

**Equity, Climate Adaptation, and Urban Planning:  
A Case Study of Cape Town**

A thesis

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## **ABSTRACT**

This thesis examines how social equity manifests in urban climate change planning. As cities begin to experience the effects of climate change, many municipalities are taking steps to adapt by mainstreaming adaptation policies into all departments, but what role does social equity play? Vulnerabilities and risks are not equally shared by cities' residents; the urban poor are least responsible for increased greenhouse gas emissions, yet they may be most afflicted by and least resilient to the impacts of climate change. A case study of Cape Town, South Africa, provides a local-level examination of adapting housing settlements and land-use planning in a post-apartheid city, and demonstrates opportunities to synergize goals of climate change planners and social equity proponents. The study finds that combining goals of sustainable development and poverty alleviation, rather than keeping them in competing silos, can yield projects that are pro-poor and facilitate adaptation to climate change.

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## **INTRODUCTION**

The goal of this thesis is to delineate a sense of the opportunities and challenges for city governments to incorporate social equity into their urban climate change adaptation policies and plans, and to identify lessons that could be transferable to other cities. This thesis takes a localized approach, and more specifically explores social equity through housing settlements and land-use planning in cities' adaptation strategies. Social equity is discussed in multilateral international climate change negotiations, but what role does it play at the city-scale of climate change adaptation planning? Adaptation on the international debate stage poses more risk for some countries than for others; specifically, the countries producing the least greenhouse gas emissions tend to be the most vulnerable to climate change's impacts and are disproportionately affected. Adaptation on the city-scale parallels the international stage, because the most vulnerable communities are also the ones producing the least emissions in the city, and have the least adaptive capacity and resilience; there is correlation between emissions, and income and wealth (International Housing Coalition (IHC) 2011). Social equity in urban adaptation strategies can address the needs of marginalized populations in the short and long-term, so that all urban residents have adaptive capacity since the impacts of climate change without policy interventions can easily further exacerbate socioeconomic inequalities. There are many facets to climate change adaptation strategies; points of focus can range from water access, to disaster evacuation strategies, to infrastructure resilience, and beyond. This thesis's focal point is on housing settlements and land-use planning in response to the experienced and expected risks posed by climate change, and adaptation planning's effects on and from social equity strategies.

A case study of Cape Town, South Africa will be presented because the City of Cape Town, along with the South African and provincial Western Cape government, has been at the forefront of adaptation planning. Additionally, the socioeconomic landscape of the city demonstrates the struggles of its population's expansive inequality, especially with housing opportunities. The City's assessed vulnerabilities to climate change and declared commitment for preparedness, along with its social struggle to address the marginalization of populations as a result of South African apartheid make it an appropriate "extreme" (Yin 2003) case to study policy's potential to marry climate adaptation and social equity.

## **CHAPTER 1: BACKGROUND AND METHODOLOGY**

### **1.1 Background and Research Question**

Urban climate change planning has gained traction more recently with the Bali Local Government Climate Roadmap of 2007, with efforts to mirror the United Nations Framework Convention on Climate Change- Conference of Parties 13 climate roadmap for countries. The network of municipalities preparing for climate change got its start with the help of ICLEI's planning of the Municipal Leaders Summit on Climate Change at the UN's Headquarters in 1993, and today various local-scale groups like the C40 Climate Leadership Group and the World Mayors Council on Climate Change are taking similar steps to build climate planning coalitions (Otto-Zimmerman 2011). Climate change's social implications are full of complexities and require creativity for solutions. International climate negotiations often discuss the socio-economic impacts of climate change on the most vulnerable and least developed countries, but this thesis explores how at the local-level climate change might affect the most vulnerable and least resilient residents of an urban

environment. Impacts are very site-specific because climates are site-specific, as are extreme weather events/pattern changes associated to climate change. One fundamental concern of welfare is poor marginalized communities' resilience constraints associated to unsuitable housing conditions; therefore, the element of social equity that is highlighted in this thesis is of housing infrastructure and land-use for poor urban residents. The study focuses on municipalities' role in both including a foundation of social equity in their climate planning policies and similarly incorporating climate adaptation thought into their pro-poor-framed housing infrastructure and land-use policies.

In looking at urban climate change strategies, how does socioeconomic equity manifest itself? What does climate change adaptation planning look like in a city with high socioeconomic disparities and in the presence of already existing extreme vulnerabilities to the poorest residents of the population?

## **1.2 Research Methodology**

This thesis relies on an academic and policy literature review for developing its assessment of the present relationship and future opportunities for strongly tying social equity and urban climate planning. In beginning a literature review of Cape Town's socioeconomic problems it was quickly evident that the city's social equity needs are great and surface in numerous aspects of residents' daily life. In order to get thorough with the identification and analysis of social inequities and local climate change policies and plans, social equity had to be more narrowly examined. A recurring theme in an analysis of Cape Town's high poverty levels was the poor living conditions of so many, and the slums/informal settlements that were occupied by many marginalized populations of the city. Thus, for my thesis, housing

settlements and land-use were the chosen focus since they are closely tied, are both affected by climate change, and have been plagued with injustice largely as a result of apartheid. The literature review will go into adaptation planning at the local level; vulnerabilities of the urban poor; and social equity in climate change adaptation planning.

The case study selection of Cape Town comes from the nature of the city's make-up and its historical circumstances. This is an instrumental single-case study of the City's overlapping social and environmental goals. The case study examines official national, provincial and city documents, and is supplemented with interviews of the City of Cape Town and the University of Cape Town officials. Yin states that a case study can be best used for "how" and "why" questions. As this thesis questions "how" social equity manifests itself in urban climate change plans, it qualifies as a fitting choice of methodology.

An instrumental case study is described as giving a specific perspective on an issue, and in its purpose is to further expand on the understanding of that issue (Stake 1998). The focus on housing and land-use give specificity to the analysis of urban climate change adaptation, and provides the opportunity to give a micro-scale assessment of connecting solutions that meet the needs of both social equity and climate change planning. The rationale for a single-case study is to examine "an extreme or unique case" (Yin 2003, 39). Cape Town not only serves as a "unique" city because of its rather recent post-apartheid status, but that same status provides the basis for its "extreme" classification, all while its current leadership has a seemingly very progressive stance on environmental policy. This regressive social landscape alongside a more progressive climate change policy makes it a unique

case study that provides insight on an atypical urban setting that is dealing with the multi-faceted effort of urban climate change planning.

Instrumental Case Study Format:

- “1) the nature of the case
  - 2) its historical background
  - 3) the physical setting
  - 4) other contexts including economic, political, legal, and aesthetic
  - 5) other cases through which this case is recognized
  - 6) those informants through which the case can be known.”
- (Stake 1998, 90).

Interviews were conducted to supplement this thesis’ literature review. The types of questions asked fall under Merriam’s case study question types: background, knowledge, and sensory questions (Merriam 2009). After identifying practitioners and experts of climate change planning and/or infrastructure and land-use in Cape Town, the Institutional Review Board (IRB) granted exemption status to the planned research interviews, so requests for a phone interview were emailed along with an outline of questions seeking response.

Practitioners/Experts who were contacted included members of the Stockholm Environment Institute, University of Cape Town, the City of Cape Town, the Institute for Sustainable Futures, the Federation of the Urban Poor and Slum Dwellers International; not all participated. Two professionals were able to contribute to this research.

The following questions guided the interviews:

- How do you assess the progress of implementation of Cape Town’s climate change adaptation plans?
- How influential have the national and regional adaptation plans been on Cape Town?
- What is your assessment of how Cape Town addresses social equity in the City’s adaptation planning and policy documents? Please elaborate.

- In your work's experience, what is your assessment of how Cape Town addresses social equity in the City's implementation of its adaptation strategies? Please elaborate.
- What are the successes emerging from Cape Town's adaptation plans and policies?
- What are the failures of Cape Town's adaptation plans and policies? Where do you see room for improvement?

## **CHAPTER 2: LITERATURE REVIEW**

### **2.1 Cities Address Adaptation**

According to the World Bank's Social Dimensions of Climate Change 2010, Local governments have the ability to influence adaptation primarily in three significant ways:

- “1) local institutions structure environmental risks and variability, and thereby the nature of climate impacts and vulnerability,
- 2) they create the incentive framework within which outcomes of individual and collective action unfold, and
- 3) they are the media through which external interventions reinforce or undermine existing adaptation practices.”

(Agrawal 2010, 179-180)

Cities recognize their high contribution to the production of greenhouse gases, but a significant portion of urban areas' attention has been focused on mitigation (Carmin et al. 2012). However, as the effects of climate change are becoming increasingly prevalent and damaging, adaptation is receiving more attention, alongside mitigation (World Bank 2008). Though, Shaw (2010) states that adaptation planning, compared to mitigation, is relatively new in terms of widespread dissemination of local-level planning guides, so emphasis should be placed on monitoring different adaptation investments and techniques, as to better

identify best practices that may be transferrable. While there is great need for monitoring, adaptation is actually happening in many parts of the world, whether explicitly addressed in response to climate change, or under another context (Arnold 2011). Numerous governments are finding themselves in a mitigation-adaptation balancing act, and because adaptation is very site-specific, the city level is where adaptation plans are being implemented. It is at this scale that policy and planning decisions regarding social equity can be seen closely and addressed. Additionally, the repeated shortcomings of international talks on climate change have inspired city governments to step up and collaborate on mitigation and adaptation efforts. The evolution of the role of cities began with the formation of the World Mayors Council on Climate Change after the Kyoto Protocol was “entered into force”, in 2005. To be in parallel with the UN Climate Roadmap of the Conference of Parties in 2007, municipalities created a Local Government Climate Roadmap by signing the World Mayors and Local Government Climate Roadmap. Subsequently, in 2009 at the 15<sup>th</sup> Conference of Parties, local governments published a list of 3,500 voluntary commitments in the Copenhagen World Catalogue of Local Climate Commitments. 2010 marked the signing of many municipalities to The Mexico Pact: the Global Cities Covenant on Climate (Appendix 1). Then adaptation took center stage on the cities’ forum with the Durban Climate Change Adaptation Charter for Local Governments, adopted in December of 2011, as well as the Bonn Declaration of Mayors (Appendix 2) and its disaster reduction goals earlier in that same year.

The 2011 Durban Climate Change Adaptation Charter was signed by 114 local officials, with the following commitment declarations:

“1. mainstreaming adaptation as a key informant of all local government development planning,

2. understand climate risks through conducting impact and vulnerability assessments,
3. prepare and implement integrated, inclusive and long-term local adaptation strategies designed to reduce vulnerability,
4. ensure that adaptation strategies are aligned with mitigation strategies,
5. promote the use of adaptation that recognizes the needs of vulnerable communities and ensure sustainable local economic development,
6. prioritize the role of functioning ecosystems as core municipal green infrastructure,
7. seek the creation of direct access to funding opportunities,
8. to develop an acceptable, robust, transparent, measureable, reportable and verifiable (MRV) register,
9. promote multi-level and integrated governance and advocate for partnerships with sub-national and national governments on local climate action, and
10. promote partnerships at all levels and city-to-city cooperation and knowledge exchange.”

(Durban Adaptation Charter for Local Governments 2011)

The Charter has inspired many cities to draft their own City Adaptation Program of Action (CAPA) plans.

## **2.2 Cities' Vulnerabilities**

Adaptation is not just a land management issue, it has and will continue to infiltrate many facets of urban planning, as well as economic development (Arnold 2011). Assets of welfare are threatened, these are social, health, economic and financial, infrastructural, and of course natural (UN-Habitat 2011). Adaptive capacity is currently limited in most developing countries, and as adaptive measures are in the process of developing, their pace of effectiveness might make it in time for long-term climate increases. However, in the short-term, extreme weather events

that are already on the rise need adaptive measures in place in order to provide resilience (Shaw 2010, 77 and 78).

Climate change's effects have been felt in many parts of the world already, and we are on a trajectory for more changes because of past decades' emissions. Mitigation remains extremely important, but a reduction and plateau of emissions now is still not enough to get us off of our current temperature increase path, so impacts are expected (UN-Habitat 2011). Through history, humans have had to cope with environmental changes and disasters, but with current climate change, people must cope and adapt to threats posed by the action or inaction of humans in emitting greenhouse gases (Arnold 2011). Adaptation is being forced on people with little choice, as a result of former and current human activity (Arnold 2011). A significant portion of adaptation-focused literature has been on rural vulnerabilities, and while that is important, urban adaptation issues should be as visible and addressed, because of the intertwined nature of urban and rural populations and capital flow. For example, urban centers rely on rural residents for agriculture, but likewise, rural residents rely on urban residents for selling their goods as well as using the services offered by cities (Satterthwaite et al. 2007). Additionally, increased extreme weather events and resulting land degradation will grow the number of environmental refugees if there are no settlement plans set in place for vulnerable populations (Jacobson 1988). This can be seen presently, with rural residents migrating to urban centers because of strained environmental resources that once adequately sustained livelihoods. Climate change is more tangible to rural residents who have a subsistence reliance on the land, so it is becoming increasingly common for rural residents to migrate into cities (IHC 2011). These migrations will

put added pressures on land and infrastructure demands, so planning is vital for stability.

The Global Humanitarian Forum reports that of weather-related events that occurred in 2005, about 40% were likely a product of climate change, with that projection expected to near 50% by 2030 (Mearns and Arnold 2010, 11). Major destructive weather events that have hit big cities in the recent past make evident that the toll taken on lives, as well economies, is high. The number of deaths and injuries due to extreme weather events has risen dramatically, so as climate change increases these weather events' frequency and intensity, it is important to plan cities with greater resilience and disaster preparedness (Satterthwaite et al. 2007).

