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Title: Translating disaster resilience into spatial planning practice in South Africa: challenges and champions

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Abstract
Well-run cities can be among the safest places in the world from the impact of disasters, but in reality many cities in the world are the most dangerous places on earth. It is highly likely that hazards and extreme climatic events will in future occur more frequently and will become more severe, increasing the vulnerability and risk of millions of poor urbanites in cities in developing countries. Poor households that are concentrated in increasingly unsafe spaces bear the brunt of the disaster losses as they find themselves on the wrong side of the growing risk divide. Disaster resilience aims to reduce disaster losses by equipping a city to withstand, absorb, adapt to or recover from external shocks. In South Africa issues of development take precedence over issues of sustainability, environmental management and disaster reduction. This is illustrated by the priority given to 'servicing' spaces compared to the opportunities offered by 'transforming' spaces through post-apartheid spatial planning. The City of Durban's quest in adapting to climate change hypothetically demonstrates that if disaster resilience were to be presented as an issue separate from what planners are already doing, then planners may become more aware of it, but would see it as insignificant compared to addressing the many developmental backlogs and challenges. If however disaster resilience is regarded as a means to secure a city's development path while simultaneously addressing sustainability and resilience, then it is more likely to be translated in spatial planning practices in South Africa.

Key words: disaster resilience, spatial planning, developmental challenges, South Africa, Durban

1. Introduction

Well-run cities can be among the safest places in the world from the impact of disasters, but in reality many cities in the world are the most dangerous places on earth. 'The signs of our vulnerability to urban risk are everywhere' (IFRC, 2010 p.

8): earthquakes bringing critical urban infrastructure and assets down with tragic consequences (for example the earthquakes in Haiti and Chile in 2010, and Japan in 2011); volcanic eruptions throwing city airports across the world into chaos (for example the volcanic eruptions in Iceland in 2010 and Chile in 2011); the drug trade turning inner cities into war zones; epidemics turning into pandemics in the developing world; and streets turning into open sewers during seasonal flooding in the slums of developing cities.

Over the past 40 years, 80 000 people have been killed on average each year and 200 million people have been affected by natural disasters (UNISDR, 2010b; World Bank & United Nations, 2010 p. 23). Of greater concern than the current trends, is the increasingly clear prognosis from the United Nations International Strategy for Disaster Reduction (UNISDR) and the Intergovernmental Panel on Climate Change (IPCC) that hazards and extreme climatic events will in future occur more frequently and will become more severe (UNISDR, 2010a; IPCC, 2007). Many international development organisations (IFRC, 2010; ALNAP & ProVention, 2009; IPCC, 2007; UN-Habitat, 2010; UNISDR, 2010a; World Bank, 2008) and several researchers (Wisner, et al., 2009; Puppim de Oliveira, 2009; Pelling, 2003) warn us that as urbanisation and other global processes continue, a 'strange new urban world' (IFRC, 2010 p. 8) is developing – one that is increasingly at risk of experiencing natural, social and/or industrial disasters beyond many urban authorities' experience and ability to manage and control (ICLEI, 2010). The consequence are bigger losses more often, but also shifts in environmental conditions that are bound to have long-term implications for human settlements – settlements, particularly in the developing world, that are already challenged by a range of socio-economic development stresses (Parnell, et al., 2007 p. 359).

'An emphasis on resilience, rather than just disaster response and recovery has become a mainstream idea in disaster reduction' (Collins, 2009 p. 103). Whereas disaster reduction seeks to identify and reduce vulnerabilities and risks, resilience is also partly defensive, but more creative in implying coping and adaptation. Planning for resilient cities involves more than being occupied with minimum standards or widely-accepted spatial designs, and involves robustness, resourcefulness and pro-activeness (Collins, 2009 p. 104).

This paper questions whether disaster resilience is likely to be translated into spatial planning practice in South Africa given its developmental priorities and challenges. The paper starts by considering what risk, vulnerability and resilience means conceptually; then discusses the planning context and spatial planning practices in post-apartheid South Africa; and concludes with a case study on the City of Durban to demonstrate how a 'new' policy paradigm has recently been mainstreamed into local planning practices in spite of the developmental and intergovernmental challenges.

2. Conceptual framework

2.1 Definitions

A ***disaster*** is when a progressive or sudden hazard or event occurs that causes injury or disease; damage to property, infrastructure or the environment; or loss of lives and livelihood that is beyond the capacity and/or resources of the community to cope with (RSA, 2002; UNISDR, 2009). Disasters are caused by the combination of a hazard and vulnerability (Oliver-Smith, 2002).

