

Learning to swim: Strengthening flooding governance in the City of Cape Town

Gina Ziervogel* and Warren Smit
University of Cape Town

Corresponding author: *gina@csag.uct.ac.za

Working Paper
November 2009

2009 Amsterdam Conference on the Human Dimensions of Global Environmental
Change 'Earth System Governance: People, Places and the Planet',
2-4 December 2009, Amsterdam

Theme: Adaptiveness of Earth System Governance
Panel: Water Quantity Management

Abstract

Vulnerability to flooding is a growing concern in cities of the South, where resources are concentrated and poor people often settle in flood prone areas. Climate change projections of increased intensity and frequency of extreme rainfall events suggest flooding impacts will grow in future, demanding improved response to current flood risk in order to adapt. Attempts by the City of Cape Town to reduce flood risk in informal settlements have not been successful, mainly because of institutional and governance constraints that result in a focus on narrow technical solutions and on the provision of disaster relief. This paper explores the notion of flooding governance and how it might be used to suggest ways to strengthen flood management strategies, particularly through collaborative governance across the local and city scale in the context of adaptation to climate change. The challenges associated with flood risk management in the City of Cape Town are discussed before presenting how a new project at the University of Cape Town aims to address these challenges.

Introduction

The challenge of urban flooding is faced by a growing number of urban poor across Africa (Douglas et al. 2008) and is no exception for residents of informal settlements (unplanned settlements that lack adequate shelter and services) in the City of Cape Town. Ironically, Cape Town is also the first major urban region in South Africa where the demand for water is likely to exceed the total potential yield for the area if the economic and population growth scenarios are realized or the expected impact of projected climate change manifests itself (DWAF, 2004). Issues of water quantity and the management of them are therefore of paramount importance, particularly in the context of changing rainfall intensity and frequency associated with climate change. This paper focuses on flood risk and its governance.

Approximately 15% of Cape Town's population of 3.5 million people live in informal settlements. Most of these informal settlements are on the Cape Flats, a flat, sandy, low-lying, poorly drained area, and are subject to regular rising flooding during the winter rains. The climate change scenarios produced by the Climate Systems Analysis Group (CSAG), at the University of Cape Town, suggest that the frequency and intensity of extreme weather events in Cape Town are changing and likely to increase, and this will result in an increase in flooding risk (Midgley, 2005). Sea level rise will also increase flooding risk in some areas (Cartwright, 2008).

Attempts by the City of Cape Town to reduce flooding risk in informal settlements have not been successful, mainly because of institutional and governance constraints that result in a focus on narrow technical solutions and on the provision of disaster relief. In collaboration with others, the University of Cape Town is proposing to assist the City of Cape Town and civil society organisations to explore and pilot a model of governance of flooding risk that will have a more proactive, participatory and integrated approach to reducing flooding risk in informal settlements.

This paper first looks at the relationship of governance and flooding risk under climate change. The flooding risk of informal settlements in Cape Town and the impact of this are then examined. This is followed by a discussion of the institutional response to the flooding of informal settlements in Cape Town, and the context of governance in Cape Town. Finally, some provisional thoughts on the proposed project to introduce a collaborative governance approach to reducing flooding risk in Cape Town's informal settlements are presented.

Understanding governance and flooding risk in a context of climate change

Climate change is expected to exacerbate the intensity and frequency of current extreme events as well as gradually change climate means (Parry et al. 2007), although there is difficulty in distinguishing variability and changes in climate-related hazards from the impacts of long-term climate change (O'Brien et al. 2008). Adapting to changes in the nature of extreme events, that are often experienced as disasters, is increasingly prioritised, particularly in urban areas where high concentrations of people, infrastructure and economic activities occur (Satterthwaite et al. 2007).