### **2.3 Vulnerabilities of the Urban Poor**

Natural disasters have widespread social implications, and there is typically a population, or persons, who are most vulnerable to the social harm derived from these events (Shaw 2010). There are wide variations in climate change's impacts, because of the unique characteristics of each locality; additionally, there is a range in vulnerability to different populations and individuals based on "sources of livelihood, levels of income and asset holdings, social class, gender, age, ethnicity, caste, access to public support, or ability temporarily or permanently to migrate in search of economic opportunities.": (World Bank 2008, 7). Climate change terms like 'resilience' and 'vulnerability' are relevant on various scales, from an individual basis to the country scale (Seidl 2011). Moser et al. (2010) suggest that vulnerability is heavily tied to assets, which can range by scale ("individual, household and community") (p. 7); commonly affected assets being "physical, financial, human, social, and natural" (p. 7). Vulnerability takes into account sensitivity to a natural

event, but also the coping capacity of people to natural events' effects; all factors in determining vulnerability's magnitude level (Verner 2010). Though weather disasters cause environmental damage, the effects on social constructs can be as harsh, and target particular groups more than others (Shaw 2010). Vulnerability is a strong determinant of whether a natural hazard becomes a disaster, and with decreased vulnerability comes increased resilience (Rossing et al. 2010). Moser (2011) places importance on temporal objectives in urban climate change adaptation plans: using characterizations of "long-term resilience, pre-disaster damage limitation, immediate post-disaster response, and rebuilding" (Moser 2011, 234 and 235). Data of the last three decades show that nearly all deaths and serious injuries from urban natural disasters are of poor people; the cause of their vulnerability being poverty and neglect of these residents. Pre-disaster-damage-limitation can be considered pro-poor-focused because high-income residents are more prone to have housing infrastructure that is able to withstand stresses like extreme weather, so it is low-income households that would rely on and benefit most from pre-disaster damage measures (Moser 2011). Vulnerabilities and their roots are heterogeneous though, making it important to use very place-based lenses when working toward solutions (Ribot 2010).

There are multiple issues natural disasters present to poor people. Among them are loss of life, loss of property, and lack of financial resilience. One example of how vulnerability might differ among countries and among cities, but not as much between the poor communities of both developed and developing countries can be seen in the aftermath of New Orleans's Hurricane Katrina. As with many disasters, it was those who could not easily evacuate who were in most danger. There were 971 deaths in Louisiana due to Katrina, with the greatest cause of death being drowning;

residents 75 years and older were highly represented among these numbers (Brunkard 2008). Hurricane Katrina also had its biggest impact on neighborhoods with New Orleans' poor and minorities, particularly African-American (Gabe et al. 2005). Poor populations have many financial constraints that make them vulnerable to the natural disaster's effects. Risk is unequivocally higher for the urban poor under climate change scenarios (UN-Habitat 2011). Lessons from Hurricane Katrina include the need for better system structures that give access to evacuation and additional support for vulnerable communities (Brunkard 2008). "... risk is a function of hazard, vulnerability, mitigation, and capacity." (Sharma, 2011, 5). The urban poor have little adaptive capacity, not much of a safety net offered by governing institutions, poor-quality living structures, greater vulnerability due to environmental injustices, and less access to legal and financial backing (UN-Habitat 2011, 80). UN-Habitat's findings declare that the majority of deaths, threatening injuries, and asset losses that occur after major natural disasters are experienced by low-income populations; though they state the caveat, that this still may not accurately represent informal settlement residents since cities may not always collect data from informal areas, thus indicating that human and asset losses are likely much higher than represented (UN-Habitat 2011, 80). Additionally, not having access to insurance because of the inability to afford it gives low-income households less of an ability to be financially resilient after disasters, as disasters often cause financial impacts that last months to years (UN-Habitat 2011). Eisenman et al. (2007) believe that the high vulnerability of minority populations in New Orleans was largely a result of economic limitations and lack of access to proper social and economic resources. These constraints have been long-lived, and are also

attributable to historic policy barriers that hindered socioeconomic mobility for many people of color, especially Blacks in the South.

#### **2.4 Urban Slums and Climate Change**

Megacities are good examples of the intersection of vulnerability and urban poverty, with the growing presence of these cities with populations of 10 million or more (DePaul 2012). It is expected that megacities will experience great growth in the coming decades, and much of that will be in slums. The slums already tend to be located on high-risk land, and the dwellers have little adaptive capacity, so with the expected growth of these cities and slum areas specifically, climate change's impacts will only further strain disaster coping abilities (Wilhelm 2011). Over a third of the global population lives in cities of low- and middle-income countries. High-income countries, relatively, have sturdier and more resilient buildings and infrastructure, but low- and middle-income countries are not as widely equipped with dependable infrastructure. The absence of widespread reliable infrastructure in low-income countries embodies high vulnerability and shows no backing of a safety net as ninety-nine percent of low-income countries' households and businesses have no disaster insurance (Satterthwaite et al. 2007, vii). Often, poor people must focus on trying to sustain their short-term assets because for many, survival is on that time-scale. The problem lies in the limitations of those assets for providing long-term resilience to climate change related events (Rossing 2010). What makes populations or persons increasingly vulnerable is additional strain on their day-to-day activities (Shaw 2010). Marginalized populations have the added burden of climate change onto their socio-economic challenges, and remain limited by spatial barriers, are often excluded politically, and have little or no economic power (Kelman and Gaillard 2010, 25 and 26). Among the commonly marginalized are women. Gender

plays an active role in vulnerability levels because women make up the majority of poor populations, and in many cultures have less access to resources, information and insurance because of long-lasting gender bias (UN-Habitat 2011, 81). Race and ethnicity play as strong a role in vulnerability. Racial and ethnic minorities of a region are often the most at-risk, because many discriminatory policy and planning practices have historically placed these groups in the landscape's risk-prone areas, i.e., floodplains, steep slopes, low-elevation coastlines, etc. (Arnold 2011). Indigenous populations tend to be prone to these risks also, because of exclusion from decision-making processes (Arnold 2011).

UN-Habitat (2011) finds that about 32.7% of the global population live in slums, and almost half (44%) reside on high-risk lands; in essence, floodplains, landslide prone slopes, and other topographies prone to natural disruption or disasters. The development of informal settlements on many of these vulnerable sites, causes a feedback loop and exacerbates the natural processes that detrimentally affects communities' ability to have a resilient home base (UN-Habitat 2011). Forty percent of the world's population live in coastal areas, a significant portion being in large metropolitan regions (Arnold 2011). Thirteen percent of the world's urban population live in low-elevation coastal zones (UN-Habitat 2011, 70). Flooding is expected to be the most monetarily costly impact of climate change on infrastructure, because of the many cities on coasts and the expected increases in frequency and intensity of heavy rainfall events. Sand erosion and the impact of long-lasting saltwater exposure on urban structures can deteriorate building material and cause very costly damage (UN-Habitat 2011, 71).

Subsidence also has a major effect on stability of infrastructure. With drought being more common in some regions, and rising groundwater-use pressure, soil gets more susceptible to sinking. Recurring exposure to rain and wind, even in mild doses but with high frequency, can add up to long-term damage to building structures that have aged and were not built strongly. Effects of heavy rain and on the other end, of drought, can be very detrimental to transportation infrastructures; e.g., bridge expansion, pavement damage, train rail deformation, etc.

Often, the most immediate and pressing concern for the urban poor is shelter (Moser 2011), and with these added dangers, it will be more challenging to maintain a stable home base. The land market is one culprit of the establishment and proliferation of informal settlements in certain locations; poor people are left with few or no options in selecting a home base because of a lack of financial security, so they are often placed in undesirable locations because those are avoided by residents with adequate financial means. The land market, on its own, has failed to give the urban poor an opportunity to formally establish homes on lands that are low-risk and affordable. While climate change depreciates land value in more vulnerable areas, those who flee are not the poor; the International Housing Coalition (2011) believes that poor populations' mobility is often stymied by limited economic resources, lack of information and the absence of good policy support (IHC 2011). Not only is it difficult to obtain affordable housing in low-risk areas, many slum dwellers are limited in their ability to be versatile about living location because of the need to have close proximity to job opportunities. The situation for many is that informal dwellings are the only affordable option if there is the necessity to be in a certain location. Dwellers on illegal lands are subjected to environmental hazards and could benefit most from protective upgrades, but their

settlements lack resilient building infrastructure investments because of the reluctance of investors to build on illegal lands (Satterthwaite et al. 2007).

“City growth, chronic poverty, urban land speculation, insecure tenure, inadequate urban infrastructure investment, and poor urban planning policies contribute to continued development in vulnerable areas.” (UN-Habitat 2011, 68.)

Key challenges of adapting cities in low and middle income countries are rooted in the dearth of foundational infrastructure that could provide a starting point for adaptive capacity. Presently many of these cities are starved of what developed countries would refer to as basic welfare sustaining necessities. Satterthwaite et al. (2007) suggest that it is the inability of local governments to provide adequate infrastructure and disaster risk reduction and preparedness that makes it difficult to adapt all residents of an urban area. Specifically, it is challenging to incorporate into discussions the poor in slums and informal settlements because many governments disregard their inclusion in adaptation talks as some of these settlements were illegally established on floodplains or other vulnerable environments (Satterthwaite et al. 2007). Though both developed and developing countries will have to adapt to climate change in one capacity or another, developed countries tend to already have building, road, and water infrastructure that are somewhat suitable to withstand certain environmental disasters (Satterthwaite et al. 2007). Informal settlements hold traits of spatial and physical vulnerability, spatial because of their often poor siting, and physical vulnerability because of the frail construction material or method used for housing (Moser et al. 2010). The quality of housing in informal settlements is often frail and therefore easily washed away during floods, and people’s access to the range of services is more limited than that of people in formal housing areas, making them more vulnerable to climate

impacts (Clark et al. 1998). Stagnant water's effect is especially threatening to standing structures in informal settlements. The post-event trauma and damages are very costly and require large amounts of time and money to mend (Moser et al. 2010).

Environmental shocks in low-income areas can reinforce poverty, and poor people are already vulnerable to the volatility of social, economic, and political issues (World Bank 2010). A number of factors keep the urban poor in situations of low or no adaptive capacity, among the most common: having no resources to allowing for mobility, and having little incentive to invest in infrastructure upgrades because of holding few valuables (IHC 2011). Poor infrastructure and lack of resources are key reasons for poor people's high vulnerability, and having little or no access to information is an augmenting problem. Density in these urban areas causes concern about resilience, especially in regard to residents' health and increased disease vectors with higher temperatures in high-concentrated areas (IHC 2011). While densification is generally lauded in urban planning, it does concentrate risk for potential weather event shocks to a city (Shaw 2010). Both inland and coastal cities have their respective risks, but with coastal regions having population density that is approximately three times greater than the global population density, there are concerns for some cities. Residents in low-lying areas are especially at high risk. An examination of population density at varying levels of elevation can be a good indicator of risk from sea-level rise (IHC 2011). The urban poor, living in high density on the coasts of developing countries have vulnerability to sea-level rise in addition to repercussions from storm surges (World Bank 2010). Those in low-lying areas will be the first to be affected by sea-level rise, making them a warning sign for the rest of the city. Without long-term relocation plans for high-risk communities,

there will in the long-run be naturally occurring displacement after an extreme event or with the progression of sea-level rise. Inadequate preparation/planning for climate induced displacement will only exacerbate the problems vulnerable urban residents face, and will put demand pressures on governments' emergency departments in the event of a disaster. Displacement and resettlement may target specific communities, but once threatened populations are looking for refuge, the problems expand to the entire region, making regional planning for climate change adaptation key to city strategies' success (IHC 2011). For an urban environment, the World Bank (2010) sees key elements of adaptation strategies as including long-term planning for infrastructure and land-use decisions, mainstreaming of policies so that maladaptation is avoided, and disaster preparedness.

Satterthwaite et al. (2007) believe poverty is a large part of specific populations' vulnerabilities, but places more culpability on local governments' inabilities and inefficiencies. International agencies doing adaptation work are well-intentioned, but are found to be limited in efficacy of getting projects on the ground, perhaps because they often do not know how to best work with local governments, largely because they may not have the capacity or expertise to do so (Satterthwaite et al. 2007).

## **2.5 Social Equity and Climate Change Adaptation**

There are complex social equity matters that play a role in adaptation policies; 1) the greenhouse gas emitters' role, 2) the developed-developing countries relationships in need for adaptation measures, 3) distribution of adaptation funds, and 4) identifying fairness in adaptation decision-making (Adger and Nicholson-Cole 2011, 259). Climate change's effects will threaten the basic

needs of individuals, especially to food security, health, and housing (Arnold 2011). Measuring vulnerabilities is complicated and measurement methods vary depending on if addressing resources, lives, or infrastructure; the meaning is very relative and surfaces issues of fairness. Arnold (2011) argues that much of vulnerability research strives to replicate measures and indicators to the gamut of vulnerabilities potentially experienced. However, Cafaro (2011) finds that current measures and indicators do not adequately consider “personal stress, dislocation, and perceptions of marginalization” (260).

The Rights-Based Approach is one method being used to address climate change’s impacts on livelihood, as well as the distribution of responsibility and of resources to cope with effects. The rights-based approach to climate change solutions (World Bank 2008) is rooted in a moral recognition that climate change will detrimentally affect human rights. The United Nations Human Rights Council, in 2008 adopted a Resolution on Human Rights and Climate Change—pushing for a study of climate change and human rights. There is presently no binding international law that links specific climate change impacts to threats to livelihood, but many countries independently state responsibilities to general livelihood (though not necessarily specific to climate change) in their domestic laws (World Bank 2008). The Rights-Based Approach has the potential to be inclusive of climate change threats because climate change does and will further affect basic livelihood.

“In order to fulfill rights, states must take action to enable the full realization of people’s rights. This could be interpreted as requiring states to focus their adaptation measures on the most vulnerable communities within their jurisdiction. It is important that a rights-based approach deal with inequities between countries as well as impacts on rights within countries. Those who are immediately vulnerable to climate change have contributed little to its causes. They also lack the adaptive capacity to deal with its consequences”

(World Bank 2008, 26).

Harris and Symons (2010) argue that the cosmopolitan perspective on the responsibility of adaptation is a more astute approach for addressing inequality because it transcends national jurisdictional boundaries. The argument is that those most detrimentally affected by climate change are poor people, but that holds true in both developed and developing countries. Though the general policy structure of deciding where adaptation funds come from and who they go to, are dealt with on a nation-by-nation basis. Developed countries' poor can be subjected to measures taken by national governments to raise funds for other countries, whether it is through increased taxes or mandated mitigation efforts. Developing countries' rich are then able to circumvent responsibility for climate change because of their country's developing status, though they are often significant contributors of high greenhouse gas emissions (Harris and Symons 2010). A more cosmopolitan approach to climate adaptation would better ensure that the most marginalized individuals or groups were receiving resources to build adaptive capacity. An international climate agreement that follows cosmopolitan principles would give each country domestic and international obligations, but variation would exist among them based on each country's population's financial wealth and emissions. The goal is to redistribute adaptation investments equitably so that those most affected in all countries can access them (Harris and Symons 2010).