'The ***risk*** (R) of disaster is a compound function of the hazard (H) and the number of people, characterised by their varying degrees of vulnerability (V) to that specific hazard, who occupy the space and time of exposure to the hazard event: R = H x V' (Wisner, et al., 2004 p. 49). Risk is thus the anticipation of a catastrophe (Beck, 1986 p. 33).

The United Nations International Strategy for Disaster Reduction (UNISDR), which is the strategic framework for reducing disaster risks as adopted by the United Nations Member States in 2000, defines ***vulnerability*** as the combination of socio-economic, political, physical, and environmental conditions people find themselves in that make them susceptible to the impact of a hazard (UNISDR, 2009). Not everyone suffers equally in a disaster due to their vulnerability: the conditions of inequality and subordination in a society rather than the geophysical features of a place explain why this is so (Oliver-Smith, 2002 p. 27).

The UNISDR defines ***resilience*** as 'the ability of a system, community or society exposed to hazards to resist, absorb, accommodate and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions' (UNISDR, 2009). Urban resilience indicates the inherent capacity of a city to maintain core functions in the face of hazards, threats and the impacts of disasters, and to rebuild itself when necessary (UN-Habitat, 2011 p. 18).

Spatial development planning is 'a process by which a national/central [or local] government seeks to consciously plan for the spatial development of the territory of a country [or city] by using the location, timing, nature and scale of infrastructure investment and development spending to stimulate, support, strengthen and discourage growth and development in specific spaces/places' (Oranje, 2010 p. 55).

2.2 Urban disaster risk and vulnerability

The vulnerability of people to disasters is progressively increasing, and, if left unchecked, will augment the local disaster risk burden of the world's urban poor (Laukkonen, et al., 2009). An urban risk divide is developing in cities as they become increasingly unjust, polarised, divided and fragmented: the well-connected elite barricade themselves in well-serviced and regulated high-security villages (Watson, 2005 p. 286; Todes, 2011 p. 116), while some communities struggle to

survive along the fault lines of urban risk (IFRC, 2010 p. 8). The poor are largely priced out of safe areas and are concentrated in severely vulnerable and unsafe spaces – most often in informal settlements that are low-lying or steeply-sloping, flood-prone, close to pollution sources, often at highest risk of fire and disease, cauldrons of social tension and crime, with inadequate or non-existent services, and lack of protection from extreme climatic events. Hazards interact with each other to produce compound hybrid hazards, and as everyday disaster risk grows, it undermines the coping capacities of communities (ALNAP & ProVention, 2009 p. 4; Laukkonen, et al., 2009 p. 287; Pelling, et al., 2009 p. 4; World Bank, 2003; Freeman, et al., 2002 p. 5; Parnell, et al., 2007 pp. 357, 361). As everyday risk becomes an acceptable part of life, it lowers people's coping threshold and makes people less willing to prepare for catastrophes. Each succeeding event erodes the resources of a household to cope with and recover in time for the next shock, resulting in a 'ratchet effect' of vulnerability (Pelling, 2003 p. 16; Oelofse, 2002 p. 43; Faling, 2012).

Addressing urban disaster risk and vulnerability is critical in protecting the lives and livelihoods of people, as well as the infrastructure and development gain. Resilience offers a perspective on reducing disasters and everyday risks, as well as making people and places more robust and adaptable to changes and shocks.

2.3 Resilient cities

'Cities are among humankind's most durable artefacts' (Vale, et al., 2005a p. 5). Resilience is perhaps a new metaphor to many disciplines to describe and frame a counter-response to threat, but resilience has always preoccupied the inhabitants of cities as they sought to defend and secure their interests. The rise of resilience is ascribed to a growth in political action against a number of perceived threats and events such as climate change related events, disease pandemics and global terrorism (Coaffee, et al., 2009 p. 1; Todes, 2011 p. 118).

C.S. Hollings introduced the term resilience for the first time in 1973 to the analysis of ecosystems. It emerged as a concept in ecosystems theory to explain how ecological systems cope with external shocks, or how to interpret its stability (Coaffee, 2009 p. 85; Ernstson, 2008 p. 17). Ecological resilience was defined as: 'the amount of disturbance that an ecosystem could withstand without changing self-organized processes and structures' (Coaffee, et al., 2009 p. 112). The range of application of the term resilience has since then broadened in theory and research. In recent years resilience has become a trans-disciplinary concept that integrates socio-political and physical aspects (Coaffee, 2009 p. 87) and is becoming a common frame for the policy goals of socio-ecological systems such as cities (Hamin, et al., 2009 p. 239; Coaffee, et al., 2009 p. 114).