Reducing the risk of disasters occurring rather than responding to the impact has become a priority in disaster management. This approach is starting to intersect with the literature on adaptation to climate change more systematically (O'Brien et al. 2008; Thomalla et al. 2006; Schipper and Pelling, 2006), where adaptation, as defined by the IPCC, has focused on adjustments in human or natural systems to reduce vulnerability to the actual or expected climate stimuli (Parry et al. 2007). This definition of adaptation links to the definition of mitigation in the disaster literature as

defined by ISDR (2009), as limiting the adverse impacts of hazards, within the broad context of sustainable development. It is clear that there is overlap between the two approaches although there are also some differences (see Thomalla et al. 2005). Limiting the adverse impacts of hazards might focus on social factors and not consider longer-term change in extreme events. However, it is clear that reducing the risk of disasters in the short term is an important step in reducing vulnerability to longer-term climate change. The capacity necessary to adapt to short-term and longer-term climate change is known as adaptive capacity. Governance is a key component of adaptive capacity (Brooks et al. 2005, Eakin and Lemos, 2006; Folke et al. 2002; Smit and Wandel, 2006) yet “good local governance” is missing in the process of urban growth in low- and middle-income nations, increasing the risks and the number of people at risk (Satterthwaite et al. 2007)

There is a continuum of how flood disasters are viewed with two dominant discourses on either side (see Table 1). The view that tends to dominate is that flood disasters are inherently a characteristic of natural hazards. The natural hazard discourse focuses on: predicting the occurrence and magnitude of flood hazards; using technical/engineering measures to control and contain flooding; and providing relief and emergency assistance after the disaster has occurred. The governance model is usually state-centred and technocratic. As Bankoff (2001) notes, attributing hazards to natural forces, and representing them as a departure from normality to which society returns on recovery, denies the wider social dimensions of hazards and focuses too narrowly on technocratic solutions.

The other end of the continuum sees flood disasters as not only the result of natural hazards, but also of vulnerabilities caused by social, economic and political processes (Adger 2003; Pelling 2003). This discourse of flooding therefore focuses on social relations, structures, institutions and governance in understanding and responding to flooding risk (Dixit, 2003). The governance model is typically pluralistic and involves collaboration between the state, civil society organisations and other key stakeholders. The ultimate objective of this alternative discourse of flooding risk is to ensure that long-term flood risk management strategies are “grounded in an understanding of exposure to the hazard, characteristics and patterns of vulnerability, and the relationship between different stakeholders in the perception of flood risk” (Brown and Damery, 2002: 424).

Table 1: Views on flood disaster and governing flood disaster risk

	Natural Hazard	Social vulnerability
Flood Disaster	Flood disasters are inherently a characteristic of natural hazards	Flood disasters are the result of the interaction of natural hazards and vulnerability
Disaster Risk Management	Focus on relief and control	Focus on mitigation and preparedness; mitigation measures address the political economy of vulnerability

Governance process	State-centered; technocratic and hierarchical	Pluralistic
---------------------------	---	-------------

Source: Adapted from Manuta and Lebel, 2005, modified from Dixit, 2003

Informal settlements and flood risk in Cape Town

Cape Town lies in the Western Cape Province, in the south of South Africa and experiences a Mediterranean climate with relatively dry summers and wet winters (Tyson and Preston-Whyte, 2004). Winter rainfall, associated with cold fronts, is driven by low pressure systems that move west to east. The frequency of strong low-pressure systems has increased significantly during March to May and decreased during June to August over the last 40 years (Tadross 2005), impacting the temporal nature of high rainfall events. There have also been significant warming trends of both minimum and maximum temperatures (Midgley et al. 2005).

Despite climate change, flood risk has been a growing concern in Cape Town as urbanisation has intensified and as people have settled on high flood risk land. Climate change has not 'created' flood risk, however it is expected to exacerbate current risk (Douglas et al. 2008). It is therefore necessary to strengthen current capacity to manage flood risk in order to be well adapted to potential changes in the nature of flood risk.

Over the past three winters (2007, 2008, 2009), between 32 000 and 34 400 people were displaced from informal settlements in Cape Town each winter as a result of flooding caused by heavy rains in the July/August period (Wood, 2009). The largest flood event in recent years was in July 2001, when 44 000 people (13% of all residents of informal settlements in Cape Town) were displaced by flooding.

Table 2: Major flood incidents in Cape Town 2001-2009

Major flood incidents	Number of households displaced by flooding in informal settlements	Estimated proportion of total dwellings in informal settlements in Cape Town affected by flooding (%)
2001 (July)	11000	13%
2004 (August)	4500	5%
2007 (July)	8000	7%
2008 (July)	8600	7%
2009 (July)	8050	6.5%

Note: The City of Cape Town estimates the number of households displaced by dividing the number of displaced persons provided with meals by 4.

