

Tomorrow is too Late: Responding to Social and Climate Vulnerability in Dar es Salaam, Tanzania

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Tomorrow is too Late:¹

Responding to Social and Climate Vulnerability in Dar es Salaam, Tanzania

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1. Introduction

Seventy percent of the population of Dar es Salaam lives in unplanned settlements; and fifty percent of the residents of these informal settlements live on an average income of less than US\$1/day (Ndezi, 2009). This fact is an important starting point for discussing the city's vulnerability to climate change, and the strategies for adapting to this. The large number of people living in poor quality housing, frequently on land that is exposed to a variety of hazards, are socially, economically and environmentally vulnerable. The city also has severe shortfalls in its sanitation systems: estimates suggest that approximately 93 per cent of urban residents rely on pit latrines of various types, 5 per cent have access to septic tanks or sewerage, and the remaining 2 per cent have no formal excreta disposal facility (Chaggu et al, 2002). Adaptation responses need to take these issues into account if they are to respond to the threats posed by climate change – and to meet the needs of low-income urban residents.

Dar es Salaam is a coastal, tropical city, located about 7 degrees south of the equator. Average daily peak temperatures are around 25°C between May and August, and up to 35°C between October and March. There are two rainy seasons: the 'short rain' season between October and December, and the 'long rain' season between March and May. Its physical situation is the basis from which the main environmental and climatic threats are derived: particularly in relation to sea-level rise; drought and flooding. These physical hazards are translated into specific risks as a result of the demographic, social and economic situation of the city. Dar es Salaam is the largest city in Tanzania, with a population of approximately 2.7 million (in 2000). The population has grown rapidly over the past several decades – from 67,000 in 1950 to 572,000 in 1975 – a situation that compounds many other difficulties (United Nations, 2008).

Understanding adaptation in Dar es Salaam requires a recognition that there is much to be done – but also that individuals, households and communities have developed a variety of strategies to deal with the adverse conditions caused by climate variability. This case study begins with a description of vulnerability to climate change in Dar es Salaam and a listing of the key stakeholders involved in adaptation activities as a means of describing the context in which adaptation is taking – and needs to – take place. The main component of the case study examines three sets of activities related to adaptation to climate change: existing coping strategies to deal with climate-related threats; broad-based city-improvement programmes that build resilience without explicitly addressing themselves to climate change; and explicitly climate-related activities (some of which contain both mitigation and adaptation components). The final sections propose areas in which further adaptation interventions are required, and discuss some of the main challenges facing the process of climate change adaptation in Dar es Salaam.

2. Vulnerability to Climate Change in Dar es Salaam

Dar es Salaam is susceptible to a wide range of climate threats. These include sea-level rise and coastal erosion, flooding, drought and water scarcity, and the disruption of hydro-

1. Quotation from interview with Mayor Adam Kimbisa, 18 June 2009.

electricity generation. These are exacerbated by poor socio-economic and environmental conditions caused by low levels of economic growth, mismanagement of the process of urbanization, and inadequate social services.

2.1 Sea-level rise and coastal erosion

Sea level rise due to climate change is a serious global threat: with rises of 1–3 metres in this century being anticipated (Dasgupta et al, 2007). On the East African coast, sea-level rise will increase flooding with potential adaptation costs of up to 10 per cent of GDP (Boko et al, 2007). Within the coastal zones of Dar es Salaam city, a rise in sea level of one metre, which in many places may be accentuated by the phenomenon of subsidence would aggravate the already existing ecological problems through increased rates of coastal erosion, more persistent flooding, loss of wetlands, increased salinization of groundwater and soil as well as greater influx of diverse pollutants. This subsidence is exacerbated by human activities, including dynamiting of coral reefs for fishing, sand extraction for construction, lime manufacture from coral rocks, removal of salt pans, and the cutting of poles from mangroves (Ibe and Awosika, 1991). The projected subsidence rates are 15 cm to 95 cm by 2100 and a sea level rise of 50 cm would inundate 2,000 square km of land in Tanzania (Elasha-Osman, 2006).