Resilience is popularly understood as the capacity to accommodate, absorb, bounce back from, or adapt to some kind of perturbation (Vale, et al., 2005b p. 335; World Bank, 2008 p. 32; Hamin, et al., 2009 p. 239). If resilient, a system has a degree of

elasticity to withstand a shock and reorganise itself when necessary (World Bank, 2008 p. 32) and is thus forgiving of external shocks (Hamin, et al., 2009 p. 239). Resilience is indicated by the continuation of particular functions at an acceptable level (Pelling, 2011 p. 42). Moreover, it includes the ability to learn by continuously adapting to the constantly changing risks and vulnerabilities (Collins, 2009 p. 106; Hamin, et al., 2009 p. 239).

The goals of a resilient city need to be built into the everyday practices of urban planners (Godschalk in Coaffee, 2009 p. 87). However, urban planning has so far played a limited role in consciously reducing vulnerability to disasters or everyday risks; and resilience is little understood (Biesbroek, et al., 2009). The International Council for Local Environmental Initiatives (ICLEI) sums up the reason for the lack of action: 'while the changing nature of disaster risk is well analyzed and increasingly addressed at international and national levels of debate and decision-making, efforts to provide direct and practical guidance to local government policy-makers and planners on how to reduce exposure and increase resilience to disasters have been few' (ICLEI, 2010 p. 1). Because resilience is not made practical, planning practices are often unsustainable – in fact, our everyday decisions could even increase people's exposure to risks and hazards, as opposed to building resilience (Pelling, 2003).

Most planners would agree that building resilient cities is of great consequence, but many countries have major development challenges – compared to which the pursuit of resilience seems like a 'nice to have'. The next section considers if, given its challenging planning context, resilience is likely to be translated into spatial planning practice in South Africa.

3. Contextual framework

3.1 The South African planning context

Apartheid had purposefully and systematically restricted black South Africans from meaningful participation in the economy. The assets of the majority of people were directly and indirectly destroyed and access to skills and self-employment was racially restricted (The Presidency, 2009). Despite solid and consistent economic growth for most of the past 18 years, and numerous policy and legislation changes, the resilience of urban settlements in South Africa is endangered by spatial inequalities, fragmentation, urban sprawl, inequalities between rich and poor that is deepening, the overload on basic infrastructure and services, congestion on roads, social exclusion, increased crime, and pressure on ecosystem services. Despite having one of the largest public housing projects in the world, decent shelter near employment opportunities remains elusive for most people, for many do not have access to housing or security of tenure, quality social services, public facilities and amenities, economic opportunities and livelihoods, and basic services. The South African space economy is thus characterised by the coexistence of formal and informal economic activities, housing and transportation systems, and a dualism in

quality of life, levels of incomes, education, skills, accessibility, density and access to service delivery (Biermann, 2011 pp. 14, 16; Oranje, 2010 p. 59; World Bank Institute, 2012). The stark inequalities in the country threaten the fragile social cohesion, and have given rise to an increasing number of violent service delivery protests and xenophobic attacks. There are furthermore huge territorial disparities between rural and urban areas (Van Huyssteen, et al., 2010 pp. 24-25, 35).

3.2 Planning in South Africa

With the rise of democracy in South Africa, expectations of the eradication of socio-economic imbalances, including equitable development and access to basic services, were high (Carmin, et al., 2012 p. 21). A new path of reconstruction and development was cut out for a post-apartheid South Africa in the form of numerous green and white policy papers, acts and regulations. Simultaneously a new intergovernmental system was established with a strong focus on the process of inclusive planning rather than planning products. Nevertheless, after many decades of comprehensive blue-print planning during which 'planners were perceived as having been instrumental in designing and maintaining the apartheid space economy' (Biermann, 2011 p. 15), spatial planning was regarded with suspicion and thus neglected – if not abandoned. This adversely affected planners' ability to perform spatial planning. Furthermore, many planning positions in government were filled with people who were not qualified planners, causing a loss in skills and institutional knowledge (Biermann, 2011 p. 15; Oranje, et al., 2011 p. 8).

