



PROMISING PRACTICES ON CLIMATE CHANGE IN URBAN SUB-SAHARAN AFRICA

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INTRODUCTION

PROMISING PRACTICES ON CLIMATE CHANGE IN URBAN SUB- SAHARAN AFRICA



Humankind faces a very dangerous threat. Fuelled by development and manipulation of the environment in the industrial age, the effects of urbanization and climate change are converging in dangerous ways.

Sub-Saharan Africa is a case in point. Desertification, destructive floods and other disasters expose decades of nonexistent urban planning and huge backlogs in basic services. It is not just the Millennium Development Goals, poverty reduction or food security that are now coming under threat, but also the foundations of socio-economic development.

However, alongside these threats is an equally compelling set of opportunities. Although urban areas, with their high concentration of population, industries and infrastructure, are likely to face the most severe impacts of climate change, urbanization will also offer many opportunities to develop cohesive mitigation and adaptation strategies to deal with climate change. The populations, enterprises and authorities of urban centres have major roles to play in these strategies.

UN-Habitat's Cities and Climate Change Initiative

Many governments south of the Sahara have developed National Adaptation Plans of Action with support from the secretariat of the UN Framework Convention on Climate Change (UNFCCC). However, most of these plans tend to overlook the central roles of urban areas and urbanisation in development, or the specific way climate change is going to affect them. UN-Habitat's *Cities and Climate Change Initiative* was launched in early 2008 and has already attracted some 30 cities in Africa, Asia and Latin America.

Its basic rationale is that since cities contribute so much to climate change, they must also provide a large part of the solution. In this sense, the Initiative builds on the momentum gathered over the past decade by the *Sustainable Cities and Local Agenda 21* programmes.

Faced with climate change, cities must reduce the vulnerability of natural and human systems against actual or expected effects (adaptation), as well as reduce greenhouse gas emissions and enhance carbon sinks (mitigation). As case studies in this *Compendium* go to show, these efforts require improved capacities from local authorities. UN-Habitat is there to help improve policy dialogue, synergies and links between national and local climate change policies and programmes.

Three main lessons and the 'green' promise

Adequate urban services and effective planning controls in the face of demographic expansion provide municipal authorities with solid defences against the effects of climate change, and this *Compendium* shows as much. During a two-day workshop in Nairobi, Kenya in early May 2011, representatives from municipal bodies, the voluntary and the private sectors in 15 selected Sub-Saharan locations discussed their early experiences against a variety of odds, including socio-economic disintegration or the prospect of submergence. The three main lessons were as follows: (1) climate change and demographic expansion can be tackled with existing instruments, but cities need new resources and donors have a major role to play; (2) nothing can be done without well-entrenched political will, and (3) little can be durably achieved without central government support.

The other perspective emerging from this wealth of experience is that a conjunction of Sub-Saharan Africa's natural (biodiversity) and human (increasing employable population) capitals has the potential to pave the way for climate-resilient, low-carbon socio-economic development. In doing so, Africa would be better poised to ward off the current and future effects of climate change.

'Promising' v. 'best' practice

At least this is the promise. As workshop participants knew too well, fulfilling the promise must start *now*, and all stakeholders must be involved, including the private and voluntary sectors and whole urban populations. Since this is a largely unprecedented undertaking, workshop participants had no 'best practice' to offer yet. Instead, they agreed that some 'promising practices' were emerging, which they began to share between themselves.

The promising practices from the 15 Sub-Saharan cities or countries share five defining features, as follows: (1) a *process*- rather than a result-oriented perspective, anticipating on the next problem or challenge rather than just relying on past experience or solutions; (2) an evolving, learning, sharing process, instead of competition, performance and selection; (3) a two-way relationship with multiple stakeholders that takes in local priorities, knowledge and 'voice', as opposed to one-way command-and-control or top-down expertise; (4) looking for convergences between environmental concerns and prevailing traditional cultures, instead of carrot-and-stick social engineering; and (5) an ongoing process that facilitates updates and inputs in local languages from a variety of stakeholders (with a designated correspondent to record developments), rather than formal, one-off documentation.