The problem of coastal erosion is already widespread in Dar es Salaam, particularly in the area of Kunduchi beach, to the north of the city. The beach has been gradually eroded by about 200 metres in the last 50 years due to the strength of headwater waves. Mr. Rajabu from Kunduchi stated that the beach is closer to his village than in the past with dramatic consequences which included washing away of a mosque and five residential houses as well as destroying a historic fish market. The Africa Hotel, which was constructed in this village in 1967, has been destroyed and is no longer operating.

2.2 Flooding

Excessive rainfall has led to frequent flooding in Dar es Salaam experiences frequent flooding that damages infrastructure and property and disrupts economic activities (see Figure 1). Various city newspapers reported that the heavy rainfall of early March 2008 caused substantial losses both socially and economically, including damage to smaller bridges and roads, flooding of homes, and the deaths of several children.

2.3 Drought and water scarcity

Residents of Dar es Salaam have been experiencing water scarcity for many years. Despite heavy rains in 2008 that meant the flood gates of the Mtera Dam had to be opened, people continue to experience water problems. The sight of women carrying water buckets on their heads remains a common sight, as does that of vendors pushing carts filled with 20 litre containers of water. The water crisis is mostly felt by women and girls as they are the ones who shoulder the burden of fetching water, spending hours queuing for at places where it is available, frequently disrupting girls' education. Dar es Salaam needs 410 000 cubic metres of water daily but receives only 270 000 cubic metres daily.² Yet even this inadequate supply of water is not supplied regularly. Broken pipes are frequent, and residents sometimes have to go for over three days without water.

2. Personal communication from Alex Kaaya, Chief Executive Officer, Dar es Salaam Water and Sewerage Corporation.

Figure 1. Flood water at the junction of Bibi Titi Mohamed and Morogoro Road, Akiba



Photo: Christopher Lissa.

Health workers in Dar es Salaam have also warned of cholera and related dangerous diseases after water shortages which forced many of the city's 3.2 million residents to use rivers and ponds for ablutions. The water shortage has disrupted supplies in three-quarters of Dar es Salaam. The high density suburbs of Ubungo, Manzese, Sinza, Kawe, Buguruni and Temeke, as well as the central business district had been particularly hard hit, with thousands of residents drinking untreated water from boreholes and streams.

2.4 Hydroelectricity disruption

Electricity cuts have become increasingly frequent in Dar es Salaam in the last two years as the water level in the dams has gradually fallen. Electricity rationing began in November 2006, as a result of a year long drought drying up important feeder dams for the country's hydro-electricity generating stations. At this point, water levels in the main hydroelectric source were only 59 cm above the level at which production would have to halt, and electricity was cut off from 0800 to about 1700 each day. Disruption of this type is likely to become more frequent as a result of climate change.

3. Stakeholders for Adaptation

A variety of stakeholders in Dar es Salaam are involved in responding to these climate threats. The state functions at several levels: wards (which cooperate in waste management programmes and pay for their refuse collection); municipalities (which are responsible for managing general waste, such as ensuring availability of sufficient services for refuse collection); the city council (responsible for provision and maintenance of water supply infrastructure and ensuring that the city has reliable storm water drainage systems); and the national government (which provides necessary legislative and policy guidance, financial grants and other resources to municipalities and the city council when available).

Non-governmental organizations (NGOs) and community-based organizations address diverse issues ranging from lobbying, advocacy and human rights to service provision. They bring creativity, innovation and develop strong community links thereby playing a catalytic role in improving the delivery of various types of services. This justifies the national NGO Policy which recognizes NGOs as development actors in their own right.

A variety of international actors also work towards adaptation. International donor agencies can expand opportunities for community participation in development, and provide financial and technological support and institutional resources to achieve results. For example, Cities Alliance works on poverty alleviation through the promotion of conservation and community development by providing small grants and other local level initiatives. It also combines or sequences various sources of funds to implement priority actions strengthening national and local capacities, and to scale up local action mainstreaming climate change risk management into national development strategies.

