharing, (3) information access and use, (4) capacity, resources, and skills, (5) institutional coordination structure and process, and (6) intergovernmental relations and coordination. The distinct conditions of each case study were taken into consideration to reflect on the unique mainstreaming approaches and experiences of each case.

3.1. Leadership arrangements

Leadership is one of the factors that can substantially enable or hinder the mainstreaming of adaptation in planning (Birchall & Bonnett, 2021; Chu et al., 2016; Eisenack et al., 2014; Pasquini & Shearing, 2014). Different forms of leadership or leadership from different

functions within a municipality is needed. Eisenack et al. (2014, p.869) argues that 'leadership (regardless of position or authority) can be crucial in the early stages of adaptation'. We explored the organisation of leadership in the municipal context to be able to provide direction about the role of leadership in driving the process of mainstreaming climate change adaptation within each case.

The City of Cape Town's participants indicated that administrative leadership around climate change response was technically rooted in the Environmental Management Department and the Resilience Office, and that high-level political leadership was limited. Participants stated that during the 2015 to 2018 Western Cape drought there was notable strong interim leadership from the Water and Waste Department who put in a lot of effort to convince political leaders to make decisions around large water projects such as the construction of desalination plants. In Thulamela, an individual from the Community Services Department was the champion and main driver of the climate change response agenda. This person had been involved in the efforts to mainstream climate change in Thulamela for over a decade. These efforts included facilitating training and establishing a network of people in the municipality to support the drive towards mainstreaming across most departments. The presence of an institutional champion that supports adaptation at a technical and administrative level, can drive collaboration and has the ability and power to enlist support from diverse stakeholders, can be key to mainstreaming (Chu et al., 2016; Department of Environmental Affairs, 2016). The study revealed that Thulamela had had some administrative and political support for climate change adaptation from the municipal manager and the mayor since 2010. Despite this political awareness and apparent support, one participant noted that ensuring the continued and sustained support of politicians and municipal officials remained a challenge.

The organisational and governance structures of the two cases are very different from each other, the municipality of Thulamela being smaller and less complex than compared to that of the City of Cape Town. Thulamela has a total workforce of approximately 600, whereas the City of Cape Town has a total workforce of approximately 26,900 (City of Cape Town, 2018; Municipal Demarcation Board, 2018). The leadership arrangements that have emerged within these municipalities' organisational structures are understandably different and appropriate to local conditions. Given its more compact size, it is possible that in Thulamela's case, climate change response and adaptation can be driven by one administrative champion who can gather support from a few individuals that would represent all departments across the municipality. In the City of Cape Town, it appears to be necessary for climate change response leadership to be more decentralised and embedded across several structures and positions to be able to reach across the many directorates and departments. Participants from the City of Cape Town said that even though climate change response and adaptation policy direction was mainly provided by the Environmental Management Department, these directives were implemented across the municipality, driving the cross-cutting aspects of climate change response and adaptation.

3.2. Networks and knowledge-sharing

Formal and informal networks and the organisation of people and partnerships in support of knowledge-sharing, and the mobilisation of resources and support for climate change adaptation emerged across the two cases as important mainstreaming factors that impacted on mainstreaming. An organisational culture of learning and knowledge-sharing in transdisciplinary teams is particularly important to enable adaptation knowledge to be embedded across disciplines, sectors, and levels of government (Juhola & Westerhoff, 2011; Moloney & Fünfgeld, 2015).

Participants indicated that Thulamela had very limited official networks, partnerships and memberships from which support was received. Apart from support from the Department of Forestry, Fisheries and the Environment through its Local Government Climate Change Support

Programme (LGCCSP), Thulamela currently received little to no support from external networks and partnerships, limiting the ability of the municipality to learn from others' experiences and share their own. The study found that the City of Cape Town, on the other hand, supported and implemented several international agreements and conventions, either as a direct signatory or through its role in supporting national commitments. The municipality's memberships included the C40 Network and the 100 Resilient Cities Network, which both provided access to services in support of climate action. Other agreements and conventions to which the City of Cape Town was committed included the Durban Adaptation Charter, the Carbon Disclosure Project (as a C40 Network member), the Millennium Development Goals, the Ramsar Convention, and the United Nations Framework Convention on Climate Change (City of Cape Town, 2017). The City of Cape Town's participants felt that these partnerships and conventions offered opportunities for networking and profiling and the exposure of the municipality and its activities and needs around climate change. These could often lead to future funding and establishing other partnerships. Respondents also mentioned that transversal working groups had been established in the municipality, serving as formal structures that supported the top-down-driven integration of certain cross-cutting issues (climate change adaptation being the focus of one of them) into all its other sectors and departments. All participants noted that they felt that informal networks and professional relationships were more valuable than formal structures to support coordination and mainstreaming. It was noted that it was often within and through these informal networks that activities, ideas, knowledge, and values around climate response were shared and developed. Other research similarly found that informal networks could facilitate open channels of sharing and cooperation between officials and professionals from different municipal directorates (Chu et al., 2016; Juhola & Westerhoff, 2011).