There are many equity-seeking frameworks for climate change planning, with cities now paying attention to the implications on the city scale and assessing the variations among them.

## **2.6 Sustainable Development and Adaptation**

On the international climate change negotiations platform, social equity is about vulnerable *countries* being most affected, and having the least adaptive capacity and ability to be resilient; not as a result of their own doing, but as a result of emissions primarily from developed countries. In the developing country context, on a *local* scale, social equity can be tied to sustainable development and poverty alleviation (IHC 2011). Many developing countries' governments will not address adaptation unless it fits into their development goals, as it does not seem as pressing as the more immediate and tangible problems faced by its constituents, i.e., poverty, health, housing, etc. Satterthwaite et al. (2007) suggest development goals that incorporate adaptation, should also address mitigation, so that as low- and middle-income countries' economies grow and develop, they are not contributing to the problem that is forcing them to adapt to climate change. Barriers to building adaptive capacity are not from finance/funding alone though, but also encompass political and institutional structures. Streamlining funding for projects requires an understanding of local politics and institutional frameworks that often determine the success of project deployment. Adaptation is so local-specific that countries with National Adaptation Programs of Action, should work with municipalities and their City Adaptation Programs of Action (Satterthwaite et al. 2007). Roger Pielke's belief in his *Climate Change 2007: lifting the taboo on adaptation* paper in Nature is that government entities are the best suited to provide leadership, and have the resources for long-term adaptation plans (Adger and Nicholson-Cole 2011, 257). There is the other argument that individuals and informal networks will be the ones to best bring in adaptation measures (Arnold 2011). Adaptation initiatives are often led by governments, but to culminate their influence, Adger and Nicholson-Cole

(2011) agree there is a need for the confluence of government, private sector, organizations, and communities.

Sustainable development's purpose is to reach poverty eradication, but Halsnaes (2009) believes that without the foresight of adaptation planning, climate change will present more hurdles in this effort. For the United Nations, the threat of climate change on sustainable development initiatives are expected to be most aggressive on its Millennium Development Goals, most aggressively affecting human and economic development, environmental sustainability, and health issues (Committee for Development Policy 2009). As many cities in developing countries are now seeing capital investments made in their cities, especially in infrastructure, it is important for construction considerations to include long-term horizons, so that future climate changes are planned for (Halsnaes 2009).

### **2.7 What does Equitable Urban Adaptation Look Like?**

“Equity refers to life equality, meaning that people have access to a broadly similar range of opportunities, resources and amenities, and that the public good prevails over private, sectional interests. A city that works for every resident, especially the poor, children, the disabled and the elderly, is more likely to be an equitable city.”

(City of Cape Town 2012, 9).

There are different degrees and forms of city governments' approaches for addressing climate change; some are creating plans and/or departments, whereas others might take a sectoral approach to addressing effects and coping strategies. Many cities' priorities are in economic development and furthering prosperity, which sometimes then places social equity as a side-agenda. However, in the last couple of decades sustainability has been picked up by more cities, thus possibly creating an opportunity for social equity and environmental responsibility to be considered as important as economic development planning. This signifies the

chance for climate change adaptation to enter the field, as the evolution of cities' priorities further changes toward more holistic agendas for sustainability (Carmin et al. 2012).

Moser et al.'s (2010) research indicates that a vital component of a pro-poor adaptation strategy is for negotiations among government, non-profits and community-based organizations. Adaptation planning processes that do not include discussions with the most vulnerable populations, run the risk of increasing distrust and/or exacerbating their marginalization and poverty (Moser et al. 2010). The role of distrust and its existence's complexities should be better understood as it presents an opportunity to examine historic injustices that could be rooted in past policies and plans. An example of the complexities of trying to move toward a progressive and inclusive climate justice framework while having a foundation of expansive social injustices can be seen in the following case study of Cape Town, South Africa.

### **CHAPTER 3: CASE STUDY: CAPE TOWN, SOUTH AFRICA**

Cape Town, located in the Western Cape Province of South Africa (Figure 1) is a unique city with a complex social history, and one that still carries the residue of colonialism and apartheid. In the mid-17<sup>th</sup> century the land of Cape Town, for the Europeans, was initially used as a halfway port point for the Dutch East India Company's trade route from the Netherlands to the Indies. The station on the Cape's Table Bay was meant to be temporary, and to provide resources to trading ships on their six month journeys from the Netherlands to the Indies (Erasmus 2001; Western 1996). The Dutch East India Company held power of the area until 1795.

Beginning in 1658 though, slaves were brought into the area to help with farming, and so by the early 19<sup>th</sup> century, slaves outnumbered White residents (Western 1996). “Slaves were shipped in from Madagascar, Mozambique, Angola, the Indonesian Archipelago, Bengal, South India and Sri Lanka. The mix of indigenous Khosian, slaves from different continents, Europeans (from France and the Netherlands), together with the constant stream of European sailors passing by, made the Cape, in the seventeenth and eighteenth centuries, a racially and culturally diverse colony.” (Erasmus 2001, 36). By the early 19<sup>th</sup> century, Cape Town was part of the British colony (Worden 2004). The British banned the importation of slaves in 1808 (Erasmus 2001) and emancipated slaves in 1834 (Western 1996). By this time though, there had been decades of interracial sexual interactions (many forced on female slaves) among the different cultures living in or passing through the city, thereby creating the term ‘Coloured’; the race classification for Cape Town residents with this multiracial lineage. Segregation was not statutorily enforced nationally until 1950, but racial separation was the social norm as of the late 19<sup>th</sup> century. In 1910 the Cape was deemed part of the new Union of South Africa, and in 1961 the Union left its British ties to become the Republic of South Africa, with apartheid only ending in 1994.

The impacts from colonization and apartheid can be seen today in various institutions, and at different scales, but this case study focuses on its spatial influence and particularly how climate change planning can be an opportunity to reduce socioeconomic inequities by addressing the vulnerabilities of populations marginalized by apartheid’s spatial segregation.

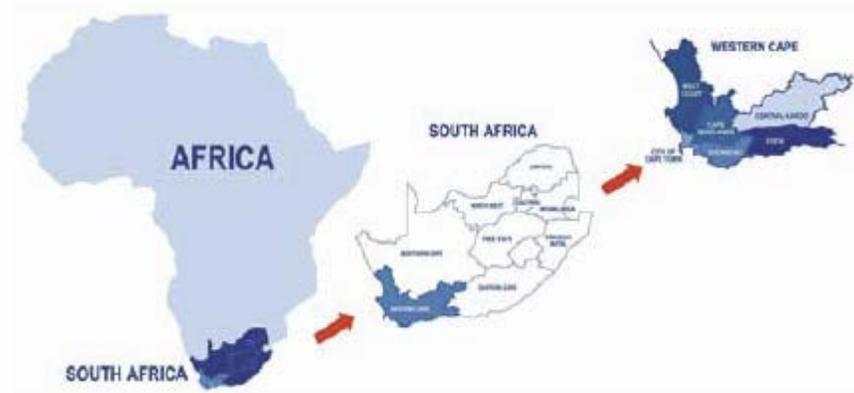


Figure 1: Map of South Africa (City of Cape Town 2011, 3)

### **3.1 Apartheid's Spatial Impact**

Racial segregation infiltrated many facets of South Africans' lives, especially spatially, and arose from oppressive policies that were in effect for decades and discriminatory social constructs originating centuries before. South Africa's end to apartheid in 1994 led to new policy initiatives that were not only removing laws of segregation, but that expressed ambitions to redistribute equity to those disadvantaged by apartheid rule.

The 20<sup>th</sup> century began with the Native Land Act of 1913 designating White and Black areas in the country, with about 7.3% of South African land going to Blacks as reservations. It was illegal for Blacks to buy land beyond these areas (Bennett 1996). The Urban Areas Act of 1923 was used to get non-Whites out of urban centers and to move them to outlying parts of the city. The Native Laws Amendment Act of 1937 forbade land-purchasing by Blacks in urban areas of the country. Then the Group Areas Act of 1950 and Reservation of Separate Amenities Act of 1950 formally gave municipalities the authority to spatially segregate all races (Wilkinson 2000).

Blacks were excluded from political decisions and because they were stripped of their land ownership, decisions of their urban spatial mobility were decided for them by their local government (Davies 1981). "Homelands" were designated for certain Black ethnic groups, as they were forced out of the urban areas known to their families for generations (Finchilescu and Tredoux 2010, 225). Race classification included four groups: Blacks, Whites, Coloured, and Indian. In designing racially segregated cities, the "group areas" designated residential spaces for each racial group, and these were not only jurisdictionally divided areas, but natural or constructed physical barriers were sought for buffering groups from one another. Industry/business neighborhoods often served as buffers, being accessible to all racial groups for employment, but though open, there was racial zoning within these districts too (Davies 1981). Western (1996) states that the designation of group areas was in part meant to keep Whites dominant in spite of the population shift which was a faster growing non-White population. The Group Areas Act forced people out of parts of town into their designated race's area, with public housing provided to some who were relocated, but many became squatters because of the lack of open housing; while many designated White communities were experiencing a surplus of living space (Western 1996). The combination of higher birth rates and immigration from rural to urban in the decades following the Groups Areas Act made housing access a big problem, as the City and State could not meet the demands of public housing needs. As a result, in the 1970s and 1980s informal settlements began proliferating (Figure2) mostly around the rim of the city, especially in Black- and Coloured-deemed areas (Wilkinson 2000). Apartheid's legacy in South Africa left many development problems and underinvestment in communities of color. Development goals in the country since the end of apartheid



### **3.2 Informal Housing and Race**

“Spatial settlement and economic activity patterns in Cape Town are a legacy of apartheid planning: Population densities are highest in the low-income and informal settlements on the outskirts of the city, far from economic activity and places of employment. The overall city density is very low. Of the 1 million households in Cape Town, 118 000 are informal households. The city population is growing rapidly at an average rate of 3% per year, while growth in informal dwellings is much higher.”

(City of Cape Town 2011a, 24)

South Africa’s racial demographics in 2010 were 79.5% Black African, 9.1% Coloured, 9.0% White, and 2.4% Asian (City of Cape Town 2010a). The **city’s racial demographics** and the racial composition of **informal dwelling occupants** of Cape Town are quite different (Figure 3):

<b>Racial Composition</b>			
	<b>South Africa (2010)</b>	<b>Cape Town (2009)</b>	<b>Informal Settlements in Cape Town (2007)</b>
<b>Asian</b>	2.4%	0.4%	0.1%
<b>Black African</b>	79.5%	38.0%	86.4%
<b>Coloured</b>	9.1%	46.9%	12.6%
<b>White</b>	9.0%	14.7%	0.8%
	(City of Cape Town 2010a)	(City of Cape Town 2010a)	(Small 2008)

Figure 3: Racial Composition of South Africa, Cape Town, and Informal Settlements in Cape Town

Ownership of dwellings in the city is lowest for Black Africans; 47.9% of Black African households own their dwelling, 69.3% of Coloured households, 77.6% of White households, and 70.4% of Asian households own their dwelling (Small 2008, 31). Informal households account for 118,000 of the city’s 1 million households (Small 2008). The City’s 2007 Community Survey reported that in 2007 140,605 households or 15.6% of the city’s population lived in informal dwellings, which includes count of backyard dwellers. Backyard dwellers differ from informal settlement dwellers because of their patchy distribution and they are less conspicuous since they are more scattered than visibly concentrated like informal

settlements. In racial distribution of informal households, the data includes both informal dwellers of settlements, backyards and non-backyards. The growth of backyard dwellers is due to the long waiting-period for formal government housing (City of Cape Town 2011b). In 2007, 37.6% of the city's Black African households resided in informal dwellings, 5.6% of Coloured households, 0.5% of White households, and 1.0% of Asian households (Small 2008).



*Hangberg, Hout Bay*

Figure 4: Informal settlements of Hangberg, a suburb of Cape Town (City of Cape Town 2011b, 47)

### **3.3 Housing Needs in Cape Town**

The National Government has a mandate "... to ensure that the right of access to adequate housing to all its citizens is realised" (City of Cape Town 2011b) in the 1996 Constitution. The City and Province also mandate the same. The

National Government's Housing Act , 107 of 1997 makes the City responsible for identifying land suitable for housing and making sure that all residents have access to adequate housing opportunities, as well as creating policies that address the poor's needs (City of Cape Town 2011b). Cape Town's current Housing Executive Director JA (Hans) Smit declares that the city's high poverty (almost 40% of the city's residents live in poverty) and urbanization are the department's greatest challenges (City of Cape Town 2011b).

The City believes that high-density planning is necessary to avoid further development on unsuitable lands (City of Cape Town 2012). Cape Town's land area is constrained for expansion because of its extensive coastline perimeter, mountains of the northeast, and large area land uses for buffering of the nearby Koeberg Nuclear Power Station, the airport, and a number of landfills (Figure 5). The 2007 Community Survey data indicates that the city government felt the need to draft an urbanization strategy because of the present-state of expanding poverty, informal settlement growth (Figure 6) and increased ecological degradation, as a result of poorly managed urban growth, or urbanization (City of Cape Town 2011b). The City has established that the majority of informal settlements need to be relocated to better land, and development of that land should be to form sustainable communities with access to amenities and transportation.