4. Coping with Risk

The first type of adaptation that is evident in Dar es Salaam can best be categorised as coping with risk. This refers to existing strategies that are used by urban residents to respond to climate variability and other threats. These are often short-term efforts to prevent injury or damage to property; usually require little financial expenditure; and are not part of a larger or more structured plan. In addition, they tend to address immediate symptoms rather than the root causes of vulnerability; and rarely result in longer-term resilience or greater levels of sustainability. Because of this, these strategies are frequently ignored by policy-makers, yet represent ongoing, locally-based attempts to deal with climatic hazards by different groups – particularly low-income groups. Yet supporting households in coping with these risks is an important component of adaptation – particularly where resources are limited.

Low-income urban residents in Dar es Salaam adopt a variety of strategies to cope with risk. These coping strategies take a variety of different forms, and are perhaps most evident in the ways in which individuals and households deal with the challenge of flooding. Climate change is likely to result in more intense rainfall in Dar es Salaam (Eriksen et al, 2008, p5), with the result that flooding is likely to become more frequent and more extreme.

Residents in Tandale (Kinondoni Municipality) explained how flooding in their community is caused by a stream overflowing and by poorly maintained storm-water drainage systems. Inadequate solid waste collection accentuates this problem, as refuse dumped in the stream

Figure 2. Stream in Tandale



Photo: David Dodman.

(both inside and outside the community) causes blockages that lead to flooding (Figure 2). A resident of the area, Mwanahamisi Mohammed, vividly described the situation: “*When it rains, short people like me can be covered with water... After the rains there is still water coming and you cannot sleep on our mattress. March to June is the rainy season so we are in trouble during that period – and during that period there are so many diseases*”. Certain groups within the population are particularly vulnerable, particularly children. As another resident, Jamila Balari, stated “*There are so many challenges for children. There is no place to play, and sometimes children die in the flooding – last year five children were washed away and died*”.³

The residents of this area recognize that a long-term solution requires addressing these issues, but have developed endogenous strategies to protect themselves and their houses from flooding when it occurs. Some of these are short-term strategies: Jamila Balari explained that “*When it starts to rain, the first thing to do is to take the mattress and small items and put them in the ceiling. If it gets worse, young men will carry children to the upper side of the area*”. These short term solutions generally involve moving items that can be moved, and temporary relocation. But there are also longer-term structural solutions, mainly related to the construction of additional walls around houses (Figure 3), with entry to the house therefore requiring climbing up and down a set of steps.

These coping strategies should be seen within a broader context of growing awareness of climate change among urban residents. Khadija Kingi, a member of the Tanzania Federation of the Urban Poor in Kurasini (Temeke Municipality), commented that “*I have heard that the rise in temperatures means that the sea will rise, and that it will eat parts of the land and destroy some houses*”; whilst fellow-member Husna Shechonge said “*the snow at Kilimanjaro is melting because of the higher temperatures*”.³ The challenge for policy-makers is to include this growing awareness within a broader framework that supports both immediate and more strategic responses to these threats.

Figure 3. Flood protection wall around a house in Tandale



Photo: David Dodman.

3. Group Discussion, 17 June 2009.

5. Building Resilience

The second type of adaptation strategy can be classified as building resilience. Vulnerability to climate change is not purely about exposure to hazardous events or changes: rather, it is a factor of resilience in the face of shocks and stresses. According to the Intergovernmental Panel on Climate Change, resilience is “[t]he ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity for self-organisation, and the capacity to adapt to stress and change” (IPCC, 2007, p880). An alternative assessment of the concept sees resilience as a process or way of functioning, that enables not only coping with added shocks and stresses, but also addressing the myriad challenges that constrain lives and livelihoods, and facilitating more general improvements to the quality of human lives. Resilience as a process therefore takes into account the economic, social, psychological, physical and environmental factors that are necessary for humans to survive and thrive (Dodman et al, 2009).