3.3. Information access and use

Knowledge and information regarding climate change and adaptation issues emerged as important factors that could inform and guide action. A lack of information or expertise (Preston et al., 2011), or of information that is not available at the right scale or in the appropriate format, makes it difficult to interpret and relate to policy and plans, hindering mainstreaming (Goosen et al., 2014). Additionally, information and knowledge that do not get institutionalised to build capacity, hinder mainstreaming (Taylor et al., 2014). It is therefore essential for local governments to have climate services available on a scale applicable to them as well as in a format that is relevant to policy (Wamsler et al., 2014). There should be access to climate services, and these services should offer tailored and actionable information, data, knowledge, and expertise related to the climate and its impacts on various sectors and activities. Such services will enable local governments to better understand, anticipate, and manage the risks and opportunities associated with changing climatic conditions (World Meteorological Organization, 2016).

The study found that Thulamela's spatial planning department acknowledged the need to include climate change response into planning and decision-making because of the inherent spatial consequences of climate change-related risks and hazards. This perception may be attributed to an increase in communication and awareness around climate change impacts facilitated through the LGCCSP, a programme which has influenced the way planning is done and decisions are made in the municipality through capacity building. Available information on high-risk areas was used in Thulamela to inform decision-making around land-use applications. One participant mentioned that the municipality's stormwater management plan identified areas at risk of flooding, and this information was considered when assessing land-use applications. Thulamela participants expressed a general need for more information, but with no specific emphasis or elaboration on the type of information needed, even when prompted.

In the case of the City of Cape Town, participants acknowledged that even though the municipality had access to data to support climate change adaptation, there was a continued need for more data as well as expertise to support evidence-based planning. In recording the lessons learnt from the 2015–2018 Western Cape drought, Ziervogel (2019) found that City of Cape Town employees felt that there was not enough opportunity to draw on external expertise to support response to the drought, again highlighting the value of reaching out beyond the municipality itself to gain access to knowledge that may support adaptation. However, participants from the City of Cape Town argued that the availability of and access to information and technology were not as challenging as getting the information and technology through the planning and political decision-making process towards implementation and acceptance. Although the participants from the City of Cape Town highlighted the availability of information and data as an important factor for adaptation planning and mainstreaming, it was less evident whether the participants from Thulamela attached the same importance to such information. Moser and Ekstrom (2010) identified barriers to climate change adaptation throughout the planning process, and found that whether, how, and which information was created, and how and through whom communication took place, had the potential to derail the adaptation planning process. Their findings around the important role of climate change information to support awareness raising and understanding by providing a basis for constructive engagement were supported by the findings of the present study.

3.4. Capacity, resources, and skills

Capacity at the municipal level is often considered in terms of tangible and intangible resources that support and sustain government functions, including human, organisational, and social resources associated with multi-level governance that contribute to community well-being and collective problem-solving (Carmin, 2014; Moser & Ekstrom, 2010). Participants from the City of Cape Town expressed the need to be able to set project specifications that integrated resilience and adaptation into the design of projects and infrastructure. However, the necessary expertise was not always available to do that, especially in the Environmental Management Department, which was driving many of the adaptation and mainstreaming initiatives. There was a need to build in-house capacity and have the necessary experts appointed, as well as to be able to access expertise on an ad hoc basis through consultants. However, this municipality found it difficult to do so, and participants argued that resources were limited to make such appointments. It was pointed out that external networks could facilitate access to external knowledge and resources to support adaptation, but the City of Cape Town appeared to have trouble leveraging its networks to support adaptation planning and mainstreaming (Ziervogel, 2019).