Rewards for promising practice

UN-Habitat manages, co-manages or is connected with various awards: the *Habitat Scroll of Honour*, the *Dubai International Award for Best Practices*, the *World Habitat Awards*, the *Habitat Business Award* and the *Rafik Hariri UN-Habitat Memorial Award*. These awards document, recognize,

publicize and disseminate outstanding solutions to various human settlements problems. Submissions received for the Dubai International Award are classified into 'best', 'good' and 'promising' practices.

The major criteria for a Best Practice include:

- Improved living environments, particularly for the poor and disadvantaged
- Partnership between at least two entities that meet the criteria in the guidelines
- Sustainability, through lasting changes in legislation, social policies, institutional frameworks and management systems
- Leadership and community empowerment
- Gender equality and social inclusion
- Innovation within local context and transferability
- Tangible impact resulting from the transfer of ideas, skills, processes, knowledge, expertise or technology.

For the purposes of the Dubai International Award, a practice is 'promising' if it meets the following three criteria: (1) it comes under one of the relevant areas; (2) it features the basic elements of the minimum criteria; and (3) it shows good potential but its lifetime (usually less than two years) is too short for meaningful assessment. When submitted for the award, practices assessed as 'promising' are provided substantive feedback and encouraged to apply in the following cycle when not selected first time around.

In this *Compendium*, Sub-Saharan Africa's promising practices are presented in four (colour-coded) categories in an easy-to-read format that takes into account the multiple dimensions of climate change. Hopes are that through sharing and learning across cities, these practices will eventually come to be considered as 'best'. The four categories are the following:

- Major roles for gender, youth and business
- Adaptation: infrastructure, slums and deserts
- How coastal cities face up to climate change
- Enhancing and spreading awareness of climate change

For further information

Contact email: updb@unhabitat.org

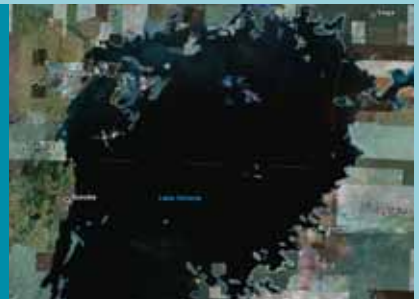
SECTION



MAJOR ROLES FOR GENDER, YOUTH AND BUSINESS

Lake Victoria:

An integrated model for climate change-proof water utilities



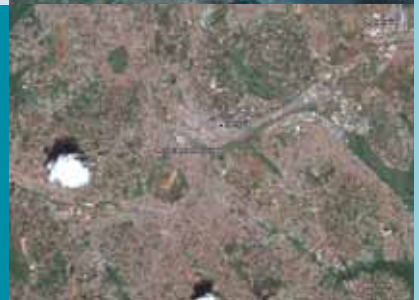
Mombasa:

A youth initiative to sustain mangroves and livelihoods



Kampala:

Mobilising women for climate change adaptation



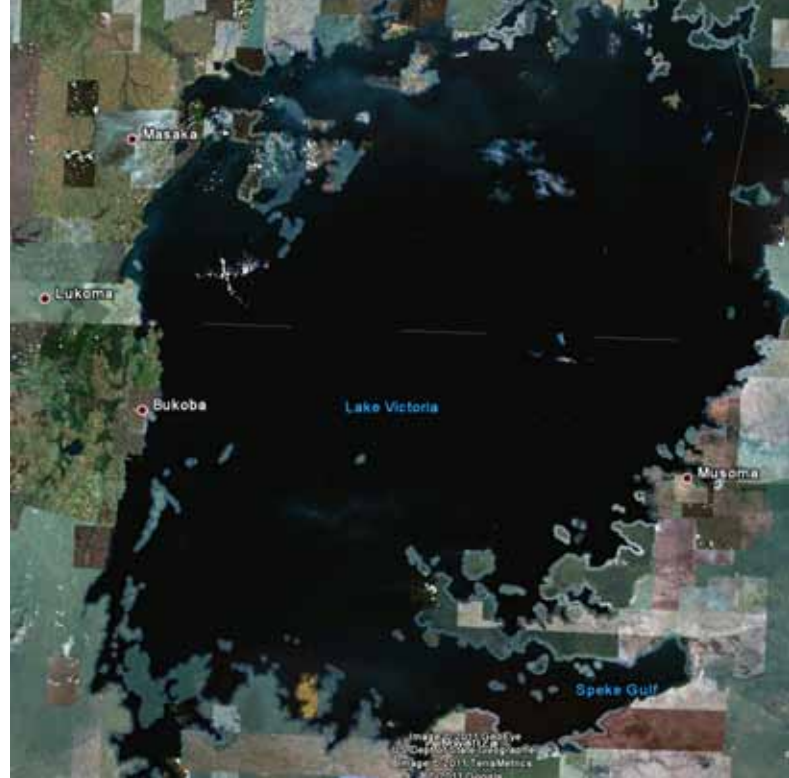
Nigeria:

