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Creating resilient settlements through climate change adaptation planning

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Abstract

There has been a move recently beyond looking at climate change as an environmental concern only to focus on climate change as a developmental concern. In South Africa, climate change adaptation has been increasingly prioritised in major national policies and plans. Local government in particular is faced with the effects of climate change as vulnerable communities are affected by climate change related disasters such as floods, drought, sea level rise and wildfires. It is widely recognised that context specific climate change related impacts on vulnerable households, communities, town economies and critical infrastructure and services are often most profound at the settlement level, necessitating local adaptation. Local government could facilitate adaptation within settlements through functions such as infrastructure and services provision, infrastructure maintenance and integrated development planning. Spatial planning is a key avenue to adaptation and can play a critical role in anticipating change and promoting adaptation within urban spaces in support of resilience. Three conceptual similarities between climate change adaptation and spatial planning are that both intervene in space, both anticipate change, and both support long-term sustainable development. These overlaps provide opportunities for mainstreaming climate change within local government.

Enabling instruments or potential vehicles for adaptation mainstreaming include IDPs, SDFs and LUMS. However, these instruments also present potential barriers that can delay implementation and exclude important issues from the policy process. This paper explores the conceptual relationship between climate change adaptation and spatial planning, specific to the local level, and identifies areas of overlap and opportunity to facilitate the development of resilient settlements. By highlighting barriers and enabling factors to implementation through existing local government planning instruments and processes, the paper aims to unlock discourse on the methods and mechanisms used for resilience planning.

Keywords: spatial planning, climate change, adaptation, resilience, local government

1. Introduction

Climate change is not only about slow-onset changes in temperatures, it is also about extreme events and the increased frequency and intensity thereof. Events such as inland flooding, coastal flooding, heat waves, drought and veldfires are expected to increase in frequency and intensity in future (The Green Book Project, 2018). Cities have inherent vulnerabilities as part of their socio-economic and physical make-up and configuration, which are compounded by climate change and risks. Some of the consequences of climate change and extreme weather events such as heat waves and flooding for human settlements include increased water demand, increased risk of death, disruption of commerce, and damage to or destruction of infrastructure, to name but a few (Van Niekerk and Le Roux, 2017). The impact of these events on cities and people are therefore immense, and will become more damaging if no adaptation planning is undertaken.

Local government in particular is increasingly faced with the responsibility to address the effects of climate change as their vulnerable communities are affected by climate change related events. It is widely recognised that climate change related impacts on vulnerable households, communities, town economies and critical infrastructure and services are often most profound at the settlement and town scale, and thus where adaptation is needed most (Dannevig et al., 2012; Madzivhandila, 2014; Pasquini et al., 2015).

The purpose of this paper is to set out the argument that climate change adaptation is not far removed from regular local government planning, especially spatial planning, and that there are existing linkages and overlaps between spatial planning and climate change adaptation, that can facilitate the creation of resilient settlements in South Africa. The paper also sets out some of the aspects within planning, its instruments and the intergovernmental planning system that could impede on the process.

2. The climate change mandate of local government

Urban processes such as urbanisation converge with climate risk in settlements, creating highly vulnerable spaces and communities. As the level of government closest to the people, local governments are largely faced with dealing with these vulnerable spaces and communities. It is therefore necessary for local government to ensure that these risk and vulnerabilities, and the subsequent need to address these, are reflected in their plans, strategies and programmes.

Within the South African context, local government, as part of their developmental mandate, are responsible for service delivery and infrastructure investment; cross-sectoral integration and spatial development; alignment of government spending; and disaster management. Climate change is an additional stressor on cities, especially in the case of Africa, which adds to already flawed planning systems and lagging development. South Africa's planning system has evolved much since 1994. The Spatial Planning and Land Use Management Act (SPLUMA), gazetted on 5 August 2013 (Republic of South Africa, 2013), provides for one piece of legislation to guide and enable the formulation of policies, plans and strategies for land use management and land development. The enactment of SPLUMA has brought a number of fundamental changes in spatial planning and land use management. The most critical of these is the reiteration of planning as the primary mandate of municipalities, placing municipalities at the centre of planning. The Act also allows for the development of a single and inclusive land use scheme for the entire municipality, the development of spatial development frameworks (SDFs) by all three spheres of government, as well as alignment of planning processes; all of which is aimed at strengthening intergovernmental support and implementation of spatial planning and development.