Source: Wood, 2009

In 2006, there were estimated to be about 136 500 dwellings in informal settlements in Cape Town (City of Cape Town, 2009). The Winter Preparedness Strategy of the City of Cape Town (2009: 4) notes that: "Informal settlements are extremely densely populated and have not been properly shaped to facilitate the drainage of surface and ground waters. In addition, dwelling construction practices such as sunken floors

aggravates the problem as floors are either flooded by surface water flows or ground water ingress. These living conditions represent significant health risks to the community.” The City of Cape Town is of the view that the flooding of informal settlements is “inevitable” (City of Cape Town, 2009: 10), and that even an average winter could result in a “total of 4000 or more informal dwellings” being affected (City of Cape Town, 2009: 12).

The City of Cape Town has identified 56 informal settlements, with a total of about 88 000 dwellings, as having a “high” or “above average” risk of flooding that required proactive measures such as warnings and encouragement of relocation (see Table 3). These informal settlements that are particularly at risk of flooding are overwhelmingly concentrated on the Cape Flats (in the areas of Khayelitsha, Gugulethu, and Philippi). The Cape Flats is a flat, sandy, low-lying, poorly drained area; rapid recent urban development, driven by high in-migration, on the Cape Flats has disrupted natural drainage patterns and increased stormwater run-off. This has exacerbated the already high water table-conditions: “One of the greatest causes of waterlogged conditions on the Cape Flats is the water table, which is usually close to the surface and may rise above ground level after heavy rains and remain that way for long periods” (Brown and Magoba, 2009: 100-101).

Table 3: Informal settlements in Cape Town with high/above average risk of flooding

Area	Settlement	Estimated number of dwellings	Total dwellings per area
Cape Flats: Khayelitsha	Enkanini	12347	44163
	Monwabisi Park/ Endlovini	7905	
	Silvertown	4929	
	Barney Molokwana Corner	4720	
	RR Section	2677	
	Bongani TR Section	2358	
	DT Section	1492	
	CT Section	1416	
	QQ Section	1364	
	BT Section	1283	
	Sebata Dalindyebo Square	1133	
	PJ Section	883	
	T Section	701	
	Other (VE Section, YA Section)	490	
Cape Flats: Gugulethu/ Nyanga/ Crossroads	Kanana	3962	
	Barcelona	2943	
	Boys Town	2000	
	Europe/ Vukuzenzele	1916	
	Waterfront	900	
	Lotus Park	875	
	New Rest	426	
	Crossroads Infills	400	
	Gxagxa	323	

	Gqobasi	188	13933
Cape Flats: Philippi	Kosovo	4592	13067
	Sweet Home	2800	
	Monwood Private	1800	
	Phola Park Philippi	1375	
	Monwood South	900	
	Thabo Mbeki	781	
	Other (Egoli, Klipfontein Glebe, Monwood Council)	819	
Cape Flats: Elsewhere	Joe Slovo, Langa	6776	10287
	Burundi, Mfuleni	2010	
	Freedom Park Airport, Belhar	822	
	Other (Malawi, Joe Slovo North, Mocke Road, Block Macassar)	679	
Elsewhere in Cape Town	Doornbach, Table View	2800	6843
	Fisantekraal	1700	
	Masiphumelele, Noordhoek	1157	
	Other (Rasta Camp Sir Lowry's Pass, Klipheuwel, Morkel Cottage, Uitkyk, Wolwerivier, Vlakteplaas, Sun City, Javage & Lovemore, Rasta Camp Ocean View)	1186	
Total			88293

Source: Based on City of Cape Town, 2009.

It is important to note that the nature of flooding risk varies from area to area. In descending order of frequency the major flood risk factors in terms of informal settlements are (City of Cape Town, 2009):

- Dwellings in trapped low lying areas without drainage.
- Dwellings within 1:20 year floodplains and within 25m of watercourses.
- Dwellings in wetland areas (typically seasonal wetlands which are dry in summer).
- Dwellings in stormwater detention ponds (which are specifically designed to retain stormwater during periods of heavy rain).

Impacts of flooding in informal settlements

Flooding in informal settlements has many negative impacts on residents' health and wellbeing, quality of life and livelihood strategies.

The flooding of informal settlements is generally "rising flooding" rather than "flash flooding". Long periods of rainfall result in the gradual saturation of the ground and the accumulation of water in poorly drained areas. The lack of adequate sanitation and solid waste management in many areas means that the water is polluted and can cause health problems. Flooding can also result in damage to or the destruction of informal settlement dwellings, which are typically constructed of corrugated iron sheets on a wooden frame, and the contents of dwellings. Flooding can also have a big impact on the livelihood strategies of residents, as residents experience health-related

flood impacts, have to spend money on replacing or repairing their dwellings and other possessions, and may lose out on many days of potential income.