According to participants, the municipality of Thulamela had limited or no funding and resources available for projects dedicated to climate change adaptation. Therefore, the approach in Thulamela was to integrate principles of resilience and climate responsive design into capital and operational projects that were funded under existing revenue streams, such as construction and maintenance of infrastructure for roads and stormwater drainage. Participants argued that this approach had a lot to do with the current discourse around climate change and response and with not labelling projects as dedicated to climate change response and adaptation so as to avoid the risk of losing important stakeholders and decision-makers. Participants argued that it was better to influence the design of projects to be resilient and responsive to climate change than to label projects as climate change projects. However, for this approach to be successful and to avoid maladaptation, the necessary skills and expertise are necessary. The study found that the municipality had made some efforts to build capacity within its environmental functions, mainly through the Community Services Department. Officials in other departments, such as Development and Spatial Planning, had limited training related to climate response. The LGCCSP

provided training and awareness-raising programmes but only to those performing mainly the environmental functions, leaving planners in the municipality to continue to grapple with the concept of climate change response and adaptation. One participant argued that if more officials and politicians were trained to understand climate change, see the need for an urgent response, and better understand their role in contributing to adaptation efforts, the easier it would be to get support to implement projects that were adaptive. According to participants, there was a need to better equip planners in the municipality to be able to integrate climate response into planning as well as decision-making.

3.5. Institutional coordination structure and process

The internal processes and structures that can support coordinated planning are an important factor to enable efficient and effective climate change adaptation mainstreaming into planning instruments and processes (Birchall & Bonnett, 2021). This study established that Thulamela currently used the Project Management Unit (PMU) as the main institutional structure to mainstream climate change response. An unofficial 'climate change team' had been established that included employees from all departments, particularly project managers who also served in the PMU. It was through the PMU that climate change response was mainly integrated into project design and ultimately implementation. The PMU reviewed the design of each project and the climate change team used this platform to ensure that principles of climate change responsiveness, resilience, and resource efficiency were integrated into all projects.

The present study found that in the City of Cape Town, climate change response and adaptation had been largely mainstreamed within projects through the Project and Programme Management Tool and the Strategic Management Framework. These tools were used to include projects in the Medium-Term Revenue and Expenditure Framework or budget. Despite this, said participants, they had trouble finding a place for adaptation projects in the municipal budget. They added that while climate change response had been mainstreamed into the budget, such mainstreaming had not been optimal because cross-cutting projects (which were at the heart of adaptation) were difficult to include. It was also the participants' experience that principles and ideas captured in the various municipal strategies and planning instruments were not always reflected on the ground. City of Cape Town participants remarked that the process to get a project, programme or initiative off the ground could be discouraging. The regulatory environment was very difficult to navigate, and there were multiple processes that were very time-intensive.

As the City of Cape Town's participants indicated, there were, however, examples where coordinated planning had successful outcomes. Coordination between the coastal management branch, the disaster risk management unit and the spatial planning branch, had led to the inclusion of the coastal urban edge, the wildland urban interface, and firebreak areas in the Spatial Development Framework. Including these elements in this framework allowed for better coordination between different branches in the municipality to guide development away from areas such as vulnerable coasts and areas exposed to fire risk. Such coordinated planning ensured that climate risk was included as an important factor in spatial planning and decision-making.

3.6. Intergovernmental relations and coordination

Intergovernmental relations, coordination processes, and structures exist to facilitate planning across spheres and scales and they are especially important in climate change adaptation planning that involves multiple actors and scales. Yet, these often lead to challenges (Adger et al., 2005; Forino et al., 2014; Juhola & Westerhoff, 2011; Mukheibir et al., 2013; Oulahen et al., 2018).

Thulamela is not a water service authority as the Vhembe District Municipality holds the mandate over water services provision and