Integrated Development Plans (IDPs) that promote the developmental government paradigm became the dominant planning instrument in post-apartheid South Africa. These plans focus on stakeholder processes and institutional coordination but neglect the notion of using space to restructure settlements. Watson calls this the 'marginalization of the spatial' (in Biermann, 2011 p. 12), while Oranje, et al (2011 pp. 6-7) describes post 1994 development planning in South Africa as characterised by a conflict in intent, action and outcome between service delivery and transformation. 'Servicing' is ensuring a rapid response to a lack of housing and basic services. As such, it has a 'very near-future perspective', concerned with the number of houses completed and services delivered in areas where people live 'now' and often with future re-election of politicians in mind. Oranje, et al (2011 p. 6) argue that the outcome has not necessarily transformed the post-apartheid space economy, but only addressed the symptoms. 'Transformation' on the other hand is concerned with the restructuring of the entire space economy 'through the pursuit of shared, sustainable, equitable and inclusive growth'. However, much more emphasis has been placed on servicing, which means that many communities may have houses and basic services, but the expansion of the economy into these 'serviced' areas has been minimal and people remain far from economic nodes with their accompanying jobs, social amenities and economic wealth.

Spatial planning re-emerged as an important component of planning with the publication of the National Spatial Development Perspective (NSDP) in 2003.

However, local spatial development frameworks are often driven by widely accepted concepts such as nodes, corridors and urban edges, without much insight into how spatial planning ought to respond to movement patterns, long-term economic prospects, the property market, or how space is used. It is often assumed by planners and politicians that it is possible through state intervention in the economy – notably though infrastructure investment – to change the spatial pattern of economic growth and development. The result is a disjuncture between conceptual spatial planning and quantitative infrastructure planning that contributes to misaligned service delivery. The absence of credible data on changing demographic and economic patterns, municipal governance and urban sustainability further impedes sound decision making (Biermann, 2011 pp. 12-14; Oranje, 2010 pp. 57-60).

Municipalities furthermore face a number of challenges in overcoming the apartheid spatial legacy: lack of funds; lack of technical, managerial, financial and planning skills and capacity to take up the developmental role; institutional transformation issues because of the amalgamation of municipalities; economic woes inherited from apartheid; huge service delivery backlogs; and intergovernmental misalignment and complexity (Van Huyssteen, et al., 2010 p. 27; Oranje, et al., 2011 p. 8).

3.3 Translating disaster resilience into spatial planning practice in South Africa

Before 1994, environmental management, disaster reduction and sustainability among other concerns, received very little attention in South African policy. This changed after 1994 as the process of democratisation resulted in a revised development agenda (Roberts, 2008 p. 521). But the simultaneous, parallel development of many policies resulted in duplicated development application processes, competing bureaucracies, interests and agendas, and differences in training, discourse and practice (Todes, 2011 p. 123). There was also a growing tension between the need to expedite development to address inequalities, and the need to introduce sustainability concerns such as environmental management and disaster reduction into planning. As described above, development won out as the priority, so that long-term issues were of less immediate concern. This tension has still not been resolved, and has, in many cases, intensified due to the range of immediate and severe development challenges (Roberts, 2008 p. 523). For this reason Faling, et al (2012) have found that planning for everyday disaster resilience is not a priority among planners in South Africa. It is not even deemed part of the planning process, but part of what the ‘environmental people do’.

What follows is a case study of the City of Durban in South Africa – a metropolitan city facing typing development challenges – and how they have started to mainstream climate change adaptation into their everyday planning. This serves to hypothetically demonstrate that the mainstreaming of disaster resilience in spatial planning can be accomplished if approached in a way that it is seen as part of the planning agenda and integrated into existing planning strategies.

4. Case study: Climate change adaptation in Durban

Durban is a coastal city with the largest port on the east coast of Africa. The eThekwini Municipality manages the 2 300 square kilometre municipal area that hosts a population of 3.5 million people and that is South Africa's third biggest urban economy (Carmin, et al., 2012 p. 20; Roberts, 2008 p. 521; SACN, 2012 p. 37).

The City of Durban faces typical post-apartheid challenges as described above. It also experiences severe weather events such as flooding, storms, droughts and tornadoes. To this extent, a report commissioned by the Municipality on climate change suggests that over time Durban would experience minimum and maximum temperature increases; and rainfall would become more infrequent, but more severe – causing flooding and high tide levels. The report also indicates that the sea level is rising by 2.7cm per decade. These changes in the climate and sea level will affect numerous sectors in the city such as food security, health, infrastructure, water security, biodiversity and the economy, and many people will become more vulnerable to disaster risks (Carmin, et al., 2012 pp. 18-21; Roberts, 2008 p. 528). At that time few strategies in eThekwini engaged proactively with each other to reduce the risk for disasters due to extreme weather events. Moreover, the disaster management sector was mostly responsive to emergencies, not focussing on proactively planning to minimise exposure and susceptibility, relocating people and infrastructure away from high risk areas, or on developing early warning systems.