The cost to the state of undertaking emergency response and disaster relief can also be considerable.

Institutional response

The City of Cape Town has been effective at responding to the flooding disasters that have occurred, i.e. providing temporary accommodation, meals and blankets to people displaced by flooding. Attempts to proactively reduce flooding risk in informal settlements have, however, been less effective.

In the long term, the intention is to upgrade all informal settlements (to provide security of tenure, facilities and full services) or, if unsuitable for upgrade, to relocate residents to formal housing projects. In the short term, the City has been attempting to reduce flooding risk in informal settlements through the following measures (City of Cape Town, 2009):

- Warning residents about the possibility of flooding and encouraging relocation/ raising of dwellings.
- Ensuring no further encroachment into high flood hazard areas such as stormwater ponds and watercourse floodplains.
- Undertaking infrastructure interventions to reduce flooding risk.

The planned upgrading or relocation of all informal settlements in Cape Town is proceeding slowly. After the first democratic elections in 1994, a new housing policy was introduced, but the lack of an informal settlement upgrading programme was a major gap in this policy. In 2004, however, there was a fundamental shift in national housing policy towards a focus on informal settlement upgrading. A key focus of the Comprehensive Housing Plan for the Development of Integrated Sustainable Human Settlements, also known as Breaking New Ground (BNG), was on “eradicating” informal settlements: “Informal settlements must urgently be integrated into the broader urban fabric to overcome spatial, social and economic exclusion... the plan supports the eradication of informal settlements through in-situ upgrading in desired locations, coupled to the relocation of households where development is not possible or desirable” (National Department of Housing, 2004: 12). A new policy instrument, the Upgrading of Informal Settlements Programme (UISP), was introduced to fund the incremental upgrading of informal settlements. One key challenge in implementing this programme has been the availability of funding: Cape Town only receives sufficient funding from the national government, through the provincial government, to deliver a maximum of about 7500 housing units per year (City of Cape Town, 2008), and the available funding for the entire province in which Cape Town falls is only sufficient for the upgrading 10 000 informal settlement dwellings per year (Western Cape Department of Local Government and Housing, 2008). In fact, the City of Cape Town’s “lack of sufficient technical, planning, financial and social facilitation

capacities” has resulted in the number of housing units delivered often being considerably less than the funding allows for (City of Cape Town, 2008: 62).

Another key challenge has been access to suitable vacant land (for permanent or temporary relocations). Many proposed upgrading projects are only feasible if suitable located vacant land is available for the temporary relocation of residents during the installation of infrastructure and for the permanent relocation of some residents so as to reduce densities.

Warning residents about the possibility of flooding and encouraging the relocation of dwellings has had little impact in practice, as residents generally do not have a suitable alternate sites to relocate to. The City of Cape Town has also distributed pamphlets which have suggestions as to how residents can reduce flooding risk. For example, the suggestions of a pamphlet entitled “Help protect your neighbourhood from flooding” include the following (City of Cape Town, n.d.):

- “Either move to higher ground or raise the floor level of your house to higher than the terrain outside”
- “Dig drainage channels around the house to divert water away from the home”
- “Slope roofs to assist runoff and make them waterproof”
- “Avoid contact with flood water as it may be contaminated with harmful substances”

The distribution of pamphlets is unlikely to have much impact on its own, though.

Discouraging encroachment into high flood hazard areas has also been unsuccessful. The scarcity of suitably located vacant land in Cape Town means that there continues to be erection of shacks in detention ponds and wetland areas during the dry summer months, despite regular warnings about risk of winter flooding. In the words of Noahmaan Hendricks, Director of Development Services, City of Cape Town: “Despite Council’s repeated warnings each year, hundreds of families still persist in building their shacks in flood-prone areas. Even after we have offered the latest flood victims an opportunity to relocate to dry ground, they still prefer to stay in their waterlogged homes, out of fear that other desperate home-seekers will occupy their properties” (City of Cape Town, 2007).