On the national level, climate change related work is strategically placed at Deputy Director General level in the Department of Environmental Affairs with some other national departments having dedicated climate change units, while in most others, functions are shared by environment, risk management and planning directorates (Department of Environmental Affairs, 2016, p. 19). The role of national and provincial government in climate change adaptation are multi-faceted, playing out in over-arching policy and legislative direction, the range of sector specific climate change strategies, and financial and capacity support to local government. In addition to the supportive, facilitative and enabling roles; national and provincial government have substantial direct impact in settlements.

The National Climate Change Response White Paper (Republic of South Africa, 2011, p. 38) identifies local government as a critical role-player that can build climate resilience through "planning human settlements and urban development; the provision of municipal infrastructure and services; water and energy demand management; and local disaster response, amongst others". The White Paper argues, that to achieve this, local government should integrate climate change into their Integrated Development Plans (IDPs) and other budgeting and planning instruments. It is clear that local government is a key player in the adaptation process, but what is less clear is the mandated role of local government. Even though the White Paper acknowledges this, mandates have still not yet been clearly defined, leaving local government to deal with the compounded effects of climate change and developmental challenges without sufficient mandate or resources.

Pasquini et al. (2015) maintain that in the South African local government context, deficiencies in leadership, knowledge and information regarding climate adaptation issues, lack of resources, strong institutional silos and political variability make climate change adaptation challenging. Municipalities in South Africa often operate under severe financial constraints, with numerous competing priorities and under significant pressure to deliver services to communities (Spires, 2015). This makes it difficult for local government to practice climate change adaptation, especially considering that the mandate for municipalities to engage in climate change adaptation is not clearly set out in any of the policy or legislation that guides the functioning of local government (Spires, 2015).

3. The conceptual relationship between spatial planning and climate change adaptation

Spatial planning can be defined as a “decision-making process aimed at realizing economic, social, cultural and environmental goals through the development of spatial visions, strategies and plans and the application of a set of policy principles, tools, institutional and participatory mechanisms and regulatory procedures” (UN-Habitat, 2015, p. 1). Spatial planning also covers a range of scales from neighbourhood to supra-national level, and “aims at facilitating and articulating political decisions and actions that will transform the physical and social space and affect the distribution and flows of people, goods and activities” (UN-Habitat, 2015, p. 1). Albrechts (2004, p. 747) defines strategic spatial planning as a “public-sector-led, socio-spatial process through which a vision, actions, and means for implementation are produced that shape and frame what a place is and may become”.

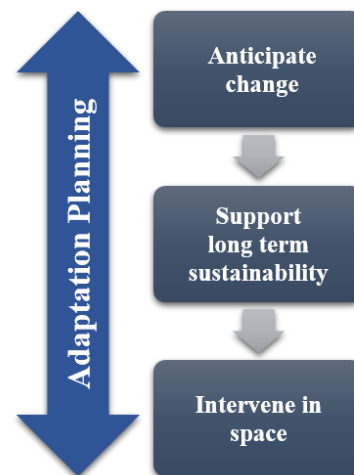
Planning deals with divergent priorities relating to social, economic and environmental sustainability, namely the ‘planners triangle’ (Campbell, 1996). Planners often find themselves promoting a certain goal, in one of the three corners, finding it difficult to resolve the conflicts within the triangle to reach the middle where sustainable development lies. Planning has been faulted for exacerbating social exclusion, economic inequality and unsustainable spatial forms largely because planning systems are slow to change and have not adapted to modern urban conditions and current realities (Watson, 2009a, 2009b).

Spatial planning is a key avenue to adaptation and plays a critical role in anticipating change and promoting robust adaptation within urban spaces (Goosen et al., 2014; Wamsler et al., 2014). “Spatial planning is often seen as a holistic approach which is used to shape spatial developments, recognising the interrelations and effects of spatial measures in a long-term perspective. Spatial planning coordinates the different relevant socio-economic objectives and desires, for example, the development of transportation systems, local economy and housing, and objectives with a strong environmental component, such as nature development, water management and agriculture” (Biesbroek et al., 2009, p. 234).

Climate change adaptation is defined as “the process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effects” (IPCC, 2014, p. 115). Adaptation is essentially about building long-term resilience and increasing capacity to deal with climate related change and extreme events. Adaptation will include actions and strategies to transform approaches to development that are not in support of sustainability and resilience, similar to those related to disaster risk reduction (IPCC, 2012).

Effective adaptation requires a clear understanding of the issues at hand, meaning an understanding of the projected climate change and the related impacts and risks. This understanding needs to be translated to the local level to connect with other priorities, of which many are often not climate related (Goosen et al., 2014).