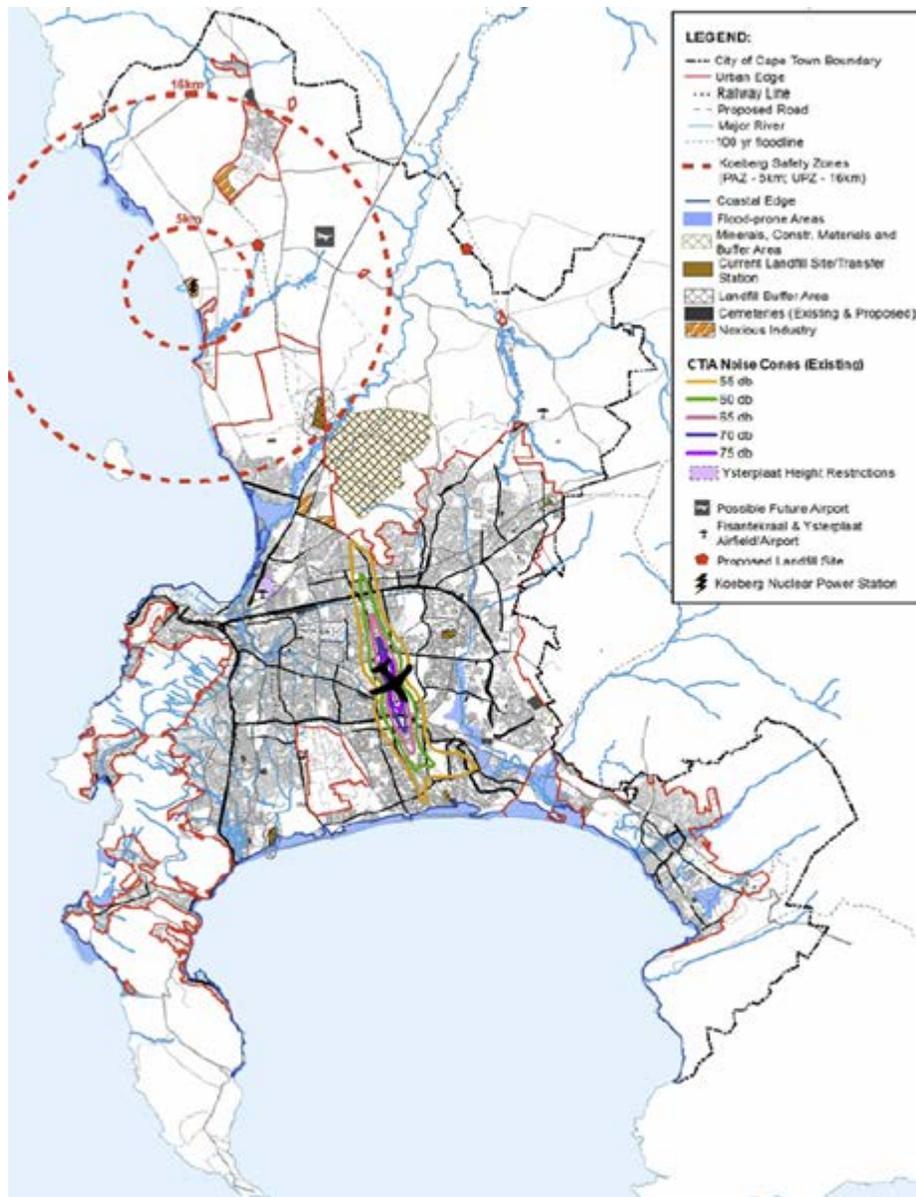


Figure 5: Map of Major Precautionary Land Areas (City of Cape Town 2012, 60)

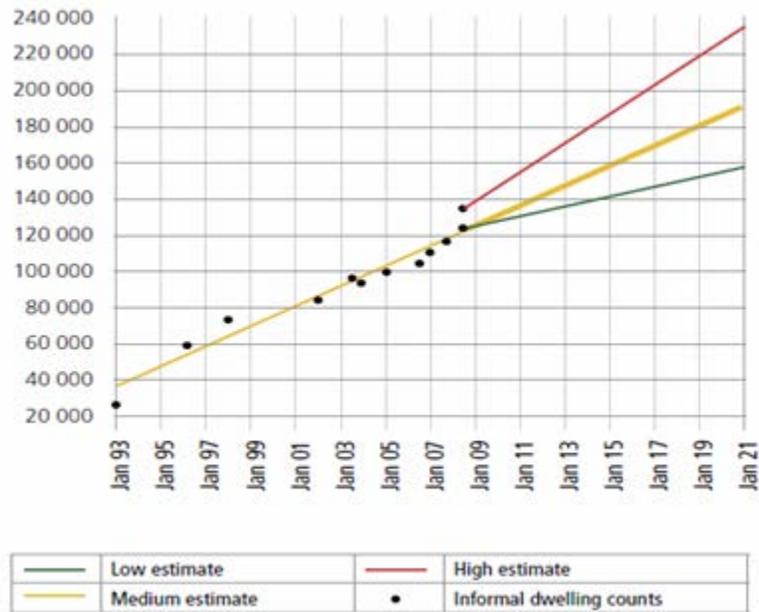


Figure 6: Existing Informal Dwellings and Different Growth Projections (City of Cape Town 2012, 20)

In the Western Cape Province, “39% of all households and 77% of informal settlement households live below the poverty line” (Western Cape 2012, 17). As of March 2011, the Housing Director’s database listed 386,590 households seeking some form of housing assistance from the City; it is believed this number is smaller than the actual needs of city residents, since many informal dwellers go unaccounted for in formal request registrations. The number of requests include Cape Town residents who are not only in informal settlements or in backyard dwellings, but include those living in informal rental dwellings or are overcrowded in formal housing. The City’s Informal Settlements Improvement Program plans to bring phased infrastructural improvements to most of the city’s 223 informal settlements. In the time span of 2007-2010, Cape Town was able to offer 33,200 housing opportunities for formal rental or ownership. Private developers have been

able to provide between 6000 and 9400 housing units per year, while the City has been able to provide support for 8300 subsidized housing units per year since 2007; though the backlog of housing requests is over 380,000. The new private developments built in the last few years have mostly come in the form of suburban expansion; however, with the densification efforts of the City, greater private investments may make more housing opportunities accessible for low-income households (City of Cape Town 2012). In the City's goal of aligning itself with the National and Provincial objectives for human settlements, it draws on the National Government's Outcome 8 and Provincial Objective 6 to create sustainable housing settlements for residents (City of Cape Town 2011b), and has a timeline of project implementation and funding distribution for rental unit upgrades, new rental units, land acquisition, upgrade of informal settlements, and community infrastructure projects in its Five-Year Integrated Housing Plan 2011/12-2015/16.

Cape Town's population is projected to grow to 4.2 million by 2030, a 13% increase, with a large portion of the growth occurring in southern and southeastern parts of the city (City of Cape Town 2011b). Much of this growth is from immigration from out of and within the country, but the majority being poor and/or from rural parts of the country (City of Cape Town 2012). Cape Town is confronting today's socioeconomic inequity in various ways, and because the city is experiencing high housing settlement needs, a key pathway is through housing, which addresses people's basic needs and when planned sustainably can contribute to mitigation and adaptation efforts (Anonymous 2012a). The effects of climate change to Cape Town residents are widespread; affecting populations differently, especially between the wealthiest and the poorest, which is correlated to the race and wealth divide caused by apartheid.

The Cape Flats, to the east of Cape Town's urban center, are notoriously known for having most of the city's poor, and is one of the more ecologically undesirable places. During apartheid, The City of Cape Town began public housing developments to the east of the city, in the Cape Flats, and designated it officially for Coloureds (Wilkinson 2000). The Flats, as its name indicates, has a flat terrain on a low plain of marine sand deposits, over an aquifer and contains small rivers that feed Table Bay and False Bay. The topography and ecology of the area make it hardly habitable; the low elevation and location along the coast and siting above an aquifer make it prone to flooding. Additionally, The Flats is an area prone to atmospheric inversion layers which trap air pollution and worsens air quality (Wilkinson 2000). Today, there are different reasons for dwellers settling or remaining on vulnerable sites; for some it is because they do not realize the risks initially, and for some because they do not have the financial resources available to commute from work to a farther located home, among other reasons. Economics and politics greatly affect the location of informal dwellings (Figure 2), and so one of the City's climate adaptation challenges is playing a more active and participatory role in the land access and allocation process for housing (Anonymous 2012b).

### **3.4 Housing Settlements and Land-Use**

Cape Town struggles with the balancing act imbedded in its status as a developing city, basically being forward-thinking in sustainability, while working to get a significant portion of its residents out of poverty. Three issues that the City tries to feature in its Sustainable Development Framework are: 1) the sustainability of spatial structures and economy, 2) the balance of formal and informal settlements, and 3) the planning of urbanization (City of Cape Town 2012). In February of 2012 the Cape Town Council approved a Densification Policy, and

aspires to get the city toward an average gross base density of at least 25 dwelling units/hectare. Cape Town recognizes its current general low density, and that the continued growth of that type of development is to the city's detriment. Informal settlements are among the densest communities of the city (Figure 7), (high density, but low-rise) though it is a product of apartheid's spatial segregation policies which resulted in underinvestment and inadequate infrastructure, making residents highly vulnerable to health and safety hazards. There is recognition of good and bad density, and there is transitioning to reducing density in areas where high density is potentially a hazard to health and safety, and some financial assistance options presented. Therefore, with Cape Town's new densification policy, it will be useful to follow and assess the difference between de-facto and intentional densification. Meeting the infrastructural demands of different neighborhoods has been especially challenging because of the private investments to suburban areas, thus creating a demand for City services to those areas, and a reduction of public investments to urban areas in the form of upgrades and general upkeep (City of Cape Town 2012). In the Densification Policy, higher densities with mixed land-uses are prioritized around public transit centers, so that all, including low-income families can better access services. Additionally, one of the Policy's objectives highlights that densification will reduce the City's expenses on water, stormwater, electricity and public transit infrastructure expenses. The Densification Policy seeks to improve social equity, and is looking into how to ensure rising property value near public transit stations will not prevent low-income people from moving in. Efforts to be pro-poor will require an examination of gentrification's potential ramifications; further exacerbation of inequality and potential barriers to access should also be explored. The City intends to work on a Corporate Urbanization Framework

Strategy with one of its underlying themes being “embracing urbanization and fostering urban advantages for economic growth, poverty reduction and climate change mitigation, etc; and the need to develop, adopt and invest in pro-poor policies by focusing on reducing urban poverty, reducing inequality and broadening opportunities” (City of Cape Town 2011b, 40).

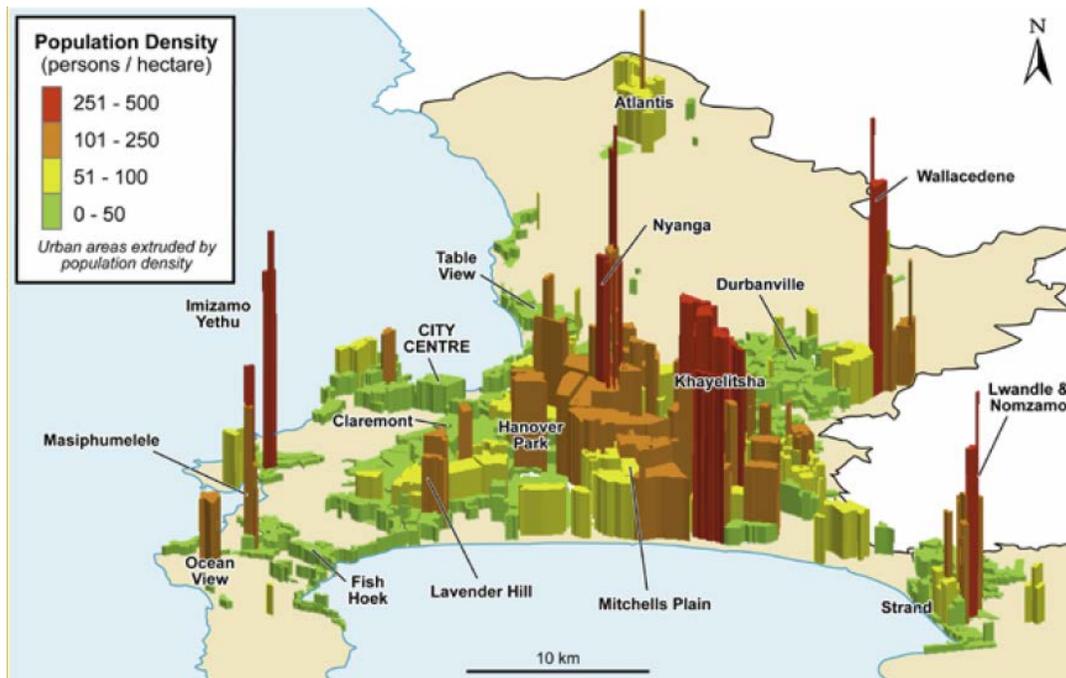


Figure 7: 2011 Population Density of Cape Town (City of Cape Town 2012, 19)

The Cape Town Spatial Development Framework 2012 is a guide for a long-term phased sustainable development plan that attempts to balance the many land-use interests and needs presently in the city (Figure 8). The Spatial Development Framework will identify suitable lands for development, then intends to encourage private investments into those areas, rather than on unsuitable land. The goal is to play a resourceful role for developers in their infrastructural investments, and to

inform them about suitable uses for certain lands, while steering them away from development on environmentally-sensitive and high risk properties (City of Cape Town 2012). The Province and the City explain the struggle in their entities to find available land that is suitable for housing (Figure 9). “The intention is to influence the property market via the redirection and redistribution of revenues and resources through various value-capturing strategies, and partnerships in the private and public sector” (Western Cape 2012, 17). In terms of land acquisition of the city, purchases average R15,000/ha in rural areas and R800,000/ha in urban areas. Presently, 235 ha of land is owned by the State, comprising of 1000 discrete parcels of land, with 150-300 ha being sought before 2016 (City of Cape Town 2011b). The National Housing Development Agency is to provide State-owned land to the City, and the Province is transferring its excess land in efforts to help it achieve its land-needs goals. The City has acknowledged that the majority of informal settlements need to be relocated to better land and development of that land should be to form sustainable communities, with access to amenities and transportation. There are varying temporal and spatial scales for the relocation developments, with some sites being infill, while others are larger parcels of land that will become large developments and will take more time to bring to fruition. Government-led land acquisition is not only a priority for housing development, but to be in support of the South African Restitution of Land Rights Act (22 of 1994), which has the purpose of returning land rights to residents whose properties were discriminately appropriated during South Africa’s apartheid policies. The City is still working to resolve the return of land to claimants, whether it is returning originally-owned land or offering an alternate piece of land to a claimant (City of Cape Town 2011b).