reticulation within Thulamela. Participants argued that the local municipality experienced challenges in that the district municipality would design and approve projects that were not necessarily adaptive to climate change or did not contribute towards resilience. One participant argued that although Thulamela advised the district municipality on planned projects within their jurisdictional boundaries, their recommendations were not always taken up. According to one participant, because of these restrictions in the mandate of Thulamela, the municipality was unable to make 'meaningful contributions' to adaptation in the water sector. Having a limited mandate to plan for and provide services such as water can severely limit the influence of a local municipality to respond and adapt to climate change. The opportunities for adaptation in the water sector are great, and when a local municipality that has the will to adapt is not able to do so because of limited mandates, the impact is diminished—as is seen in Thulamela (Azhoni et al., 2017; Shah, 2009). Thulamela participated in the drafting of the Vhembe District Climate Change Response Plan that was facilitated through the LGCCSP, but since then its involvement in district-level planning has been limited. One respondent explained that after the completion of the said plan, Thulamela started to implement smaller, quick-win projects such as replacing some public water taps with stop-taps to reduce water waste. Participants argued that the municipality wanted to do larger projects that addressed vulnerabilities in the municipal area but found it difficult to do so because of its limited mandate, capacity, and resources. Even though the municipality participated in several intergovernmental planning forums on a district and a provincial level, participants did not consider these forums worthwhile for advancing and supporting climate change adaptation and mainstreaming. There was a perception among participants that existing intergovernmental planning and coordination processes and structures did not support their ability to integrate climate change adaptation across the spheres of government.

The City of Cape Town is constitutionally mandated to carry out the functions related to all basic municipal services or to appoint municipal entities or substructures to carry these out (Western Cape Government, 2019). Participants from this municipality considered coordination between the Western Cape province and the City of Cape Town as critical, particularly concerning long-term planning and water management. Many of the regional initiatives required to address drought and water scarcity form part of the mandate of the province rather than the City of Cape Town. Thus, the study established that it was very important that initiatives related to dams, water transfers, and augmentation were developed and implemented in a coordinated manner between the municipality and the province. Participants reported that a good relationship, particularly around managing drought, had already been established during a drought in the Western Cape in 2005. The relationship that had been established at that time, was perceived to be the key to effective coordination and alignment between the province and the City of Cape Town during the severe 2018 drought and the imminent Day Zero scenario wherein taps were projected to run dry. The National Department of Water and Sanitation also played an important role and facilitated inter-basin water transfers during the drought, although it was found that it sometimes failed in its leadership and duty to support the City of Cape Town and the province in other instances related to the drought (Ziervogel, 2019).

The findings of the study indicated that the City of Cape Town's good intergovernmental relationships and coordination proved valuable in overcoming issues related to its mandate and adaption on a regional scale. This was also likely facilitated by the fact that the City of Cape Town and the Western Cape province had a similar view about climate change adaptation, both considering it as integral to responding to the impacts of climate change (City of Cape Town, 2021; Western Cape Government, 2014). In Thulamela, it was found that intergovernmental coordination and relations were experienced very differently. The study indicated that the Limpopo province had not taken a particularly strong position on climate change response and had drafted their first

provincial climate change response plan only in 2016 (Limpopo Provincial Government, 2016), the Western Cape, on the other hand, had already had a response plan in place since 2008 (Western Cape Government, 2008). In the Western Cape, there proved to be strong drives for climate change response and adaptation from both the province and City of Cape Town. In Thulamela, the drive was initiated to a lesser extent by the province than by the municipality, yet it appeared that Thulamela had limited agency and power in its current intergovernmental structures. Limited capacity, powers and functions diminish agency in terms of the intergovernmental structures within which local governments operate. Good intergovernmental relationships and coordination are valuable in overcoming mandate issues and adaption on a regional scale. Where municipalities have a limited mandate, it is important that intergovernmental relations and planning coordination are firmly in place and able to facilitate the inclusion of local municipal adaptation and response agendas (Birchall & Bonnett, 2021; Koelble & Siddle, 2014).

4. Discussion

The diversity and complexity inherent in adaptation mainstreaming processes and experiences are underscored by the six factors outlined above. These factors accentuate the significance of context, portraying a multifaceted landscape where adaptation mainstreaming strategies are implemented. However, navigating this landscape reveals the presence of challenging dynamics. Within this spectrum, organisational size, complexity, and the regulatory environment strongly influence the effectiveness of mainstreaming, particularly when in pursuit of transformative adaptation. Organisational and institutional dynamics

intertwine with mainstreaming dynamics, as evidenced by the interplay between factors that enable or hinder the process of mainstreaming. Existing organisational structures and institutional arrangements shape these factors that lead to different mainstreaming outcomes. Considering these findings, certain implications emerge, revealing the complex relationship between mainstreaming and transformative adaptation and emphasising the critical role of effective planning in balancing transformational objectives and broader development agendas. Fig. 1 offers a conceptual framework of the relationship between the factors that enable and/or hinder mainstreaming and transformational adaptation. The framework illustrates that balance or alignment between long-term transformational objectives and short-term responses in support of development agendas is necessary for transformational adaptation. The mainstreaming factors offer insight into the processes and dynamics that influence this balance.