Many interventions being undertaken in Dar es Salaam – by local, municipal, national and international stakeholders – contribute to building this resilience through improving infrastructure and services, particularly for the urban poor. Addressing the challenges of climate change adaptation may not be the explicit or primary purpose of these activities, but in practice they will assist in the process of adaptation. Indeed, for many cities in low- and middle-income countries, this is likely to be the single most important component of an overall adaptation strategy.

In addition, using the city as the scale of analysis, Dar es Salaam can be identified as experiencing an ‘adaptation deficit’. This is a situation in which infrastructure is insufficient to cope with present climatic conditions. For example, the storm-water drains serving Dar es Salaam were constructed in the 1950s to serve a much smaller population than present – before these can be ‘adapted’ to deal with future climate threats, they must first be upgraded to deal with current conditions. In this respect, it is helpful to consider Lord Nicholas Stern’s definition of adaptation: development in a more hostile climate (Stern, 2009). Many of the adaptation needs for Dar es Salaam, therefore, are based on the need for development that takes a changing climate into account.

Many communities are involved in activities that will build the resilience of individuals and households. For many low-income urban residents, savings schemes form the basis for this resilience. The practice of saving regularly has both instrumental benefits (the ability to access funds when necessary) and organizational benefits (the relationships of trust built up around small savings groups are central to identifying solutions to larger problems). Small-scale loans repaid over very short time periods provide much needed capital for livelihood activities. And the ability to access land that is not vulnerable to climate threats such as flooding and landslides on which to build secure housing provides protection against short- and long-term climatic threats.

In Kurasini, near the main port of Dar es Salaam, approximately 36,000 people have been or are currently awaiting eviction as result of port expansion plans (Figure 4). Although this is obviously not a climatic threat, the process of land becoming unusable, and the need to relocate, is one that will be repeated as a result of climate change. The Tanzania Federation of the Urban Poor, in association with the Centre for Community Initiatives (a local NGO), has been addressing this issue through a process of community organization. This began with savings schemes and enumerations, and has continued with group purchasing of an alternative piece of land. Initial plans for compensation were limited to the owners of properties, but many of the residents of the area were tenants and therefore ineligible. Working together, the

Figure 4. Area of demolished houses in Kurasini



Photo: David Dodman.

residents of the area have identified 30 acres of land in Chamazi, which has been collectively purchased by 300 families for US\$24,000. Yet this is only the starting point in a complex set of processes: including negotiations with the city authorities over the minimum allowed plot size; provision of loans for building; and the development of affordable housing designs. This process builds the capacity and resilience of low-income urban residents, and enables them to acquire better-constructed housing in safer locations, a set of strategies which will equally facilitate adaptation to more specific climate-related threats. Federation groups are also involved in improving the supply of drinking water in communities, for example through the reconnection and management of water kiosks; the provision of a small revolving loan project for lining and improving pit toilets; capacity building for hygiene promotion; and working with households and local authorities for solid waste collection.⁴

Other small-scale initiatives also demonstrate the potential for building resilience. Among these are recently developed innovative solid waste management strategies that are implemented at the scale of the community, in which residents of unplanned settlements make a nominal payment of 100 shillings (less than US\$0.10) per collection. Activities of this type that link community capacity and municipal action demonstrate the potential of partnerships between different stakeholders to address pressing problems. This activity creates several benefits that can be seen as building resilience in the face of climate change. The presence of uncollected waste generates a variety of public health risks, and this waste frequently blocks streams and drainage channels leading to flooding. These blockages also create ideal breeding grounds for *Anopheles* mosquitoes that carry malaria (Caldas de Castro et al, 2004). Solid waste collection has gradually been improving in Dar es Salaam (from 10 per cent in 1994 to 40 per cent in 2001), but there is the potential for further improvements, for example through waste recycling and composting (Kaseva and Mbuligwe, 2005).