The three main interactions between spatial planning and climate change adaptation are that both anticipate change, both support long-term sustainable development, and both intervene in space. These concepts can also be seen in terms of process, where both climate change adaptation considers future change, responds by taking a long-term sustainable planning approach and then acts through place-based interventions. These relationships will now be explored further.



3.1. Anticipate change

It is anticipated that South Africa will become hotter and drier in the future, and experience more extreme weather events such as heatwaves, flooding, coastal flooding, and drought (Department of Environmental Affairs, 2014). Cities are also experiencing inevitable socio-economic changes that converge with changes in the climate to impact on space, and increase the risk for hydro-meteorological disasters. Some of the key drivers of socio-economic change in South African cities include urbanisation, growing inequality, and growing informality (Van Niekerk and Le Roux, 2017). There are certain responses to these changes, adaptation in the case of climate change and extreme events, and spatial planning in the case of urban processes. Both are dealing in public good (Halsnaes, 2006). Adaptation is concerned with anticipated change in climate and related climate events. It entails “taking the right measures to reduce the negative effects of climate change (or exploit the positive ones) by making the appropriate adjustments and changes” (UNFCCC, 2007, p. 10). Spatial planning creates a vision of a future environment meaning that the planning process is required to be aware and anticipate change to ensure that visions are placed within a specific context (Albrechts, 2004). Spatial planning is concerned with a longer-term vision of anticipated development in space, e.g. to influence the location and density of development. This coincidence in anticipating change (Bulkeley, 2006) and appreciating geographical variability (Halsnaes, 2006), makes spatial planning a fundamental tool for integrating climate change adaptation with development planning to create order, reduce conflicts among activities, use resources efficiently, and seek to benefit all of society (Sanchez-Rodriguez, 2009). Spatial planning thus has a key role to play in addressing both the causes and impacts of climate change (Bulkeley, 2006).

3.2. Support long-term sustainable development

Because climate change adaptation is forward looking in nature by considering projected and anticipated changes in climate, there is a link with the long term nature of spatial planning. Planning typically draws from past trends to inform long term public investment decisions, but adaptation planning introduces projected changes as evidence for planning (Carmin et al., 2012b). Considering and addressing climate change is essential for any city to be on a long-term path towards sustainable development (UN-Habitat, 2014).

Efforts to address climate change is often neglected in favour of immediate development needs that are considered more urgent (Broto, 2014). Spatial planning and adaptation both promote a long-term planning approach by encouraging actors to plan, as well as act, now for the future.

In a paper by Revi and others (Revi et al., 2014) based on the outcomes of the 'Climate Change 2014: Impacts, Adaptation and Vulnerability' report by the IPCC Working Group II as a contribution to the Fifth Assessment Report, the opportunity that adaptation planning has to bring about transformation or urban space in support of resilience, has been highlighted. It is noted that adaptation in urban areas, using development and planning processes, has the ability to have both incremental and transformative change. The term "transformative adaptation" is being used to support the recognition that adaptation has the potential to "address root causes of poverty and failures in sustainable development, including the need for rapid progress on mitigation" (Revi et al., 2014, p. 25), which is very similar to the concept of "spatial transformation" in the South African context. Spatial transformation can be considered as the action of addressing embedded spatial imbalances that exacerbate economic and social inequities, while unlocking development potential and long-term inclusive growth (National Planning Commission of South Africa, 2012).

3.3. Intervention in space

Climate impacts are inherently spatial and climate services information such as climate change projections, hazards and vulnerabilities are almost always visualised geographically. Climate change adaptation therefore has spatial consequences (Goosen et al., 2014) in response to the evidence provided by climate services. The spatiality of both climate change adaptation and spatial planning are in support of targeted interventions in space. Because adaptation is largely spatial in its response to climate change (Biesbroek et al., 2009; Goosen et al., 2014), it provides a practical way for spatial planners to include climate change considerations in the planning process. Planners generally have a more divergent view of climate change, viewing it as one of many "context-dependent environmental and socio-economic challenges" (Biesbroek et al., 2009, p. 231).

Even though there are not much literature that explicitly state that both spatial planning and climate change adaptation are concerned with space, it is the inherent purpose and logic of both to impact space.

4. Building resilience through adaptation planning

Even though climate change is a global phenomenon, responses are positioned locally. Local governments are most sensitive to risks and vulnerabilities (Carmin et al., 2012a; Chu et al., 2016; Sanchez-Rodriguez, 2009). Local government and settlements are the spaces where climate change is felt, through both short term events such as disasters and long term impacts such as temperature or sea level rise, and where opportunities lie to address it. The important task is to integrate local knowledge and experiences into multidimensional and multiscale approaches that can better guide the configuration of adaptation responses to climate change and integrate them into development strategies and planning processes (Sanchez-Rodriguez, 2009).