To be able to mainstream transformative adaptation that drives long-term systemic change, accommodates complexity and uncertainty, and addresses structural causes of vulnerability, clear alignment is needed between transformational objectives and broader development agendas. Such alignment is supported by effective communication, emanating from strategic leadership positions, which not only galvanises the process but also shapes organisational culture and perceptions related to climate change adaptation. This alignment ensures that transformational objectives are integrated into the larger context of societal progress, enhancing their viability and effectiveness. Just as alignment is essential in any collaborative or intergovernmental endeavour, adaptation mainstreaming creates purposeful change by leveraging existing systems and resources towards transformational goals. Similar to other research, it emerged from this study that when dealing with long-term

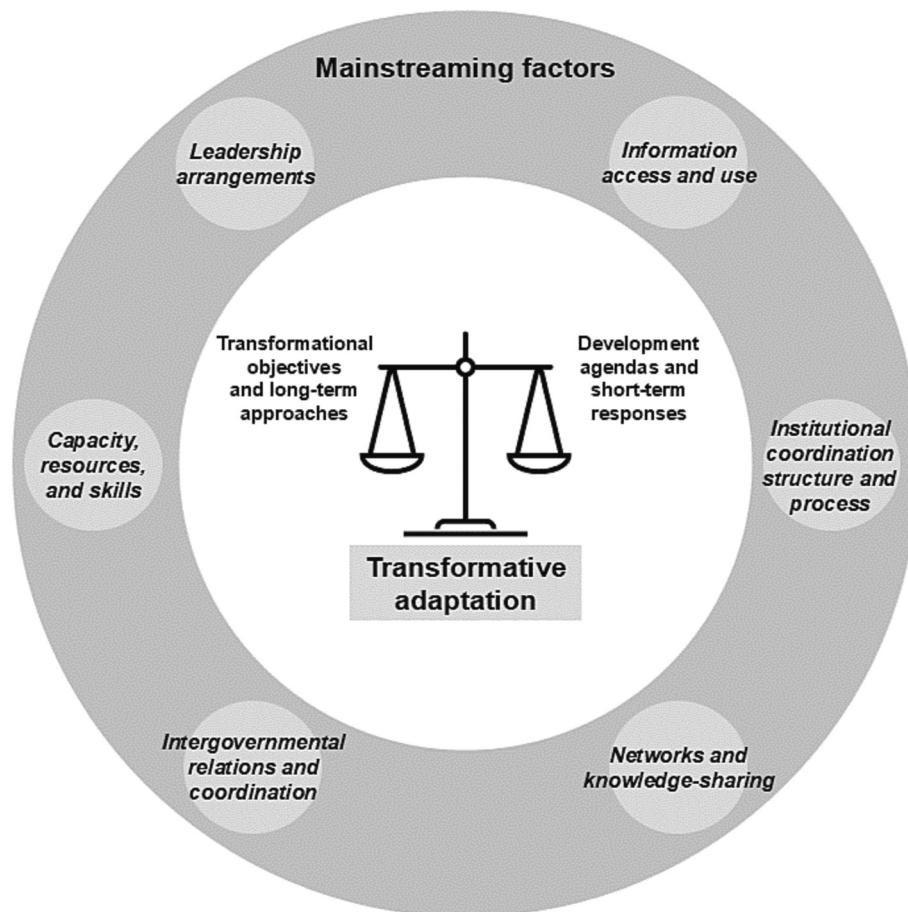


Fig. 1. Conceptual framework of the relationship between the factors that enable and/or hinder mainstreaming in the context of municipal planning and in pursuit of transformational adaptation.

impacts, which often have high levels of uncertainty, it is especially difficult to get support in decision-making and planning processes, further challenging transformative adaptation and mainstreaming (see Di Giulio et al., 2018; Goosen et al., 2014; Scoville-Simonds et al., 2020; Street et al., 2022; Wamsler & Osberg, 2022). Wamsler and Osberg (2022) emphasise that successful mainstreaming involves not only incorporating transformational goals into programmes but also catalysing change at institutional and individual levels. They stress the importance of balancing short-term responses with long-term approaches, acknowledging that both play crucial roles in achieving transformational outcomes. A balance between short-term responses and long-term approaches is essential for navigating the uncertainties associated with long-term impacts. Reliable and relevant climate services form the foundation of a shared understanding and a knowledge base of the possible impacts of climate change in an area, the need for adaptation, and what adaptation can or should look like. These services not only inform responses and adaptations but also shape planning initiatives and decision-making processes in the face of uncertainty.