Undertaking infrastructure interventions to reduce flooding risk, such as installing drainage channels in some informal settlements, has had some success. The City of Cape Town believes that the fact that recent flooding events have had less of an impact than the 2001 floods is “due to the City’s installation of better drainage systems, more regular area cleansing operations, and ongoing public education programmes” (City of Cape Town, 2007). In the longer term, the main proposed solution is to fill in low lying areas. However, temporary relocation of dwellings is required and obtaining suitable land for temporary relocation is a major blockage. Although appropriate infrastructure is important, Swilling (2006) highlights how in the city of Cape Town,

the sustainability of this infrastructure planning is seldom engaged with at the level needed.

The way that the City of Cape Town has been dealing with the issue of flooding in informal settlements has been severely criticized by some community groupings. For example, Abahlali baseMjondolo, a federation of communities in informal settlements, say that they “strongly condemn the government for their short-sightedness. The floods happen every single year and the government does absolutely nothing to prevent them from happening. They would rather give blankets and soup to distressed families because it’s good for publicity. But these floods are easy to prevent. The government could just build more adequate houses for the poor. An even easier and more sustainable approach would be to grant these poor communities some well-located open and serviced land where they can build their own houses” (Abahlali baseMjondolo, 2009). The view of Abahlali baseMjondolo is that “the crisis of flooding in the informal settlements is caused by government's anti-poor policies”, “not the weather” (Abahlali baseMjondolo, 2009).

Governance in Cape Town

The response to flooding of informal settlements in Cape Town has been partially constrained by institutional limitations.

There has been a process of almost continuous local government institutional restructuring in Cape Town over the past 15 years. In the early 1990s, there were 61 racially-segregated local government bodies in the Cape Town metropolitan area. By 1996, these government bodies had been restructured into a Cape Metropolitan Council and 6 municipalities. In 2000, these seven local government bodies were merged into a single municipality (the City of Cape Town). During this period there has been continual institutional restructuring, as municipalities were split up and rearranged and merged together again, and there has been ongoing rationalisation of municipal staff – the number of employees of the City of Cape Town has fallen from 27 000 in 2000 to 22 000 in 2006.

The institutional complexity is highlighted by the various directorates and departments of the City of Cape Town that are involved in the process of dealing with flooding (see Table 4). The City of Cape Town is structured into eleven Directorates headed by Executive Directors; these Directorates are each sub-divided into various departments. Each of the eleven Directorates is assigned a role in terms of flooding. The key departments currently involved with pre-empting and responding to flooding in informal settlements are Informal Settlements (in the Housing Directorate), Roads and Stormwater (in the Transport, Roads and Stormwater Directorate) and the Disaster Risk Management Centre (in the Safety and Security Directorate). In addition to the City of Cape Town, the Provincial Government and National Government, and government set-up agencies such as the Housing Development Agency, are also potentially involved.

Table 4: Selected responsibilities of City of Cape Town Directorates, Departments and Branches with regards to flooding in informal settlements

Key activities	Lead agent	Directorates involved
Preparation of Flooding and Storms Plan	Disaster Risk Management Centre (Safety and Security)	All directorates
Programme management	Development Services (Service Delivery Integration)	Service Delivery Integration
Warning residents about the possibility of flooding and encouraging relocation/ raising of dwellings.	Informal Settlements (Housing)	Housing
Ensuring no further encroachment into high flood hazard areas such as stormwater ponds and watercourse floodplains.	Informal Settlements (Housing)	Housing; Safety and Security
Undertaking infrastructure interventions to reduce flooding risk	Informal Settlements (Housing)	Housing; Service Delivery Integration; Transport, Roads and Stormwater
Maintenance/ cleaning of stormwater systems	Roads and Stormwater (Transport, Roads and Stormwater)	
Flood incident response	Depends on nature of incident (Disaster Risk Management Centre responsible for responding to major flooding incidents)	Transport, Roads and Stormwater; Housing; Safety and Security
Public health and safety advice	City Health	City Health
Community capacity building/ awareness raising	Disaster Risk Management Centre (Safety and Security)	Safety and Security; Housing
Compiling information on, and reporting on, flooding	Roads and Stormwater (Transport, Roads and Stormwater); Disaster Risk Management Centre (Safety and Security)	Transport, Roads and Stormwater; Safety and Security