Integrating adaptation into planning instruments allows early action which is more cost effective than after the fact response (Wilson, 2006). Revi et al. (2014, p. 14) argues that local governments are at the centre of successful adaptation because much of adaptation depends on local government integrating it into local policies, plans and processes. Some of the factors that would enable integrated adaptation planning include:

- i. Strong political leadership which is essential for driving rapid change, and strong administrative leadership which can be essential for proactive change (Pasquini et al., 2015).
- ii. The presence of an institutional champion that supports adaptation at the local level, drives collaboration and has the ability and power to enlist support from diverse stakeholders (Chu et al., 2016; Department of Environmental Affairs, 2016).
- iii. Internal programmatic incentives and benefits that support adaptation planning (Chu et al., 2016), such as legislative requirements and obligations (Department of Environmental Affairs, 2016). Funding is the most powerful incentive and often comes with sanctions that foster action (Carmin, 2014).
- iv. The presence of local networks that generate ideas and knowledge (Chu et al., 2016). Ideas foster change through the diffusion of knowledge from one actor to another, and include best practice, standards and conventional wisdom that generate an awareness and understanding (Carmin, 2014). In addition, knowledge and information regarding climate adaptation issues, (Pasquini et al., 2015), including indigenous knowledge (Department of Environmental Affairs, 2016).
- v. The availability of resources such as revenue and capacity, but also dense social networks (Pasquini et al., 2015) as a basis for initiating and sustaining change. Capacity, at the level of the city, 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).
- vi. Institutional and political stability greatly benefit a municipality's ability to make decisions and see them through (Pasquini et al., 2015).

Local government functions such as infrastructure and services provision, infrastructure maintenance and integrated development planning can either facilitate adaptation or work against it. Efforts to address climate change is often neglected in favour of immediate development dilemmas (Broto, 2014), such service delivery crises, and many local plans have short-term horizons that are in conflict with the long term implications of climate change. Integrated Development Plans and Spatial Development Frameworks span over a horizon of five years, as they are often linked to budgeting periods. Somewhat contradictory to this, spatial development frameworks are required to have a long-term spatial development vision statement and plan, as well as to identify long-term risks of particular spatial patterns (Republic of South Africa, 2013). Ultimately, spatial planning and the instruments that guide it, are in support of long-term sustainable development despite administrative restrictions and contradictions of planning timeframes. In a recent study on the alignment of spatial policy in South African, it was found that there is tension between addressing immediate service delivery needs and city-wide needs in support of sustainability (Pieterse et al., 2016). This is a problem not unique to South Africa, but common to planning across the world (Wilson, 2006).

Other issues within the intergovernmental planning system of South Africa that could hinder adaptation planning in support of resilience include a lack of coordination between national, regional and local levels regarding the critical regional resource and investment constraints, and opportunities impacting local development planning and future development; the general issue of having difficulty in interpreting long-term visions into local action (Pieterse et al., 2016).

Barriers to adaptation planning and integration delay implementation and can exclude important issues from the policy process (Uittenbroek et al., 2013). Some of the challenges that local governments face in terms of effective adaptation planning include:

- i. Securing funding (Carmin et al., 2012b; Preston et al., 2011).
- ii. Communicating the need for adaptation to elected officials and local departments (Carmin et al., 2012b).
- iii. The notion that climate change adaptation is purely an environmental issue and should be dealt with through environmental management, and that environmental management is an unfunded mandate (Department of Environmental Affairs, 2016).
- iv. Getting support in decision-making and planning processes in a multi-stakeholder setting, especially when dealing with long-term impacts which often have high levels of uncertainty (Goosen et al., 2014).
- v. Lack of financial and policy support, namely the necessary mandate (Carmin et al., 2012b).
- vi. The format of available information on climate change and its impacts is often difficult to interpret and relate to policy and plans (Goosen et al., 2014).
- vii. Lack of information or expertise (Preston et al., 2011).
- viii. Organisational and institutional barriers such as fragmentation, lack of coordination and organisational cultures (Uittenbroek et al., 2013).