Further, mainstreaming adaptation within an imperfect planning system carries the risk of maladaptation and perpetuation of injustice. This tension underscores the need for strategic navigation when mainstreaming transformational goals within existing systems. Transformative adaptation within mainstreaming requires a dual approach that encompasses both policy and practice. This dual approach recognises the complexities stemming from uncertainty, multi-stakeholder dynamics, and the transformative nature of adaptation. By skilfully embedding transformational goals into existing systems, fostering change at multiple levels, and critically assessing planning frameworks, transformative adaptation's potential can be harnessed while minimising decision-making inertia and inequitable outcomes. Reflexivity and transdisciplinarity are essential in mainstreaming research, governance, and practice to accommodate the innovative policy frameworks demanded by transformative adaptation.

5. Conclusion

The imperative to integrate climate change adaptation into decision-making processes, particularly those that relate to development planning, has garnered wide support among scholars and practitioners. Simultaneously, support for transformative adaptation has increased as a response to the root causes of climate risk. This dual focus underscores the necessity to address climate risks and vulnerabilities through the dynamic interplay of both transformative adaptation and mainstreaming.

The study, through a comparative case design, enquired into the experiences of the City of Cape Town Metropolitan Municipality and the Thulamela Local Municipality in South Africa. Even though these cases have unique contexts, they hold wider international relevance as they underscore the interplay of universal factors that hinder and/or enable adaptation mainstreaming processes. Leadership dynamics, knowledge-sharing cultures, access to and utilisation of information, resource capacities, institutional coordination, and intergovernmental relationships stand out as pivotal factors shaping the success and addressing the challenges of mainstreaming. While acknowledging the inherent diversity of organisational contexts, the authors of this article believe that the insights offered by the study can guide municipalities that seek to enhance their adaptation efforts. Administrative and political endorsement serves as a cornerstone for effective mainstreaming, reinforcing shared understanding and organisational culture. The cultivation of learning ecosystems, particularly in multidisciplinary teams, becomes paramount, fostering adaptation knowledge integration across disciplines and levels. Climate services, founded on reliable and relevant data, form the bedrock of informed decisions, underpinning adaptation, and shaping planning initiatives. Intergovernmental engagement proves to be pivotal, unlocking the local adaptation mainstreaming potential by overcoming capacity constraints and facilitating regional adaptation.

This study has expanded our understanding of the relationship between adaptation mainstreaming and transformative adaptation by suggesting a conceptual framework. This study contributes to wider adaptation, mainstreaming, and planning literature by offering empirical findings to better understand established and emerging concepts such as the 'operationalisation gap', the 'implementation gap', and the 'mainstreaming-transformation paradox', particularly through connecting adaptation mainstreaming to the challenging interplay between long-term transformative objectives and immediate concerns. The findings illustrate that addressing these complexities requires a dual approach that balances policy and practice, tactically embedding transformational goals and fostering multi-level change. The intricacies of adaptation mainstreaming and the integration of transformative goals within local municipal planning demand careful consideration of organisational attributes and intergovernmental engagement, and the alignment of transformative adaptation with broader development agendas. These insights shed light on the path towards effective adaptation strategies, reconciling the evolving landscape of climate change with the practical realities of municipal governance. The tensions and lessons revealed underscore the importance of ongoing innovation, collaboration, and critical reflection in shaping policies that navigate climate uncertainties while fostering equitable and sustainable futures. Further, this study has highlighted the need for greater integration between climate adaptation research and practice to address the limitations of mainstreaming within planning systems, and the challenge of transformative adaptation. The conceptual framework could inform transdisciplinary approaches and collaboration to integrate knowledge from various fields and sectors to tackle the complex challenges of climate change adaptation, mainstreaming, and transformation.

CRedit authorship contribution statement

Amy Pieterse: Writing – review & editing, Writing – original draft, Methodology, Investigation, Conceptualization. **Jacques du Toit:** Writing – review & editing, Supervision, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Data availability

The authors do not have permission to share data.

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