Source: based on City of Cape Town, 2009

Residents and community organisations can also potentially play a crucial role with regards to flooding in informal settlements. South Africa has a strong history of community-based organisations. The first community organisations in black residential areas were “organisations of survival”, such as *stokvels* (savings clubs), burial clubs and church associations (Narsoo, 1991: 27). During the late 1970s and early 1980s, in response to the clampdown by the apartheid government, “organisations of resistance” grew out of the organisations of survival (Narsoo, 1991). These organisations claimed to represent all residents in a particular geographic area, and were commonly known as residents associations or civic associations. In 1983, the mass political movement the United Democratic Front (UDF) began a campaign to form civic associations in every township of South Africa as part of the struggle against the state (Shubane and Madiba, 1992: 4). The high point of the civic

association movement was the founding of the South African National Civic Organisation (SANCO) in 1992. The civic association movement first grew in formal townships; informal settlements had initially usually been controlled by undemocratic “warlords” or “squatter committees”, but SANCO-aligned civic associations (or “residents’ associations” as they were often called) began to be established in these settlements during the 1990s (Seekings, 1998). Civic associations in informal settlements were usually mainly concerned with resisting forced removals and with negotiating with the municipality about housing, services and facilities. Civic associations in informal settlements also began to be responsible for controlling access to informal settlements and use of land within these settlements. Civic associations were seen as having two main roles in the post-democratisation period: (i) developmental agents (facilitating and managing local development activities), and (ii) watchdogs over government, i.e. “political mobilisation, lobbying and contestation *vis-à-vis* primarily local government, about local issues” (Pieterse, 1997: 7).

Since 1994, the State has introduced various mechanisms to facilitate participation by citizens and civil society organisations at a local scale. Researchers of participation in local governance overwhelmingly agree that “institutional participatory mechanisms (i.e. those organised by the state – ward committees, ad hoc participatory or development forums, integrated development planning, etc.) currently in place in South African cities do not work properly in practice” (Bénit-Gbaffou, 2008: i-ii). Staniland (2008), based on a study of community organisations in Gugulethu in Cape Town, argues that not only are the participation policies not working, but they are “sedating” community organisations. Staniland sees this as a result of local politicians controlling the process of devolution of powers to civil society; local councillors are thus able to use these processes for patronage and as a way of exerting political control over local civil society organisations.

The formalization of informal settlements is having a significant impact on community organisations in informal settlements. State intervention is generally reducing the power of bottom-up grassroots organisations and strengthening formal top-down participatory processes. One example is a study of a community organisation during the partial upgrading of an informal settlement in Cape Town (Oldfield, 2002). Oldfield notes that “partial formalization has led to social and political fragmentation, changing the ways in which households link with their leaders and the ways in which community organizations work together for physical and social development” (Oldfield, 2002: 113).

Way forward

The problem we seek to address, therefore, is that informal settlements in Cape Town have a high risk of flooding and that risk will increase if extreme events become more intense and/or frequent as a result of climate change. Institutional complexity and governance constraints are preventing an effective proactive response to reducing this risk. Strengthening governance and reducing constraints can be seen as a key

component of building adaptive capacity to better respond to current and potential future flood risk.

It has been recognised in other contexts that the sustainable management of flooding risk can only be achieved by institutional change aimed at horizontal integration, “underpinned with capacity-building interventions targeted at enabling a learning culture that values integration and participatory decision making” (Brown, 2005: 455). A major mindset change in how to reduce flooding risk is thus required, including strengthening the capacities of all stakeholders and increasing opportunities for co-management. Table 5 outlines some of the capacities required for mainstreaming climate change concerns in disaster risk management. These are broad but help to ensure a range of capacities are focused on to include a social vulnerability perspective as opposed to a hazard-centric focus. Spatial planning is a particularly important issue, given that the current model of urban development results both in large numbers of people being forced to live in unplanned settlements in high risk areas (Napier and Rubin, 2002) and in excessive amounts of impervious surfaces that lead to increased run-off of polluted water and thus increased flooding risk (Arnold and Gibbons, 1996).