Various larger activities have aimed to address the infrastructural problems facing Dar es Salaam. The Community Infrastructure Upgrading Project aimed to upgrade infrastructure and services in unplanned and under-serviced settlements. The first phase (2005–2008) involved 16 communities and was expected to benefit 167,000 people; the second (2008–

4. Interview with Meki Mkanga, Centre for Community Initiatives, 17 June 2009.

2011) covers 15 communities and 162,000 people. Communities are involved in the process of choosing infrastructure priorities, including roads and footpaths, drainage, solid waste management, street lighting, and public toilets.

Various projects also exist to improve the provision of water and sanitation: some of which entail extending infrastructure in low-income communities; others of which are based on expansion and rehabilitation of water supply to the city as a whole. The city council plans to construct a number of strategic water supplies, including new boreholes with electric submersible or hand pumps. In 2008, the European Union water facility granted financing for the provision of clean, safe and reliable water supply and sanitation in 14 peri-urban areas of Dar es Salaam, which is intended to provide 60 water supply systems and provide 170,000 people with access to safe drinking water, sanitary facilities, capacity building, and awareness raising to improve hygiene and sanitation (The Citizen newspaper, 2009.) Elsewhere, the provision of community standpipes that provide water at a cost of 20 shillings (approximately US\$0.02) per litre have expanded the availability of water to low-income residents at a reduced cost.

Perhaps the largest project that aims to address many of the infrastructural problems facing the city is the Citywide Strategy for Upgrading Unplanned and Unserviced Settlements in Dar es Salaam, coordinated by the Cities Alliance. This project began in 2005 with the objective of developing mechanisms for local authorities to work with partners to implement projects that improve living conditions in squatter settlements. These interventions have been developed in a city-wide approach that takes all different sectors into account.⁵ A draft Citywide Action Plan has been produced which outlines and details specific activities to be carried out, the roles and responsibilities of various stakeholders, and scenarios for financing. The implementation of this plan will bring together various state, civil society, and private sector partners. The primary objectives of this strategy include:

- provision of 40,000 affordable planned plots by 2015 (and a further 150,000 new plots by 2020);
- increased density of residential areas;
- access to safe drinking water increased from 30 percent to 60 percent;
- access to adequate sanitation increased from 30 percent to 60 percent;
- improved coverage of access and circulation roads and drainage;
- solid waste collection and management improved from 30 percent to 60 percent (Cities Alliance, 2009).

All of these interventions will play an important part in building the resilience of low-income urban residents to face a variety of shocks and stresses – including those that will result from climate change. However, the current version of the Citywide Action Plan does not explicitly identify climate change as an area of focus, and it should be ensured that the proposed actions are both ‘climate-friendly’ and ‘climate-proof’. With that proviso, improving the ability of the urban poor to acquire safe land with suitable water, sanitation and drainage will reduce their vulnerability to a wide range of climate-related hazards, including flooding, water scarcity, and diseases.

6. Responding to Climate Change

The final set of adaptations to climate change that exist in Dar es Salaam are those that do have a specific climate change focus. This is the smallest set of activities to be discussed, for reasons that will be discussed in section 8 below. These responses take place at a variety of

5. Interview with Maria Marealle, Cities Alliance, 17 June 2009.

scales, and involve individuals and households, the state (at local and national levels), and NGOs (both local and international).

As described above, many individuals and households in vulnerable situations have already adopted strategies to reduce their risk from climate variability and change. In addition, it is likely that (where possible) families and households will make incremental improvements to their dwellings to deal with prevailing climatic conditions – spending that is seldom included within global estimates of adaptation costs.

Various environmental NGOs in Dar es Salaam are directly involved in activities to support adaptation. Environmental Protection and Management Services (EPMS) is a Tanzanian NGO that has been engaged in climate change for more than a decade. Although this initially prioritised mitigation activities, the involvement of EPMS in the Capacity Strengthening for Adaptation to Climate Change in the Least Developed Countries (CLACC) programme since 2005 has lent a stronger focus to adaptation. Activities have included conducting research on the distribution and spread of malaria in the highland areas of Tanzania, compiling a study of Dar es Salaam's vulnerability, building capacity for community-based adaptation, creating a library of resources on climate change adaptation, and raising awareness with other civil society groups through the formation of an NGO Forum on Climate Change and Development.