As severe weather events started to cause more damage to the city during the last decade – notably the 2007 severe flooding and coastal erosion that caused significant damage to the coastline around Durban – the Municipality started to wake up to the consequences of these events, and realised that many of the post-apartheid development gains are already being undermined or lost, and will be further exacerbated by climate change. Climate change adaptation or resilience-focused interventions, started to achieve prominence in Durban for the potential it offers for 'development-linked co-benefits that are responsive to a context of poverty and underdevelopment' (Roberts, 2010 pp. 398-399; Roberts, 2008 p. 532; Carmin, et al., 2012 p. 23).

It still took some time and trial and error for Durban to be recognised today as one of the leaders in climate change adaptation. First, the Environmental Management Department commissioned the development of an adaptation strategy, published in 2006, which summarised general adaptation actions that could be taken by sector departments. It was an important document to further the debate on climate change in the city, but it did not act as a catalyst for action – in part because it did not specify goals and actions for specific departments, and partly because many departments were dealing with work backlogs and overloads, as well as a lack of funding and capacity. In 2008 the Environmental Management Department, whose name changed to the Environmental Planning and Climate Protection Department (EPCPD) – to indicate the priority given to climate change in the city – realised that to gain widespread support for an adaptation plan, they have to shift the emphasis from the

threats climate change present to presenting adaptation as a means to realise development priorities. Work was started on individual plans for specific sector departments by embedding adaptation planning into existing business plans and development objectives. These plans formulated measures and protocols to maintain or improve the functioning of municipal systems, services and infrastructure given the projected impacts of climate change. 'Essentially, the goal was to build increased resilience one adaptation intervention at a time' (Roberts, 2010 p. 401). Climate change consideration were also factored into the overall long-term plans and budgets of the municipality (Carmin, et al., 2012 pp. 21-23; Roberts, 2008 p. 533; Roberts, 2010 p. 401).

Three endogenous factors seem to have driven the adaptation initiatives in Durban. One is the efforts by a champion who pushed the adaptation agenda and creatively navigated the minefield that is local government. Two, the city came under the impression of the gravity of climate change impacts and the danger their residents were in if it became more severe. Three, the municipality realised that climate change adaptation was a means to secure the city's development path while simultaneously addressing sustainability and resilience (Carmin, et al., 2012 p. 28). eThekwini found ways to link adaptation to existing policies and plans to 'demonstrate that this is not an unfamiliar or inconsequential issue but one that was already part of current citywide priorities and initiatives' (Carmin, et al., 2012 p. 29). Adaptation came to be seen as integral to the on-going work of municipal departments.

Roberts (2008 p. 527) identified four markers that indicate the successful integration of climate change in the day-to-day operations, planning and decision making of the Municipality. These are:

- The emergence of a champion(s);
- The appearance of climate change as a significant issue in municipal plans;
- The allocation of dedicated human and financial resources to climate change issues; and
- The incorporation of climate change considerations into political and administrative decision making.

If the City of Durban could manage to integrate climate change consideration into their various sector plans, then surely other South African cities can attempt to mainstream disaster resilience into their spatial planning practices?

5. Conclusion

It is very likely that losses to lives, livelihoods, assets and infrastructure will increase in future as more people migrate to cities and as the effects of global process such as climate change increase communities' vulnerability and disaster risk. Many of the implications will be beyond the capacity and experience of local governments to address, wiping out development gain and diverting scarce funds towards relief and

reconstruction. Developing countries will suffer most from these impacts, increasing the risk divide within and between nations.

Disaster resilience attempts to reduce these losses by mainstreaming physical, social, economic and environmental measures into planning practices to allow urban systems to accommodate, absorb, adapt to or bounce back from shocks to the urban system. Spatial planning is critical in building this resilience. By managing growth and change in cities, spatial planning can promote liveability, sustainability and inclusion (Todes, 2011 p. 128). By mainstreaming disaster resilience into spatial planning practices, these development endeavours can be protected from future losses.

Post-apartheid spatial planning has had 'far more of a life on paper than in practice' due to various fears and concerns and inabilities concerning implementation (Oranje, 2010 p. 66). Planning in South Africa is burdened with addressing housing and service backlogs; fragmented and sprawled spatial patterns and inefficient transportation systems that result in unequal access to urban functions and the economy; challenges of intergovernmental coordination; and so forth. To add another burden – that of building resilient cities – would be met with contempt or despair. The Durban experience shows how planners and officials can be entrepreneurial and innovative in seeking to promote an emerging policy domain. By presenting disaster resilience as a means to realise a city's development priorities whilst protecting the development gain, it is more likely that resilience would be translated into spatial planning practice in South Africa, than if it were presented as a policy paradigm inconsequential from what planners are already doing.

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