Table 5: Capacities required by stakeholders for mainstreaming climate change concerns in disaster risk management

Stakeholders	Capacity needs
Communities	<ul style="list-style-type: none"> • Human capital • Social capital of societies • Underlying health of the communities under question to deal with the climate change threats • Knowledge on climate change and its implications for the disaster profile of their region • Enhanced response capacity • Functional social networks • Empowerment and enfranchisement
Government and non-governmental personnel	<ul style="list-style-type: none"> • Consideration of uncertainty in planning • Flexibility and innovation in the institutions • Policies and regulations • Strengthening early warning systems (Klein 2002) • Spatial planning • Finances • Analytical skills to identify climate change impacts and related disaster dynamics • Respond to the developmental pressures and resource crises • Risk spreading instruments • Governance

Source: Prabhakar et al., 2009

The University of Cape Town, in collaboration with the Stockholm Environmental Institute, and partnering with the City of Cape Town and Shack Dwellers International, has a project to address some of these issues under the Climate Change Adaptation in

Africa programme (CCAA)¹. The project aims to explore how responses to flooding could be coordinated and whether climate change adaptation efforts in Cape Town could be strengthened through focussing on the governance system and the institutions responsible for managing these climate change risks. To achieve this a number of more specific objectives need to be met:

- Facilitating shared understanding of the nature and perceptions of the risk of flooding in the City of Cape Town.
- Assessing existing and alternative approaches to climate change risk management in the city, to guide the development of adaptation planning.
- Building on existing civic and City of Cape Town initiatives to develop multi-institutional knowledge platforms around urban flooding and sea level rise.
- Assessing the nature of adaptive capacity and changes in climate change decision-making that emerges during the project, with a focus on relationships and information flows between academia, civil society and the relevant units within the City of Cape Town.

The intention is to contribute towards building the capacity of all stakeholders to reduce flooding risk in Cape Town within a context of climate change.

References

Abahlali baseMjondolo (2009) *The City of Cape Town is Politicising Flood Aid & Failing to Deal with the Structural Issues*. Press release issued on 16 July 2009. <http://www.abahlali.org/node/5485> [accessed 18 November 2009]

Adger (2003): Social Capital, collective action, and adaptation to Climate Change. *Economic Geography* 79(4) 387-404.

Arnold, C.L. & Gibbons, C.J. (1996) "Impervious surface coverage", *Journal of the American Planning Association* 62(2): 243-258.

Bankoff, G. (2001) "Rendering the world unsafe: 'vulnerability' as Western discourse", *Disasters* 25: 19-35.

Bénit-Gbaffou, C. (2008) "The place of participation in South African local democracy", *Transformation* 66/67: i – vii.

Brooks, N., W.N. Adger, and P.N. Kelly. 2005. The determinants of vulnerability and adaptive capacity at the national level and the implications for adaptation. *Global Environmental Change Part A*, Volume 15, Issue 2, pp. 151-163.

¹ Funded by International Development Research Centre (IDRC) and UK Department for International Development (DfID)

Brown, C. & Magoba, R. (2009) *Rivers and Wetlands of Cape Town: Caring for our rich aquatic heritage*. Pretoria: Water Research Commission.

Brown, R.R. (2005) "Impediments to integrated urban stormwater management: The need for institutional reform", *Environmental Management* 36(3): 455–468.

Brown, J.D. & Damery, S.L. (2002) "Managing flood risk in the UK: Towards an integration of social and technical perspectives", *Transactions of the Institute of British Geographers, New Series* 27(4): 412-426.

City of Cape Town (2007) *City Launches Massive Flood Mop-Up Operations*. Press release issued on 31 July 2007.

<http://www.capetown.gov.za/en/MediaReleases/Pages/CityLaunchesMassiveFloodMopUpOperations.aspx> [accessed 18 November 2009]

City of Cape Town (2008) *5 Year Plan for Cape Town - Integrated Development Plan (IDP) 2007/8 – 2011/12: 2008/09 Review*. Cape Town: City of Cape Town.

City of Cape Town (2009) *Winter Preparedness Strategy*. Document number SMC 05/03/09.

City of Cape Town (n.d.) *Help Protect Your Neighbourhood from Flooding*. Pamphlet issued by Catchment, Stormwater and River Management Branch, Roads and Stormwater Department, City of Cape Town.

Dixit, A. (2003) "Floods and vulnerability: Need to rethink flood management", *Natural Hazards* 28: 155-179.

Douglas, I., Alam, K., Maghenda, Mcdonnell, Y., McLean, L. and Campbell, J. (2008), "Unjust waters: climate change, flooding and the urban poor in Africa", *Environment and Urbanization*, 20 (1).

DWAF (Department of Water Affairs and Forestry) (2004) *National Water Resource Strategy*, First Edition, September.

Eakin, H and Lemos, M.C. (2006) "Adaptation and the state: Latin America and the challenge of capacity-building under globalization". *Global Environmental Change*. 16. 7–18.