Other NGOs address climate change issues, although more frequently from the perspective of mitigation. Tanzania Tradition Energy Development and Environmental Organization (TaTEDO) promotes access to modern energy services for productive and consumptive use, undertakes field implementation of sustainable energy programmes and projects, and mitigates environmentally adverse effects associated with energy production and use. TaTEDO's promotion of solar photo-voltaic power technology has increased public awareness on the potential to access lighting, radio and television services – whilst simultaneously providing mitigation benefits. Similarly, the Tanzania Solar Energy Association (TASEA) aims to develop and promote the rational use of solar energy in Tanzania through its members.

The Dar es Salaam City Council is engaged in a range of environmental and carbon emission reduction initiatives – some of which will also provide adaptation benefits (Dar es Salaam City Council, n.d.). In the energy sector, activities include landfill gas capture and electricity generation, with the potential to reduce annual greenhouse gas emissions by 200,000 tons of CO₂eq, and a planned briquetting plant that will reduce annual emissions by 111,360 tons CO₂eq. Improved waste management incorporates the development of transfer stations and new disposal sites; while a mixed type of collection system, involving door-to-door collection in planned areas and a collection-point service in unplanned areas will help to reduce the amount of uncollected waste that poses health hazards and disrupts drainage. The development of a compost plant will reduce the amount of uncollected biodegradable waste, and has the potential to reduce emissions by 160,000 tons of CO₂eq per annum. A comprehensive transport master plan has been prepared for the city, which includes provision for a Bus Rapid Transit (BRT) System – this will make mobility more efficient and environmentally friendly.

7. Areas for further intervention

Yet despite these promising interventions, there are substantial adaptation needs in Dar es Salaam. These fall into the broad areas of social, scientific, and infrastructural change. Social changes for adaptation are primarily related to education and capacity building. At the national level, there appears to be widespread awareness of the importance of climate change

in central government, led by the Vice President's Office (which contains the Directorate for the Environment), but this is seldom transmitted to the local level. At the community level, climate change is not widely recognized as contributing to the variety of other social and environmental problems faced by individuals – particularly in low-income settlements. Awareness-raising is therefore an important area for adaptation. Some of this is likely to be addressed in a planned capacity building programme organized by the Carbon Finance Unit of the World Bank, in which Dar es Salaam is one of four included cities.⁶

These awareness issues need to be supported by investment in scientific information. The detailed implications of climate change – including detailed estimates of temperature change, sea-level rise, and changes in precipitation – for Dar es Salaam are not well known, yet require elaboration if they are to be used as the basis for planning. New buildings need to be constructed in such a way that maintains cooler temperatures in the face of warming, and that simultaneously use less energy⁷ – generating a 'win-win' situation for both mitigation and adaptation.

Substantial investments are required in infrastructure for adaptation in Dar es Salaam. Many of the threats facing Dar es Salaam are from the sea – indeed, according to Ladislaus Changa of the Tanzania Meteorological Agency and the Institute for Resource Assessment, "*the most immediate threat in Dar es Salaam is to coastal areas*".⁷ Adapting to future rises in sea-level requires a variety of responses: including 'hard' engineering (e.g. the construction of sea walls); 'soft' engineering (e.g. the protection and expansion of mangroves); and social responses (e.g. managed retreat). Owners of hotels and private homes along the coastlines of Dar es Salaam have already started to protect their properties from erosion by constructing seawalls and groynes to prevent the loss of sediment. However, these individual actions may have harmful side-effects through their modification of hydrodynamic and sediment transportation systems – frequently moving the problem of erosion to nearby areas.