Municipalities are faced with the requirement to do forward planning while facing the challenges of addressing backlogs in service delivery, fiscal constraints, capacity constraints and a lack of information. These challenges are even greater when coupled with climate change. However, because of the pressure on local government to expedite development to address inequalities, and the somewhat uncertain future of climate change, adaptation is often one of a multitude of long-term context-dependent dilemmas that requires urgent attention by the planning profession but is of less immediate concern (Biesbroek et al., 2009). This tension does not need to exist, for “good planning practices are, by nature, also climate smart planning practices” (UN-Habitat, 2014). Furthermore, spatial planning that integrates adaptation measures offers opportunities to protect cities against anticipated impacts of climate change, while simultaneously protecting past development gains as well as addressing the present development agenda.

Spatial planning interventions can have unintended or unanticipated consequences and can trigger maladaptation, like many other policy instruments (Macintosh, 2013). Maladaptation occurs when an adaptation measure directly increases vulnerability, shifts vulnerability and/or erodes preconditions for sustainability (Juhola et al., 2016). Measuring planned interventions against long term goals, and the possible effects they might have is crucial to limit negative impacts and maladaptation. To contribute to the creation of resilient settlements, all actions need to incrementally contribute to the long term goals. When communicating the adaptation planning responsibilities of local government “policy makers should ensure that the objectives of planning frameworks are clear, there is minimal ambiguity in decision guidelines, and that the resourcing and capacity constraints of planning bodies are appropriately considered” (Macintosh, 2013, p. 1051).

To prompt more responsive action to climate change in local development and spatial plans, would require reinforcing the connections between short term crises and long term needs. It needs to be made clear that addressing immediate service delivery needs does not need to happen at the expense

of long term sustainability. For example, local recreational and open space needs can be addressed as well as the need to adapt the built-up space to deal with the impact of flash floods, by developing multi-functional green space that will respond to a community's recreational, social and health needs, and act as a retention pond during floods. Actions such as this offer flexible, no-regret responses to climate change, meeting both local government development and climate change adaptation objectives, as well as avoiding maladaptation. It only requires that planners and other local government actors, plan with climate change in mind.

5. Conclusion

Spatial planning has the ability to potentially either increase local capacity to manage climate change and reduce exposure to risk, or it can establish unsustainable and maladaptive development pathways that increase vulnerability in cities (Bruin et al., 2014; Storbjörk and Uggla, 2015). According to Blanco, et al. (2009 p. 158) 'adapting to climate change is at its core a call for planning' and adaptation is the 'type of planning that fits naturally the agenda of urban and regional planning'.

Climate change adaptation requires national, regional and local responses, recognising that neither climate change responses, nor spatial planning can be addressed in isolation. Involving a range of role players and stakeholders impacting place based development, as well as supporting municipalities in delivering their spatial planning mandate is therefore crucial.

Wamsler et al. (2014) argues that "adaptation is not a separate process but an integral part of urban planning; a coherent integration of climate change-related issues could thus generate multiple benefits from different sectoral policies". Integration of adaptation in planning processes is necessary to reduce the likelihood of fragmented adaptation responses that address only risks and vulnerabilities related to climate change. "Considering adaptation as a development process creates a framework that can evolve and improve in time and foster flexible and efficient adaptation strategies capable of addressing the formal and the informal process of urban growth in the short-term and long-term" (Sanchez-Rodriguez, 2009, p. 204).

The conceptual, logical and somewhat practical, overlaps between spatial planning and climate change adaptation provides an opportunity for integration of climate change adaptation within existing local government planning instruments and processes, through adaptation planning. It is very important, especially in the multi-sphere but non-hierarchical South African government structure, to realise the intergovernmental and collaborative nature of adaptation planning. Navigating this complex landscape gets increasingly tricky as national sector funding streams impact directly on local government mandates and capacity, and national sector priorities are required to reflect in local plans such as SDFs and IDPs (Pieterse et al., 2016). Aligning national development priorities with local socio-economic and spatial contexts that are coupled with diverse climate related risks and vulnerabilities, will be a significant task. Therefore, if climate change adaptation is to be integrated into these local planning instruments, it is crucial to plan within an intergovernmental and collaborative process. Beyond this, a commitment to sustainable adaptation planning would require a shift in the ideas, values and goals guiding development and urban management as well as adjustments in the institutional frameworks related to decisions, actions and support (Carmin, 2014; Wamsler et al., 2014).

Additional research is required to explore the process of development and spatial planning, and climate change adaptation to identify practical pathways of least resistance for integration. By using existing instruments, processes and capacity to do this, local government are not further burdened, but rather able to reconcile short term development needs and long-term sustainability agendas.

This paper has explored the conceptual and logical relationship between climate change adaptation and spatial planning, specific to the local level, and to identify areas of overlap and opportunity to facilitate the development of resilient settlements. The paper also considered and raised some issues within the intergovernmental planning system that could impede on the process.

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