Folke, C., S. Carpenter, T. Elmqvist, L. Gunderson, C.S. Holling, and B. Walker. 2002. Resilience and sustainable development: Building adaptive capacity in a world of transformations. *AMBIO*, Volume 31, Issue 5, pp. 437-440.

Manuta, J. & Lebel, L. (2005) *Climate Change and the Risks of Flood Disasters in Asia: Crafting Adaptive and Just Institutions*. Paper prepared for the Human Security and Climate Change International Workshop in Oslo, Norway on 21-23 June 2005.

Napier, M. & Rubin, M. (2002) *Managing Environmental and Disaster Risks Affecting Informal Settlements: Lessons in Innovative Practice From South African Local Authorities*. Paper presented at conference and meeting of CIB Task Group 40 on informal settlements: *Sustainable livelihoods in the integration of informal settlements in Asia, Latin America and Africa*, Surabaya, Indonesia, 10-13 October 2002.

Narsoo, M. (1991): "Civil society: A contested terrain", *Work in Progress* 76, pp. 24-27.

National Department of Housing (2004): *Breaking New Ground: A Comprehensive Plan for the Development of Sustainable Human Settlements*. Pretoria: National Department of Housing.

O'Brien, K., Sygna, L. Leichenko, R., Adger, N., Barnett, J., Mitchell, T. Schipper, L., Tanner, T., Vogel, C. and Mortreux, C. (2008) *Disaster Risk Reduction, Climate Change Adaptation and Human Security*. Report prepared for the Royal Norwegian Ministry of Foreign Affairs by the Global Environmental Change and Human Security (GECHS) Project, GECHS Report 2008: 3.

Oldfield, S. (2002) "Partial formalization and its implications for community governance in an informal settlement", *Urban Forum* 13(2): 102-115

Parry, M.L. et al. (Eds.) *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press, Cambridge, UK, 976.

Pelling, M. (2003), *The Vulnerability of Cities: Natural Disasters and Social Resilience*, Earthscan, London, 212 pp.

Pieterse, E. (1997) "Urban social movements in South Africa in a 'globalising' era", *Urban Forum* 8(1): 1-17.

Prabhakar, S.V.R.K., Srinivasan, A. & Shaw, R. (2009) "Climate change and local level disaster risk reduction planning: Need, opportunities and challenges", *Mitigation and Adaptation Strategies for Global Change* 14: 7-33.

Schipper, L. and Pelling, (2006) "Disaster risk, climate change and international development: scope for, and challenges to integration", *Disasters* 30 (2006), pp. 19-38.

Seekings, J. (1998) "No home for revolutionaries? The structures and activities of the South African National Civic Organisation in metropolitan Cape Town, 1996-97", *Urban Forum* 9(1): 1-35.

Shubane, K. and Madiba, P. (1992) *The Struggle Continues? Civic Associations in the Transition*. Research Report No. 25. Johannesburg: Centre for Policy Studies.

Smit, B. and J. Wandel. 2006. Adaptation, adaptive capacity and vulnerability. *Global Environmental Change*, 16 (3): 282-292.

Staniland, L. (2008) "'They know me, I will not get a job': Public participation, patronage, and the sedation of civil society in a Capetonian township", *Transformation* 66/67: 34-60.

Swilling, M (2006), "Sustainability and infrastructure planning in South Africa: a Cape Town case study", *Environment & Urbanization* 18(1): 23-50.

Thomalla, F., T. Downing, E. Spanger-Siegfried, G. Han and J. Rockström. (2006). "Reducing hazard vulnerability: towards a common approach between disaster risk reduction and climate adaptation". *Disasters*, 30, 1.

UNISDR Basic Terms of Disaster Risk Reduction (UNISDR)
<http://www.unisdr.org/eng/library/lib-terminology-eng%20home.htm> [Accessed 18 November 2009]

Watson, V. (2003) "Conflicting rationalities: Implications for planning theory and ethics". *Planning Theory & Practice* 4(4): 395-407.

Western Cape Department of Local Government and Housing (2008) *Annual Performance Plan 2008/09 - 2010/11*. Cape Town: Western Cape Department of Local Government and Housing.

Wood, B. (2009) *Winter 2009 Overview*. Presentation at City of Cape Town Disaster Management Advisory Forum Meeting, 8 September 2009.