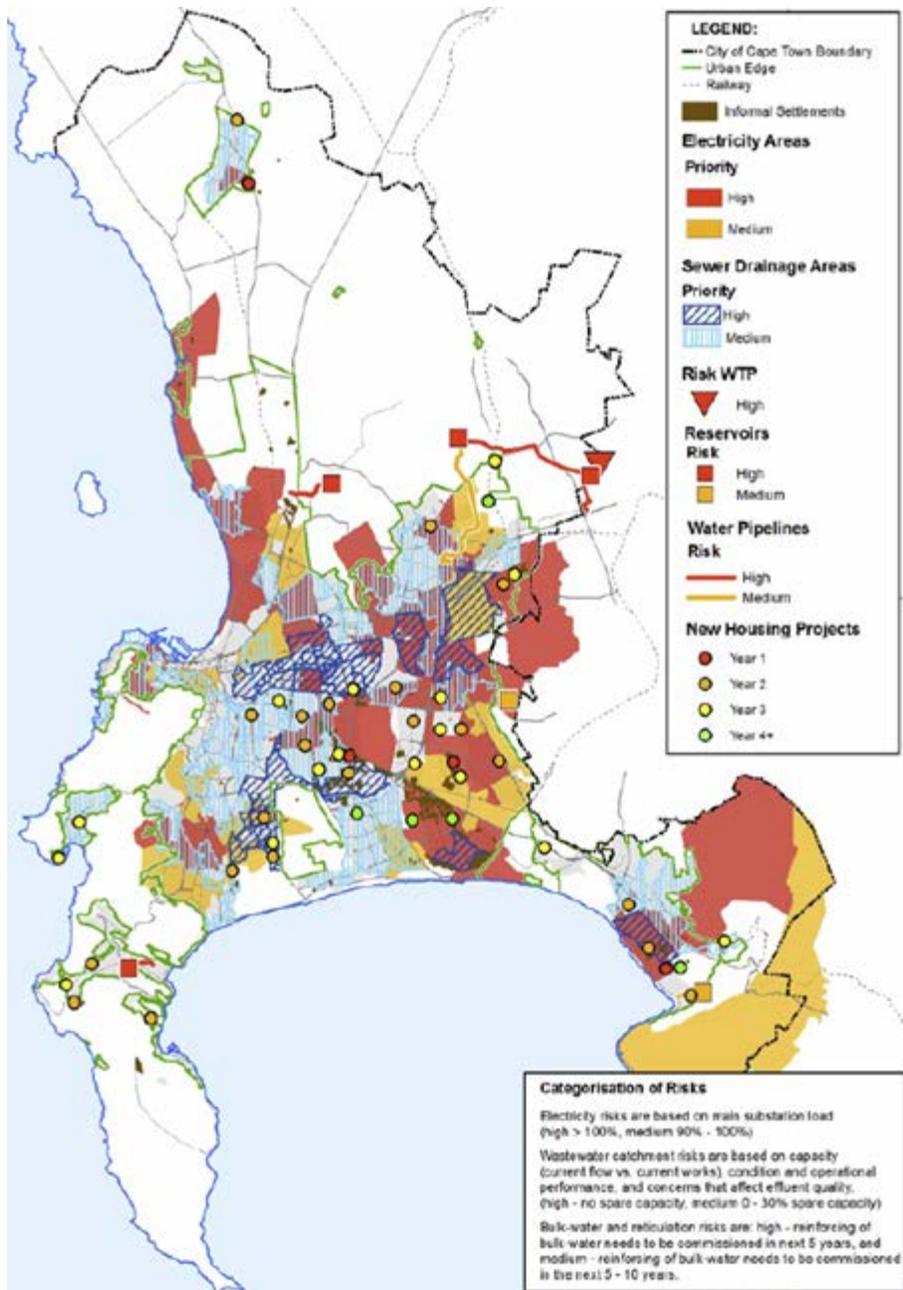


Figure 8: Map of Priority Infrastructure and Housing Actions (City of Cape Town 2012, 92)

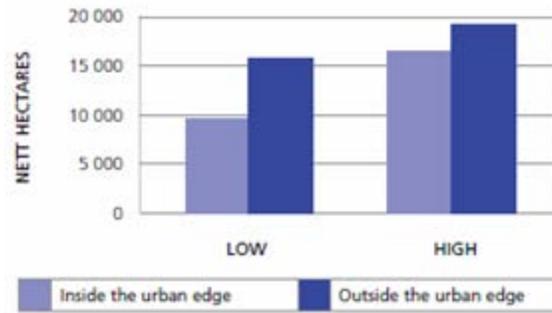


Figure 9: Chart of Net Hectares of Available Developable Land in the City (City of Cape Town 2012, 22)

Huchzermeyer (2006) examines the different approaches stated by the national government for dealing with informal settlements so that poverty alleviation, vulnerability reduction and social inclusion are captured: upgrading settlements and relocating households. Vulnerability tends to be focused on lacking access to water and sanitation facilities; essentially, vulnerability to health risk. Though it is acknowledged that many relocations occur because of being sited on unsuitable land, Huchzermeyer suggests the use of land rehabilitation, which is actually offered by the government. There are parameters that must be met in order to qualify for land rehabilitation, often land might only need drainage, storm water features, and land alteration due to steep slopes. Relocations are more challenging and the State looks to inspire municipalities to find well-located land, not far from their original dwelling, for residents who are moved. A concern for Huchzermeyer (2006) is the long-term scenario for residents who are relocated, and the sustainability of their livelihoods in a potentially less affordable community than before. This concern is being combated with economic development initiatives by the government, because it realizes that infrastructure and relocation alone will not solve the poverty crisis of so many. South Africa's Department of Human

Settlements has collaborated with the Housing Development Agency to influence various departments and scales of government to find safe, accessible and well-suited land for relocation of some residents. In order to assist municipalities collect data on housing allocation, the Human Settlements Department started a database support program as well as a fair allocation policy guideline. The data assists the department with demographic distribution assessments and determination of local areas' housing need changes (Western Cape 2012). Since 2011, the Western Cape Province undertook responsibilities to develop integrated and sustainable human settlements, partly through providing stronger support to local government in their efforts to achieve this goal. Part of the Province's support is the use of Professional Resource Teams (PRTs). The PRTs will "provide municipalities with assistance in various areas, including the formulation of pipelines reflecting short, medium and long term human settlement developments, project development, project packaging and reviewing, assisting with processing of transfers and obtaining title deeds." (Western Cape 2012, 2). A team has been designated to Cape Town (Western Cape 2012).

A determinant of the City's success in being pro-poor is by a thorough examination of access to basic and social services (Western Cape 2012). The Province's department on human settlements has reached out to other departments, and sees the overlap in others' goals and the value in inter-department collaboration. Its strategy explicitly states the commitment of social inclusion in its rolling out of sustainable development, especially in poverty reduction and asset building through housing and land access (Western Cape 2012). In the City's efforts to alleviate poverty, it recognizes the inability of housing upgrades to be the all-encompassing solution to Cape Town's poverty problem, and believes that a

comprehensive approach that includes social and economic development is needed for tackling the city's pervasive poverty (City of Cape Town 2011b).

### **3.5 Cape Town's Vulnerabilities and Risks**

Determined risks from climate change to Cape Town include sea-level rise, extreme storms, change in precipitation levels, soil liquification, wild- and urban fires, and increased disease (City of Cape Town 2010b). An increase in extreme storms will pose flooding risks. Flooding affects formal and informal settlements, but a lack of adaptive capacity puts informal communities especially at risk. Many informal settlements are set in flood detention areas, wetlands, or floodplains. Formal settlements tend to be at higher risk if they are located near development that is inappropriately placed on a flood plain or coastal area, or if natural buffers to flooding have been removed for development (City of Cape Town 2010b) Cape Town expects increased water demand in the coming decades as it projects temperature increases and greater susceptibility to drought (UN-Habitat 2011). Data from the Disaster Mitigation for Sustainable Livelihoods Program show the cause of many informal settlement fires coming from candle-use, due to the lack of electricity access in these communities (City of Cape Town 2010b), which can be further exacerbated under drought conditions.

Among Cape Town's energy and climate action plan objectives lies the objective to improve the resilience of vulnerable communities. The social component of climate change can also be seen in the Western Cape's Climate Change Strategy and Action Plan. It is established that a portion of the province's residents presently live on lands vulnerable to flooding, and the frequency of flooding is expected to be higher with climate change; therefore, leaving this already

disadvantaged population in an increasingly hazardous situation is consequential. The potential adverse effects could threaten structures, but especially livelihoods, so the fact that the most vulnerable settlements tend to have the highest population density could pose high risk to many (Western Cape Province 2008). Additional stresses are also expected to be placed on the city's resources and infrastructure as the Province projects increased migration into urban areas as a result of reduced livability in rural areas due to climate change (Western Cape Province 2008). While emergency preparedness and disaster management are part of the adaptation process, the Province proposes the inclusion of climate risks into development plans and explicitly incorporating climate risk in disaster preparedness and management plans.

### **3.6 Climate Change Policies in Cape Town**

The City of Cape Town is recognized as an African city with wealth and high emissions, while also having a large portion of the population in poverty. The City has a GDP of R200 billion, and a carbon footprint of 7.8 tons per person, but the carbon footprint does not accurately portray the large income gap of residents. Cape Town's average per capita income is 40,071 Rand, with a median of 13,576 Rand (Western Cape Government Department of Human Settlements 2012). One U.S. Dollar is equal to approximately 8.25 Rand (United States Department of Treasury 2012). The city's great economic inequality can be seen in its high Gini Coefficient number of 0.699 (Western Cape Government Provincial Treasury 2012, 148). South Africa's greenhouse gas emissions are the highest on the continent; over 1% of global emissions contribution, while all other African countries emit below 1% each (if Land Use Change and Forestry is considered, South Africa's emissions are below 1%) (World Resources Institute 2005). In 2008, the country held 95% of Africa's

coal reserves making it one of the world's largest coal producers, and has the second largest oil refinery system on the continent after importing crude oil from OPEC countries (Energy Information Administrator 2011). Use of coal is expected to only increase as it is in South Africa's mission to bring greater access of electricity to the 12.5 million residents without connection (Energy Information Administrator 2011). Cape Town's energy consumption in 2007 was 39% from electricity (85% of electricity source is coal-fired), 30% petrol, 22% diesel, 3% coal, 3% heavy fuel oil, 2% paraffin, and 1% LPG (City of Cape Town 2011a). Half of energy consumption in the city is for transportation, and the other half residential, commercial and industry use (18%, 17%, and 14%, respectively) (Borchers and Lewis 2012).

South Africa's history of climate change action began in response to the 1990 IPCC Assessment Report. By 1994 the government established a National Climate Change Committee under the Department of Environmental Affairs and Tourism. Later South Africa took part in ratifying the United Nations Framework Convention on Climate Change, followed by ratification of the Kyoto Protocol. After submitting data on its 1990 and 1994 greenhouse gas emissions in its Initial National Communication to the UNFCCC, South Africa concluded and accepted that it was a considerable contributor to climate change while also being subject to great harm from it. In 2005 the government held a National Climate Change Conference that admitted to the reality of climate change, and committed the government mapping of South Africa's goal to meet Article 2 of UNFCCC (a stabilization of emissions) while also meeting its interest to alleviate poverty and create jobs, and committed to making the policy development process participatory. In 2008, South Africa decided it would take a plateau and decline approach to emissions reduction: plateau between 2020 and 2025 and begin decline between 2030 and 2035.

Additionally, the country established the direction its policies would go toward: a low-carbon economy/society and the evolution to a climate resilient country (South Africa Department of Environmental Affairs 2011a). Garnering inspiration from bodies of work like the country's Constitution, its Bill of Rights, the National Environmental Management Act, South Africa's Millennium and the United Nations Framework Convention on Climate Change, South Africa's government approved the National Climate Change Response Policy (South Africa 2011b).

The objectives of South Africa's climate change plans are founded in principles that include equity, attention to special needs and circumstances of cities and people, uplifting the poor and vulnerable, sustainable development, and informed participation. Among its strategies, priorities include: risk reduction and management; effective mitigation actions; sector-based responses; alignment of policy and regulation; integrated planning; informed decision-making and planning; tech research, development and innovation; facilitated behavior change; and resource mobilization. Strategies are categorized in the short- (within five years), medium- (within twenty years), and long-term (goes beyond 2050) from 2011, based on risk (South Africa 2011b). It also includes collaboration with its bordering countries, since adaptation will be a regional issue on a scale that transcends borders. There are four identified priorities and sectors of focus for the Western Cape Province's Climate Strategy and Action Plan: natural systems; economic sectors; economic resources and infrastructure; and the built environment, livelihoods and disasters (social systems, extreme events).

The national government recognizes the local scale efforts needed to adapt the country's infrastructure, so it supports a bottom-up approach in this respect.

There is reiteration of South Africa's need to balance its contribution to global mitigation objectives with its developmental goals. Even though the South African government addresses adaptation and mitigation practices as separate endeavors, the government gives recognition to their overlap. For example, South Africa's approach to job growth intertwines adaptation and mitigation. There are plans to focus on green jobs growth by limiting contracts in sectors that are tied to high emissions and carbon intensity alongside a Sector Job Resilience Plan that will analyze the vulnerability of sectors and propose resiliency measures. In order to successfully disseminate its widespread plans, South Africa will mainstream by giving every national department and State-owned enterprise two years to review their policies and plans so that they are in accord with the Climate Change Response Policy's objectives. Mainstreaming also gives significant focus to communication with the public about the policies and actions of the government, and also aspires to influence behavior change that will reduce residents' contribution to emissions (South Africa 2011b).

In Cape Town's recognition of the environmental urban problems posed to the city, it first established an Integrated Metropolitan Environmental Policy in 2001 and the Council approved a City Energy and Climate Change Strategy in 2006. In 2009 it established a climate change think tank which is composed of City officials, university members, and climate experts. The think tank's goals were to assess energy consumption and carbon emissions under different scenarios, and to identify potential interventions and risk reduction. Today, the think tank links itself and its work with academia to study public sector efforts on climate change (Cartwright et al. 2012). In 2010, the City of Cape Town approved the Energy and Climate Action Plan, which guides decisions on energy and climate change programs. In 2011, Cape

Town hosted the Local Climate Solutions for Africa 2011 Congress, which brought together different stakeholders: local and national political leaders, climate experts, development proponents, and private and public representatives. The City hosted it in partnership with ICLEI Africa. Cape Town signed onto the African Mayors Climate Change Declaration that same year, in addition to being titled a Role Model City for the United Nations International Strategy for Disaster Risk Reduction (UNISDR) and the International Council for Local Environmental Initiative (ICLEI)'s Making Cities Resilient—My City is Getting Ready campaign. It is the first South African city to obtain this status for exercising good practices for making the city resilient and safe from natural disasters. The City has a Municipal Disaster Risk Management Plan that amalgamates relevant planning parties, included are the Disaster Risk Management Center, the Housing Directorate and the Environmental Resource Management office.