Infrastructure is also required to reduce the incidence of flooding: the pipes and channels for diverting storm-water to the sea were built in the 1950s and are inadequate for current demand. As explained by Kasulwa Mvano of Kinondoni Municipality, "*there is a need for an overhaul of the storm-water drainage system – but there is no plan for its rehabilitation*".⁸ Storm drain systems should be effective in preventing flooding, but are frequently blocked by solid waste. In this regard, unblocking drains can be an effective adaptation measure: the cleaning of the Kibasila drain in Temeke resulted in a reduction of 60 cm in the level of a nearby swamp. Drainage work has long been a key feature of Dar es Salaam's malaria control programme, and it has clearly been shown that the construction and maintenance of drains is one of the most important measures for reducing mosquito density, controlling floods, and reducing the size of marshy areas.

These infrastructural changes need to be supported by more effective urban planning. The last Master Plan for Dar es Salaam was prepared in 1979, and does not reflect current realities or the future climate. Planning of this sort needs to take vulnerable areas into account and to incorporate measures that will discourage settlement in these locations – but also needs to ensure that land is identified that can serve the needs of low-income groups. The local authorities also need to ensure that their actions support the ways in which communities already deal with climate variability and change, as explained above.

6. Mohammed Mkumba, Dar es Salaam City Council, Group Discussion, 16 June 2009.

7. Ladislaus Changa, Tanzania Meteorological Agency, Group Discussion, 16 June 2009.

8. Kasulwa Mvano, Kinondoni Municipality, Group Discussion, 16 June 2009.

Activities elsewhere in East Africa can also point to appropriate adaptation strategies. A variety of strategies have been suggested in Kampala, Uganda: including innovative urban agriculture activities; urban greening on hill slopes to increase infiltration; and encouraging the formation of community groups to share information and work together on common challenges. Urban development policies and plans can be used to upscale these innovations to the city-wide level (Lwasa et al, 2009).

8. Challenges for Adaptation

In order to meet these adaptation needs, many challenges will have to be overcome. The first of these is linked to the awareness of climate threats: many individuals, city officials, and others involved in urban development are unaware of these, and what they will mean in relation to achieving broader goals of city improvement. According to the Mayor of Dar es Salaam, Adam Kimbisa, city officials have much more knowledge of mitigation because there has been little effort at building capacity in adaptation. This reflects a broader focus on mitigation – despite the fact that Tanzania has very low levels of greenhouse gas emissions. This situation is borne out by the focus of the City Council’s brochure on Environment and Carbon Emission Reduction Initiatives, and the interest in Clean Development Mechanism (CDM) and Reduced Emissions from Deforestation and Degradation (REDD) activities – which are associated with a guaranteed source of funding. In contrast, and as stated by the Mayor, “*we need a small dose of mitigation, but a much bigger dose of adaptation*”.⁹

Within Tanzania, adaptation priorities have tended to have a rural focus. The National Adaptation Programme of Action (prepared in 2006) identified 14 priority project activities of which most were rural with a focus on agriculture, forestry and rural livelihoods. These activities were ranked in order of priority – and only the final item (‘establish good land tenure system and facilitate sustainable human settlements’) can be identified as having an explicitly urban focus.

These challenges are compounded by difficulties in financing adaptation in urban areas. At a global level, the scale of financing for adaptation is inadequate; and the components of this that are available for urban areas and the development of infrastructure are smaller still. Investments such as those that will take place under the Citywide Strategy for Upgrading Unplanned and Unserviced Settlements are vital, but these need to be complemented by specifically targeted funds and interventions for adaptation.

In summary, meeting the adaptation challenge for Dar es Salaam requires greater awareness on the part of citizens; greater political will; specific interventions in infrastructure; and more effective financing mechanisms to support these processes. Perhaps the final word in this case study should rest with Mayor Adam Kimbisa: a strong advocate for ensuring Dar es Salaam adapts appropriately to climate change:

*The message is clear. We need to put a system in place to have tangible projects, working with local government, community-based organizations, and non-government organizations. We need to avoid seminars and go directly to doing things, and we must have a bottom-up approach. And these activities must take place yesterday, because tomorrow is too late.*⁹

9. Interview with Mayor Adam Kimbisa, 18 June 2009.

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