“We want to be a city that is resilient and always acting for the common good, with social justice as our guiding principle” Executive Mayor of Cape Town, Alderman Patricia De Lille” (City of Cape Town 2011a, 7)

### **3.7 Climate Planning and Social Equity**

“Both climate change and sustainable development – which indeed are intertwined – give rise to contemplation of the problems of inequality and poverty. When considering these against the environmental challenge inherent in the climate change scenario it may appear that the latter is not important – but to quote Amartya Sen, Nobel economics laureate and philosopher who visited South Africa in April 2007 to deliver a lecture on poverty, war and peace, *“It seems (to me) that the main challenge for a human being is how to take note of each of these major issues without putting them in a horse race with each other”*

*(Western Cape Province 2008, xxii).*

Sustainability's holistic nature brings a range of benefits to urban environments, but those benefits are more evident in the extensive literature of the field, than on the ground in some municipalities. Cities like Cape Town have so many needs that municipalities often find competing interests to climate change planning's needs. Competing interests can be extracted temporally between immediate short-term needs and long-term needs, as well as between social and environmental goals. Cape Town's problems are many, falling in the realms of poverty, health, housing, education, etc., so groups interested in promoting socio-economic equality, sometimes perceive climate change adaptation as a competing agenda item (Anonymous 2012b). These perceived conflicts are expressed internally in city governments, and also by external stakeholders. Addressing problems with exclusivity ignores the critical accord of interests that can surface as a result of sustainable longer-term and larger spatial-scale planning. An example in Cape Town is with land allocation. There is great demand for parcels of land for housing, but the environmental department sees the protection and conservation of green space for ecosystem services as an adaptation effort; however, the housing and social department may see the land as a space to relocate informal dwellers. In a City with many demands for residents' basic needs, there are very contrasting immediate and long-term implications depending on the stakeholder. The climate adaptation goals of the City's work tends to be more focused on ecosystems rather than social institutions, which on the surface can appear to sometimes conflict with the short-term or immediate goals of the exclusively social policy-focused departments (Anonymous 2012b). These "competing" interests also play a role in budget allocation. This study did not delve into budget and finance for climate change projects, as that piece was too large for the scope of this paper. However, in

doing a cursory analysis of budget allocation, it proved difficult to decipher the City's total expenditure on mitigation and adaptation projects, since the projects are fragmented as they fall into various departments' scope, e.g, Environmental Resource Management, Human Settlements, Spatial Planning and Urban Design, Planning and Building Development Management. While Cape Town has apportioned funds to mitigate and adapt, it is important that other cities following suit be explicit in budgeting funds appropriately, as financial investments are necessary for implementation to occur. Climate change investments in cities will likely need a diverse portfolio that includes public and private funds if to meet the cost demands of mitigating and adapting in infrastructure, social needs, and disaster preparedness (Baker 2012).

In Cape Town, mitigation appears to have a bigger social equity component than does adaptation. Many of the resilience improvements to informal settlements are geared toward mitigation, and that meets with sustainable development goals. The City's pilot projects manifest this, with programs like solar water heater distribution and ceiling upgrades to low-income households: 2300 thermally-efficient low-income houses, which was a Clean Development Mechanism project, it included insulated ceilings, solar water heaters, and energy efficient lighting (Figure 10). These upgrades have spread to various communities of Cape Town, though many households still access traditional sources of electricity. Cape Town's low-income population can spend up to 25% of their income on energy, so the City subsidizes electricity use if use is less than 450 KWh; making the first 50 KWh free. The electricity subsidy adds complication to mitigation efforts, but serves to help low-income residents tap into power affordably.

Cape Town's planned expansion of public transit is considered a pro-poor policy that is climate friendly, because it seeks to give better access to low-income residents, while decreasing the city's carbon footprint (Anonymous 2012a). A focus on public transit is in place in the province to enhance location efficiency, so that dependable transportation is affordable and low-emitting. In addition to the benefits of improved local air quality, expanding public transit helps to meet the region's sustainable development goals because it provides transit options to the poor and mitigates greenhouse gas emissions (Western Cape Province 2008).

Mitigation is often framed by the City as increasing social equity, through efforts like the aforementioned energy pilot projects in low-income houses; these are attempts to improve living conditions of the poor in a sustainable manner (Anonymous 2012b). Many infrastructural mitigation and adaptation efforts are also found in the City's Green Building Guidelines. It is anticipated that eventually, new development projects will be required to include enhancing insulation for cooling and heating efficiency, and use solar heating; and the hope of additional commitments to create more resilient infrastructures that can endure extreme weather events (Mokwena 2009). Additionally, the adding/retrofitting of ceilings is a stated priority for public housing and residents lacking this piece of infrastructure, with the intent of enhancing the ability of homes to retain heat and cooling when necessary. "... initiatives that aim to adapt to climate change or mitigate the possible effects thereof, requires foresight and sophisticated planning around pre-emptive strategies. In a context of high inequalities in terms of access to important social services like housing and sanitation, justifying the allocation of scarce financial resources to unknown future events that might or might not materialise is not an easy task:" (Mokwena 2009, 17).



Figure 10: Photo of Solar Water Heater Installations (City of Cape Town 2011a, 14)

The vulnerability of urban populations in informal settlements is identified as a problem that needs to be solved, because of the expected exacerbation of their poor living conditions due to climate change/variability. Enhanced density is often a planning measure for mitigation, but can be risky in adaptation if not planned well. In informal settlements of Cape Town, density is often higher than in other parts of the city or province, but because of the lack of resilient infrastructure and often being located on high water table land, the risk of being devastatingly affected by climate-induced disaster is higher (Western Cape Province 2008). The City's Spatial Development Framework looks at Cape Town's eight planning districts (Figure 11) and has integrated spatial development plans and environmental management frameworks for each. In preparation for climate change's effects, the City is looking into budget reform options so that it is capable of handling costs related to infrastructure upgrades or repair, in addition to widespread disaster preparedness. Additionally it is conducting ecosystem mapping, as to identify parts of the city that

require conservation, restoration and management attention. Through these efforts, the City hopes to use nature's ecological processes to provide ecosystem services that are lower cost, and are expected to reduce the risk of maladaptation that could be a result of human intervention solutions.



Figure 11: City of Cape Town Planning Districts (City of Cape Town 2011c)

Resilience and adaptability are features presented for the City's long-term plan, and beyond strictly in response to climate change, rather they are part of a larger net, in response to any economic, social and environmental shocks that could affect the city. Development edges will be used to limit sprawl, two types of edges: urban and coastal. The urban edge will phase growth as to conserve natural

ecosystems, but in the long term, if population growth is high, then the edge will be altered to meet demands of the population. The coastal edge is used to protect ecosystems, but to also ensure that the coastline remains a public good and is not further privatized (City of Cape Town 2012). The City of Cape Town includes 240 km of coastline, and portions of the coastline have been significantly altered by development. These developments have diminished dunes' ability to serve as storm surge buffers; therefore, increasing the risk of flood to communities in the coastal vicinity. The Coastal Protection Zone (CPZ) Bylaw's intention is to use an ecosystem-based method to protect the City from flooding; part of it addresses informal development (City of Cape Town 2010b). The CPZ would restore the coast so that ecosystem functions like storm surge buffering and erosion prevention can be maintained through natural processes. Livelihoods and infrastructure are threatened as development occurs on these lands, and part of the CPZ plan tries to be aligned with South Africa's goal to improve equity, in this case through being more inclusive of coastal space and providing access to all (Colenbrander et al. 2010). The complexity with coastal property is that it tends to have higher economic value, so developers see economic opportunity on these sites, which has caused increased building, and has further degraded the natural ecological function of those once pristine sites (Colenbrander et al. 2010). Property development on the coast serves as big tax revenue for the City, so zoning restrictions are debated and difficult to agree on for affected stakeholders, but regulations outlaw some uses in certain zones. The insurance industry also plays a role in coastal development politics, because there is system risk in some development along the coastline.

The risks posed to informal settlements is largely of recurring flooding from rain events, and ownership of damage responsibility is an ongoing struggle between

informal residents and the City. The City feels it should provide safe land space, but if settlements are being established in high-risk areas informally, then there is contention about who holds responsibility for recurring disasters. The City would like to reduce the number of informal settlements in Cape Town and support residents in a movement to safer lands closer into the city (Figure 12). Most importantly, to do this equitably and successfully, there is recognition of the need for a community-engagement process to have a better understanding of the problems posed to settlers (Anonymous 2012a).

Disaster risk reduction work in the City seems to be expanding its scope to climate adaptation since climate change will bring increased climate variability and therefore pose increased risk. Climate variability has been a source of many problems for informal settlements, and not exactly because of runoff, but rather siting on locations where the water table is so high that rainwater sits and causes extensive damage to community-constructed structures. In the absence of government assistance, many households become autonomous and take steps to use their resources to raise homes, or block water with sand bags. Many of these dwellers are on housing lists and have been backlogged for even 6 to 8 years. The new densification policy has the opportunity to influence adaptation planning in how it deals with affordable housing and siting (Anonymous 2012b).

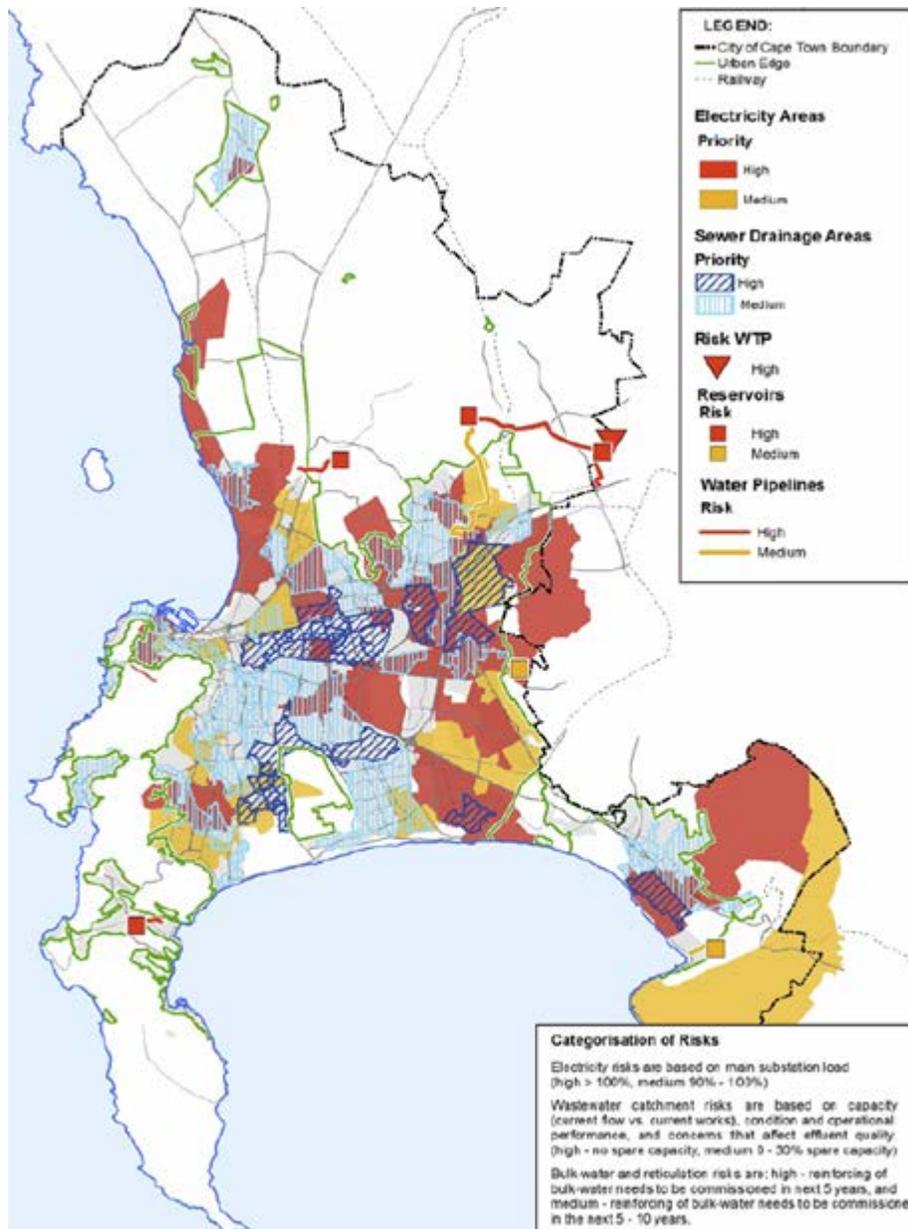


Figure 12: 2012 Map of Major Infrastructure Risk Areas in Development Areas (City of Cape Town 2012, 21)

### **3.8 Discussion**

Cape Town has the added challenge of extreme socio-economic inequalities, giving the City an opportunity to maximize mitigation and adaptation's benefits to include poverty alleviation. The racially-based socioeconomic inequalities as related to development in the city show there are many underserved communities that lack

basic infrastructure, which is perhaps the reason for such a focus on mitigation in its development goals. Even with its good intentions, South Africa still relies heavily on coal as an energy source, and though it has an energy plan and is working toward renewable energy-use expansion, and mitigating emissions through densification, this demonstrates the challenges of emerging economy countries' varying interests. As many residents do not have access to electricity, a big goal of the City and State is to improve access, but fiscal limitations and time-demands make coal the most immediately accessible energy source. In the long-run, however, this strategy will inevitably bring more suffering from climate-related damage. As the country is an emerging economy and as the city further develops itself, planning with a mitigation framework will be a way to reduce instances of maladaptation in the development process. This is clear in the City's urbanization, sustainability, and climate change plans, but might require more of an analysis with the City's and State's energy plans. Cape Town's urbanization planning is seen largely as a mitigation effort within the climate change planning agenda, while it mostly implicitly focuses on adaptation measures. However, some of the City's programs indicate that there are many instances of mitigation meeting adaptation and poverty alleviation's needs. The solar water heater and ceiling distribution programs are evidence of sustainability's ability to meet several goals. The solar water heater and ceiling distribution reduce heating emissions (mitigation), are adapting households to extreme weather by upgrading ceilings as a protective measure (adaptation), and provide basic development needs like hot water access and housing upgrades while reducing energy expenditures (poverty alleviation). A reason for the presence of multi-beneficial projects may be indicative of the challenge in fully bifurcating mitigation and adaptation in policies and plans. The densification policy is another example of

this, with its goals to incorporate good density into the city's plans, and remove bad density designs, thus creating the opportunity to relocate vulnerable communities out of high-risk areas.

A constant challenge for many governments, and especially those in low- and middle-income economies, is the decision of prioritization of mitigation and adaptation with poverty alleviation. The City of Cape Town acknowledges their interconnectedness in objectives and positive outcomes, but under financial and time constraints, these related goals can seem to be in competition when looking at immediate needs. The added component of South Africa's apartheid history makes the State eager to help bring the many Black-Africans, Coloured and Asian groups oppressed under apartheid out of poverty. The country's racist past adds a layer of complexity to adaptation planning. There are many high risk-prone settlement areas with Black-African and Coloured populations, and the City recognizes that many of these dwellers should be relocated if to avoid natural disaster risks presently faced by them. However, the country's history of relocation is painfully in the memory of many informal dwellers. The laws under Apartheid rule forced non-Whites out of land-ownership and mandated relocation to certain areas based on racial groupings, which the post-Apartheid government has committed to compensate to victims through land restitution policies. Though segregation is no longer the law, its long-lasting grip is still seen and has kept many racial minorities in spaces of high vulnerability. The subject of mandated relocation is a delicate issue, especially in this region, so it is crucial that the governments engage with residents to hear their concerns and suggestions, while also being clear and honest about climate change's present and potential threats to vulnerable communities. The combination of relocation and efforts for affordable good density (de-densifying high-risk areas,

and re-densifying points closer to public transit stations) provide another good effort to create the mitigation, adaptation, equity trifecta of sustainability.

## **CHAPTER 4: ANALYSIS OF FINDINGS AND CONCLUSION**

### **4.1 How is Social Equity Manifesting Itself in Cape Town's Climate Adaptation Plans?**

Cape Town, though now free from Apartheid-rule, has spent the last 18 years trying to undo the social and economic damage done in the decades apartheid was in law. The effects were so deeply rooted that Cape Town's present-day disparities reflect racial groups' statuses under apartheid. The same groups that were subjected to discrimination during apartheid are now the ones most vulnerable to climate change's impacts today. To uphold the rights of all against threats from climate change means that resources and investments need to be made in communities identified as vulnerable. The City has mapped risk areas (flood-prone areas, landfill sites, and noxious industrial sites) posed to Cape Town, which looks to hold great potential for further expansion to incorporate climate change-specific risks to the city.

Cape Town has ambitious plans, with adaptation projects underway, and others in the planning phase. However, in reading the Cape Town Climate Change Think Tank's first book publication, *Climate Change at the City Scale: Impacts, Mitigation and Adaptation in Cape Town* (Cartwright et al. 2012), of the Think Tank's findings and plans for the city, there is a noticeable lack of content on the socio-economic inequity issues of the City and how inequity will worsen as a result of climate change. The publication is full of material on effects on the landscape as well as the built environment, then it partially discusses hazards faced by people, but

there is no clear distinction between impacts to the general population and those to the poor. It proved to also be challenging to find other published works of the Think Tank that did focus on climate change issues of Cape Town's urban poor in the city's widespread informal settlements. The Think Tank is likely very aware of these vulnerable communities' risks, but they are not doing them justice by being silent on the issue in their publications. There is no doubt that the Think Tank is trying to juggle many facets of climate change, but the importance for it to prioritize marginalized people's needs is especially crucial due to Cape Town's stated commitment to social justice in this post-apartheid era.

The Densification Policy has great potential to foster the needs of Cape Town's urban poor, especially since densification would include relocation as a result of the desire to design more high-rise density communities and fewer high-density low-rise communities as they are tied to higher health and safety risks. In Cape Town, the balance needed to keep adaptation efforts pro-poor also requires a good relationship between governance and informal settlement residents or advocacy groups, so that with adaptation measures there is not the risk of low-income communities getting coerced into moving because of landowners potentially using adaptation zoning as a scapegoat to evict low-income residents from their land (Satterthwaite et al. 2007, x). Cape Town's history of land relocation during apartheid and its backlog of restitution claims makes it especially important for the City to be sensitive and communicative about its plans to relocate households currently residing on vulnerable land. Planned relocation is more desirable than the potential for climate change induced displacement after an environmental shock, but this takes trust-building, collaboration and an assessment of good density priorities/capacities as well as land risk-assessments. For households that are less

vulnerable and do not need to be relocated, upgrades to their housing can assist in strengthening resilience.

The notion of “competing interests” needs to also be addressed by city governments. Varying temporal and spatial scales lead sectors to prioritize issues differently, but thoroughly assessing climate change in all, short-, medium-, and long-term scales at the community- and city-level can assist in recognizing overlapping interests. For example, with land-use in Cape Town, there have at times been different perspectives of priority uses for certain land areas. Housing conditions are poor-quality for many residents, so open land is often seen for its potential to formally house the urban poor. However, from environmental departments’ point of view, open land is seen for its value in providing an ecosystem service. Placing these interests as competing and into silos can compromise both objectives, when an alternative like smart densification can enhance the goals of both. An outcome that meets both housing and conservation’s goals is the Cape Town Densification Policy. Its foundation is mitigation by decreasing the city’s carbon footprint and it also favors ecological processes on lands free from development, while it furthers the goals of sustainable development, increasing housing opportunities, and centralizing density so that development does not occur on unsuitable lands. If departments are perceived as exclusive to their own interests then it is difficult to ascertain commonalities and enhanced outcomes. Densification efforts coupled with home upgrades are great examples of numerous goals being met under the sustainability umbrella. Cape Town’s climate planners are meeting immediate equity needs through its upgrade programs for low-income households. Upgrades of solar water heaters and ceiling installations both serve as

poverty alleviation efforts as it improves shelter conditions, while also serving as adaptation and mitigation measures.

#### **4.2 Are there Extractable Lessons from Cape Town and are they Transferrable to Other Cities?**

Academic literature and the case study of Cape Town suggest that social equity can and should be an integral part of urban climate change plans. A social equity approach has the ability to influence most sectors of climate change planning, and especially in regard to housing settlements and land-use. As Cape Town was an extreme case of housing inequity and spatial injustice, for those reasons, it needs climate change planning to bolster and speed up the process of prioritizing housing upgrades and relocation. Just as social equity has mainstreamed Cape Town's various departments and their goals, climate change planning is mainstreaming itself into the City's various departments; and as related to housing and land-use, it appears a symbiotic relationship for meeting the goals of climate change adaptation/mitigation and equitable sustainable development.

Cape Town's implementation of climate adaptation plans are rather nascent, but its efforts in the development of plans can serve to inspire other cities as they are presented with worsening impacts of climate change. A guiding comprehensive adaptation plan that includes a detailed timeline of actions is foremost necessary in order to effectively mainstream climate change planning into all municipality departments. One way to design a plan is with the creation of a climate change think tank, much like Cape Town's; this allows for local experts and stakeholders to collaborate and develop city plans that address those most affected presently and into the future.

Cities with high socio-economic inequality can follow Cape Town's model of connecting the needs of poverty alleviation with mitigation and adaptation. Programs that maximize these three components will help to further the goals of sustainable development and minimize maladaptation, the most visible of these in Cape Town are the solar water heater distribution and ceiling upgrade initiatives. The Densification Policy of Cape Town could also provide municipalities with inspiration to identify good and bad density designs throughout the city, and therein examine locations of high-vulnerability to impacts of climate change and mapping high-risk areas. Plans for smart relocation, with the engagement of affected communities, can then be discussed further; though, this must be done empathetically and with sensitivity, because residents of slums globally have a history of being excluded in political decisions, and are often victim to government-led evictions, with few or no alternatives for relocation.

Whether or not municipalities take measures to assist vulnerable populations in adapting, the urban poor are forced to take responsive measures themselves. Poor populations are taking autonomous coping measures in response to climate change related events, though they are far less equipped to adapt long-term (Moser et al. 2010). A big and commonly missing piece in adaptation plans is insight from poor communities and their understanding of climate change's overall threat to their livelihoods, their current methods of coping, and their needs for building adaptive capacity (Moser et al. 2010). The inclusion of these engagements in the planning process can bring municipalities closer to the social equity framework. An exchange between communities and government, along with funding priority projects, could assist municipalities in maximizing their adaptation plans'

success, especially if they are able to derive local knowledge and experience for adaptation.

Paavola et al. (2006) argue that distributive and procedural reform are needed in order to adapt cities justly. Empowerment on different scales of climate negotiations is also necessary so that vulnerable individuals, households, communities, cities, and even countries are able to adapt to the risks presented to them because of others' high emissions. Participation by empowered groups in adaptation planning provides the opportunity for climate adaptation plans to avoid further isolating and worsening vulnerable communities while benefiting those with more access to adaptive capacity (Paavola et al. 2006). In Cape Town's case it is evident that adaptation plans must address the most marginalized residents because the most impacting economic and infrastructural risks are posed to them. The City's mainstreaming of undoing apartheid's legacy, would also obligate the City to focus on the urban poor, who were made vulnerable initially because of segregation, and now have vulnerability exacerbated by climate change.

Satterthwaite et al. (2007) see the next couple of decades as an opportunity for developing countries, especially those that are only now developing comprehensive plans, to incorporate adaptation in their development plans. With the planning of better zoned areas, high-risk areas can be established, and development can be stopped and prevented from expansion. And, residents of informal settlements ought to be justly incorporated in the planning of urban adaptation strategies. This cannot be a top-down project, but requires community engagement and input. It will also require trust-building (Susskind 1996) because many residents of informal settlement communities feel slighted by governments'

neglect of their needs and historical exclusion of the poor in policy-making processes; as also seen in the Cape Town case study. With the construction of newer buildings, disaster-proof facilities, and increased land-use regulations, there is potential for the poor to be once again displaced and forgotten, so these changes must occur prudently with contemplation and sensitivity to highly vulnerable populations.

### **4.3 Conclusion**

Social equity plays a strong role in urban adaptation strategies. Climate adaptation planning not only has the responsibility of addressing the needs of vulnerable populations, but can also help advance the goals of social equity and speed up its pace since climate change requires an urgent response. Municipalities have the ability to enhance resilience and adaptive capacity of the urban poor especially through land-use and housing settlement upgrades, as seen in Cape Town's developed plans. Inaction can only further exacerbate poverty, and contribute to the growing polarization of the wealthy and the poor; in addition to its more fundamental threat to lives. It is evident in literature that adaptation planning is capable of reducing the number of casualties from climate change. The added advantage is its potential contribution to increasing marginalized groups' socioeconomic mobility, foremost, by creating a foundation of stable and sustainable home bases that can absorb environmental shocks without disrupting poor people's efforts toward financial security.

Climate adaptation, singularly, can be challenging to prioritize if portrayed as just another one of a City's competing agendas; therefore, it is important to mainstream adaptation and connect it with the goals of other sectors. In Cape

Town's case there exists great potential for pro-poor urban adaptation plans as more connections are being made with sustainable development and poverty alleviation; the City's implementation process and its progress, however, were beyond the scope of this thesis and require a more thorough examination.

Like Cape Town, cities can re-examine their spatial development plans and their building and zoning codes and patterns in their pursuit to strengthen disaster-coping tools and develop long-term resilience-building measures. From there, it is crucial that the planning process be inclusive of local knowledge, expertise, and concerns. Adaptation planning takes collaboration and requires deep consideration of different temporal and spatial needs. Adaptation of housing settlements and land-use patterns very directly affect people's lives, thus should balance the short- and long-term needs of the city. A symbiotic relationship can be forged between climate change adaptation and social equity proponents, and whether the dire situation of the urban poor is exacerbated relies heavily on the ability to work toward pro-poor sustainable development that provides resilience under climate change's threats.

**APPENDIX 1**  
**THE MEXICO PACT:**  
**THE GLOBAL CITIES COVENANT ON CLIMATE**



WORLD MAYORS SUMMIT ON  
**CLIMATE • MEXICO CITY**  
21 • NOV • 2010

## **Global Cities Covenant on Climate - "The Mexico City Pact"**

**Acknowledging** that cities play a strategic role in the fight against climate change, because they are centres of economic, political and cultural innovation, host to half of the world population, and manage vast public resources, infrastructure, investments and expertise;

**Recalling** that between 1992 and 2007, whilst the UNFCCC and its Kyoto Protocol were designed, numerous local governments demonstrated leadership and implemented innovative actions to combat climate change at the local level;

**Reminding** that as today half of the world's population lives in cities; that the International Energy Agency estimates that cities accounted for 67% of the world's primary energy demand and more than 70% of global CO<sub>2</sub> emissions in 2006. With continued urbanisation and urban growth, energy use in cities is projected to increase to 73% of the global total, and CO<sub>2</sub> emissions to 76%, by 2030;

**Noting** that since our cities are at increased risk of the devastating consequences of global climate change, particularly affecting the urban poor, many cities around the world, despite limited budgets and capacities, are already developing and implementing local adaptation strategies to address problems caused by climate change, even in the absence of a binding global commitment on adaptation;

**Recognizing** that since 2007, when national governments embarked on the UN Climate Roadmap, local governments signed the World Mayors and Local Governments Climate Protection Agreement and developed a parallel *Local Government Climate Roadmap* to mirror and influence the on-going work of the Conference of the Parties (COP), with the purpose of seeking recognition for local climate action within global climate governance;

**Emphasizing** that during COP15 in 2009, when the Copenhagen Accord was announced with national commitments and actions of governments, local governments published the *Copenhagen World Catalogue of Local Climate Commitments*, which identified more than 3,500 voluntary greenhouse gas reduction commitments of local governments in countries of Annex 1 and Non-Annex 1 countries;

**Welcoming** and seeking synergies with regional initiatives such as the Covenant of Mayors in Europe and the U.S. Conference of Mayors Climate Protection Agreement in the U.S.A;

**Inviting** more cities, local and regional governments to initiate action or accelerate their climate efforts, both in developed as well as in developing countries;

**Acknowledging** that our local commitments and actions must be measurable, reportable and verifiable in order to attract recognition and support from existing or new multilateral institutions and funding mechanisms;

**Considering** that the Intergovernmental Panel on Climate Change (IPCC) has determined that reductions in greenhouse gases emissions must limit the increase of global temperatures to less than 2 degrees Celsius by the end of this century;

**Gathering** on the eve of COP16, at the World Mayors Summit on Climate, in Mexico City on 21 November 2010, we state the following:



## Global Cities Covenant on Climate - "The Mexico City Pact"

### WE, THE MAYORS AND LOCAL AUTHORITY REPRESENTATIVES BY SIGNING THE GLOBAL CITIES COVENANT ON CLIMATE "THE MEXICO CITY PACT", WE COMMIT TO:

1. Reduce our local greenhouse gas emissions voluntarily

We shall promote measures, public policies, laws, plans and campaigns to reduce emissions of greenhouse gases in our cities, taking into account our individual resources and capacities to do so.

2. Adopt and implement local climate mitigation measures designed to achieve our voluntary reduction targets

If we have set targets for reducing GHG emissions, we will adopt and implement measures to achieve them, in areas such as sustainable transportation, proper waste management, energy efficiency, as well as implement low carbon options that help to green our local economies and lifestyles.

3. Develop local adaptation strategies to address the local impact of climate change

We shall design appropriate local adaptation plans and implement climate change adaptation and preparedness measures with operational mechanisms that improve the quality of life of our inhabitants, in particular the urban poor, who are most vulnerable to the harmful impacts of climate change.

4. Register our emission inventories, commitments, climate mitigation and adaptation measures and actions in a measurable, reportable and verifiable (MRV) manner

With a view to launch and follow-up on our commitments, we will enter our climate actions in the **carbonn Cities Climate Registry**. Acknowledging our common but differentiated responsibilities in responding to climate change, we agree to make our actions transparent and provide regular information and data so that our efforts can be measured, reported and verified.

5. Seek the creation of mechanisms that allow direct access to international funding for local climate actions

We will seek the development of mechanisms to directly access financing for our registered mitigation and adaptation actions and in doing so, we will seek the support of various national governments and multilateral funding institutions.

6. Establish a *Global Cities Covenant on Climate Secretariat*

We agree that a Global Cities Covenant on Climate Secretariat will be established to follow-up on actions arising from this instrument and to promote the Global Cities Covenant on Climate with other local and regional authorities. We request the Secretariat to undertake all efforts to facilitate cooperation, exchange and expertise on climate mitigation and adaptation among all signatories of the Global Cities Covenant on Climate.

7. Promote the involvement of civil society in the fight against climate change

We will engage our citizens in our actions to address climate change, and will support proposals from civil society that encourage changes in lifestyles that contribute to our local climate actions.

8. Advocate and seek partnerships with multilateral institutions and national governments on our local climate actions

We agree to cooperate actively with each other to advocate support before multilateral institutions and national governments – within the scope of the UNFCCC process and beyond -, to seek recognition and support for our measurable, reportable and verifiable local climate actions, and to implement sub-national, national, regional and multilateral frameworks that are complementary to our climate actions and which may result from multilateral climate negotiations.

9. Promote partnerships and city-to-city cooperation

We agree to seek active partnerships and promote city-to-city cooperation among all signatories of the Global Cities Covenant on Climate, including sharing information and knowledge, capacity building and technology transfer in all areas relevant to climate mitigation and adaptation.

10. Spread the message of the Global Cities Covenant on Climate and, in particular, encourage and invite other leaders of local and sub-national governments to join our climate actions.

TRANSITIONAL PROVISION: In the case that signing Mayors require their decision to be processed through other instances of their governments; their signature will be subject to ratification in an 8 months term.



WORLD MAYORS SUMMIT ON  
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## **Global Cities Covenant on Climate - "The Mexico City Pact"**

### **Annex 1**

#### **The carbon $n$ Cities Climate Registry**

The carbon $n$  Cities Climate Registry will be launched on 21 November 2010 in Mexico City at the World Mayors Summit on Climate (WMSC / CCLIMA).

Under the auspices of the World Mayors Council on Climate Change and with the endorsement of United Cities and Local Governments and Club of Madrid, the carbon $n$  Cities Climate Registry (cCCR) has been developed with support from ICLEI – Local Governments for Sustainability and Government of Mexico City.

The cCCR will be operated by the Bonn Center for Local Climate Action and Reporting – carbon $n$ .

The carbon $n$  Cities Climate Registry is a mechanism for cities and local governments that ensures transparency and accountability of local climate action through a commitment of regular reporting.

By being included in the carbon $n$  Cities Climate Registry, cities demonstrate leadership in transparency and accountability of local climate action and will be better prepared for verification of their commitments, performance and actions, which should facilitate their direct access to global climate funds.

The carbon $n$  Cities Climate Registry aims to be the global response of cities and local governments for measurable, reportable, verifiable climate actions that are also being discussed by the UNFCCC.

By signing the Global Cities Covenant on Climate, the signatories agree to enter their climate actions in the carbon $n$  Cities Climate Registry and to submit their official documentation as a part of a regular reporting system on their greenhouse gas reduction commitments, on the performance of their GHG emissions and their portfolio of mitigation and adaptation actions through the online infrastructure of carbon $n$ .

The carbon $n$  Cities Climate Registry has two sections:

1. Section 1 is for cities that wish to undertake mitigation and climate change adaptation measures and that, by signing the Global Cities Covenant on Climate, pledge to take the first steps, such as preparing their emissions inventory, design and implement a Climate Action Plan and will adopt local legislation that favours GHG emissions reductions, among other measures.
2. Section 2 is for those cities that have already climate actions in place and which they wish to be measurable, reportable and verifiable (MRV). Signatories of the Global Cities Covenant on Climate are requested to enter their climate data (i.e. commitments, performance and actions) in the carbon $n$  Cities Climate Registry within eight (8) months from the date of signatory of the Covenant.

Cities included in the carbon $n$  Cities Climate Registry will also be ranked through a carbon $n$  Cities Climate Index based on their commitments, performance and actions.

The information submitted to the carbon $n$  Cities Climate Registry, will be handled with full confidentiality whereas the data output will be transparent and online.



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## Global Cities Covenant on Climate - "The Mexico City Pact"

### Signing form

I, Mr./Mrs \_\_\_\_\_

Mayor/Governor of \_\_\_\_\_

Would like to confirm the below information as the official commitment to the Global Cities Covenant on Climate –  
"The Mexico City Pact" and its provisions.

Date: \_\_\_\_\_

Place: \_\_\_\_\_

Sign: \_\_\_\_\_

(Official Stamp).

#### Designated political liaison for contacts with the Mayor/Governor's office:

Name-Surname: \_\_\_\_\_

Official Title: \_\_\_\_\_

Division/Department: \_\_\_\_\_

Phone Number: \_\_\_\_\_

Fax Number: \_\_\_\_\_

Email Address: \_\_\_\_\_

#### Designated Contact Point reporting to the carbonn Cities Climate Registry:

(please complete as appropriate)

Name-Surname: \_\_\_\_\_

Official Title: \_\_\_\_\_

Department: \_\_\_\_\_

Phone Number: \_\_\_\_\_

Fax Number: \_\_\_\_\_

Email Address: \_\_\_\_\_

**APPENDIX 2**  
BONN DECLARATION OF MAYORS

**We, Mayors of the World,  
coming from 35 cities in 30 countries and representing all continents  
gathered in Bonn, Germany, convened by World Mayors Council on Climate Change together with our partners  
at the Resilient Cities 2011: 2<sup>nd</sup> World Congress on Cities and Adaptation to Climate Change,  
are dedicated to confirm our commitment to globally coordinated local climate action.**

**Thereby, We, Mayors of the World,  
*Underlining***

That recent disasters which hit in particular Pakistan, Australia, United States, Canada, Brazil, and Japan, since our last meeting in Bonn in June 2010 remind us that resilience to disasters is of critical importance. Moreover, climate change is likely to exacerbate the intensity and frequency of many disasters, with a disproportionate amount of the associated impacts affecting the urban poor and vulnerable in developed and developing countries. As such, appropriate measures need to be urgently implemented at the local, subnational, national, regional and international levels to build local adaptive capacity for all types of disasters, including those likely to be exacerbated by climate change

***Recalling***

The Global Cities Covenant on Climate Change - the 'Mexico City Pact' and its reporting mechanism – the carbon Cities Climate Registry, key outcomes of the World Mayors Summit on Climate in Mexico City on 21 November 2010, as successful implementation of the proposals contained in the 2010 Bonn Declaration of Mayors and acknowledging the African Mayors Climate Change Declaration adopted in Cape Town, South Africa in March 2011 as providing important regional support to this global process.

***Welcoming***

The 2011 UN-HABITAT Report on Cities and Climate Change, the outcomes of the Mayor's Task Force on Urban Poverty and Climate Change, the First Assessment Report on Cities and Climate Change (ARC3) and the IPCC Expert Meeting on Human Settlements in Kolkata, India, on 22-24 March 2011, with a view that the outcomes of all these efforts should be appropriately fed into IPCC 5<sup>th</sup> Assessment Report and other relevant scientific and global studies in order to reflect the needs and opportunities for immediate climate action at the local level.

***Building upon***

The achievements of 'Making Cities Resilient' Campaign launched in Bonn in May 2010, under the leadership of the United Nations International Strategy for Disaster Reduction.

***Fully supporting***

Decision X/22 at of the 10<sup>th</sup> Conference of Parties of the Convention on Biological Diversity and its annex - The Plan of Action on Sub-National Governments, Cities and Local Authorities on Biodiversity, which further strengthens Decision IX/28, with a view that UN Climate negotiations should be inspired by such ambitious and innovative decisions.

***Supporting***

Opportunities presented by the Cancun Agreements, in particular para.7 of Decision1/CP16 that designates local governments as 'governmental stakeholders', introducing city wide approaches on CDM, the launch of the Green Climate Fund for long-term finance and the Cancun Adaptation Framework.

**We, Mayors of the World, declare the following Action Points:**

Regarding adaptation and urban resilience:

1. Considering the fact that over the next 40 years, particularly in the cities of the Global South, we will have to urgently build the same level of urban capacity that we built over the last 4000 years, efforts on urban resilience and adaptation should shift from a singular, special purpose focus on specific climate-affected infrastructure and locations towards a more integrated focus on overall risks, development conditions, and local area performance.
2. Future urban development should be assessed in terms of its contribution to improved urban resilience.
3. We recognize that the impacts of climate change will most severely affect vulnerable groups within our cities, and commit to pursuing strategies for social, economic, cultural and environmental development that will reduce the vulnerability of all citizens.
4. We recognise that ecosystem based adaptation offers a cost-effective and sustainable approach to adaptation that can improve human wellbeing, particularly of vulnerable groups, in the cities of the Global South.

5. We recognise the need for financial institutions to fund locally relevant and appropriate development, rather than conventional global financing mechanisms determining which local projects are eligible for funding. As such, we take note of ICLEI's Global Report: *Financing the Resilient City* presented at Resilient Cities 2011 and underline the three essential bottom-up features for building adaptive capacities for resilient communities and cities;
  - a. *Local planning processes* for identifying vulnerabilities and risks,
  - b. *Local technical and institutional capacity* for designing comprehensive adaptation and resilience upgrading projects;
  - c. *Local procurement of investment* through managed, competitive sourcing mechanisms and processes.
6. We further encourage efforts to advocate for the implementation of the below findings of the Report at the local, subnational, national and international level, supported via additional appropriate joint initiatives with business and civil society partners;
  - a. *Mainstreaming new adaptation and resilience standards* into conventional urban development projects, similar to recent 'green building' standards that have been mainstreamed into urban development and construction over the last decade.
  - b. *Developing specialized financial instruments* for comprehensive local adaptation and resilience upgrading projects in urban areas and systems known to be highly vulnerable.
  - c. *Building additional local institutional capacity* to prepare, structure and manage large scale redevelopment;

Regarding UN Climate Negotiations:

7. We urge the UNFCCC delegates to commence relevant processes for the full implementation of para.7 of the Decision1/CP16 that designates local governments as 'governmental stakeholders' both at the UNFCCC level and within the negotiations related to international environmental governance, with a view to reach an effective and efficient global environmental system.
8. We encourage national delegations to include local government representation where appropriate.
9. We propose that sustainable and resilient urban development that prioritises climate change adaptation, poverty alleviation and improved human well-being should be defined as a thematic window in the design of the Green Climate Fund under the UNFCCC.

Regarding further collaborative actions:

10. We encourage all local governments to further engage in decentralized and city-to-city cooperation in order to advance adaptation actions.
11. We encourage our international networks and in particular ICLEI and UCLG to work closely together maximising the engagement of local governments in the global environmental governance system. We encourage local governments to join the Making Cities Resilient campaign. We further invite interested partners and stakeholders to consider their support in building an alliance that will ensure the long-term sustainability of the Resilient Cities Congress as the global forum for learning, cooperation and networking on all aspects of urban resilience and adaptation to climate change.
12. We call upon national governments, multilateral institutions, and civil society stakeholders to recognize the value of the Global Cities Covenant on Climate - "the Mexico City Pact" and the carbonn Cities Climate Registry, which has 191 signatory cities as of today, representing around 300 million citizens, as the global response by local governments to the call for measurable, reportable, verifiable climate action and access to global climate funds.
13. In preparation for COP 17 in Durban, South Africa, in December 2011, we commit to support the pre-COP conference to be hosted by Durban and its partners, aimed at raising the international profile of adaptation as an urgent priority for the cities of the world, in particular those of the Global South, where high levels of poverty and underdevelopment put vulnerable populations and infrastructure at immediate and severe risk, thereby hindering progress towards achieving global development objectives. On the eve/during COP17 in December 2011, in Durban, we will further communicate outcomes of this pre-COP conference at the Conference of Signatories to the Mexico City Pact, with a view to strengthening adaptation actions alongside those of mitigation.

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