Business launches Green Building Council for climate change mitigation



CHAPTER 1

LAKE VICTORIA: AN INTEGRATED MODEL FOR CLIMATE CHANGE-PROOF WATER UTILITIES



By their very nature, water utilities deal with supply and demand of this vital resource, but in Africa this takes on a special dimension against the double challenge of climate change and unabated population growth. The world's second largest freshwater body in the world (and the largest on the continent), Lake Victoria supports Africa's largest inland fishery, and is of critical socio-economic importance to the three riparian countries (Tanzania, Uganda and Kenya) and beyond (Rwanda and Burundi); it is also the source of the Nile River. As a result, the demographic density in the basin is extremely high (170 people/sq km). The growth rate of the population (8.1 million) is the fastest of the whole continent as migrants from unemployment- and drought-hit areas turn to the lake and surrounding fertile land (two wet seasons and two crops per year) for livelihoods – with the associated expansion of insalubrious informal settlements, mostly in secondary towns.

Lake Victoria and local water utilities are particularly vulnerable to the effects of climate change for two main reasons: (1) receiving 80 per cent of its water from direct precipitation, the lake is very sensitive to even moderate changes in

rainfall; (2) influents are scarce and the surface area of the lake is large compared with its volume, both factors suggesting that it can dry up quite easily. A direct source of livelihoods and fresh water, the lake also serves as the main receiving body for domestic and industrial waste. Increasing urban demand for water is also met by local springs and wetlands. The complex interplay between local communities and the environment is why in 2006 UN-Habitat launched a *Water and Sanitation Initiative* in the Lake Victoria basin (see boxed item).

Local issues related to climate change and sustainable urbanisation

- Water is and will continue to act as a constraint on local development
- local utilities must reconcile the requirements of demographic and socio-economic expansion with those of water preservation in the face of climate change over the decades to come
- average temperature is to rise 1°C over 20 years and climate is to become wetter
- water level is now at the lowest in 80 years, due to natural variability, climate change and water diversion

THE WATER AND SANITATION INITIATIVE

The Lake Victoria Region Water and Sanitation Initiative is a collaborative effort between UN-Habitat, Kenya, Tanzania, Uganda and the East African Community. With support from a dedicated Trust Fund, the scheme helps 25 small towns to achieve the water and sanitation target set under the Millennium Development Goals. The rationale is that this can take only low-cost rehabilitation of existing infrastructure, with capacity-building to ensure sustainability. The first stage involves 10 towns with populations of 20,000 to 200,000 and inadequate water provision. Also included is design and improvement of solid waste management systems, as volumes are increasing with rapid demographic growth.

- severe lake level falls in 2004-2005 were due to drought (45 per cent) and over-releases from the dams on the Nile (55 per cent)
- the severe weather extremes threatening the lake involve increased evaporation, floods and droughts
- equatorial glaciers will completely melt away by 2020, reducing runoff and water availability
- higher surface temperatures and changing monsoon patterns in the Indian Ocean will have direct effects on rainfall/drought
- fish is a major source of livelihoods and export earnings
- fish landings are correlated to water levels and rainfall
- current fishing patterns threaten biodiversity
- expanding populations discharge waste into, and pump water from, the lake
- expanding populations put increased pressure on land (including wetlands and forests) for urban agricultural purposes
- for the sake of energy and food security, riparian countries are exploring hydroelectric projects and a switch from rain-fed agriculture to irrigation in the Lake Victoria area, which would divert water from influents.

The problem

The main effects of climate change are expected to be as follows: (1) the region will become very wet with periods of intense precipitation interspersed with prolonged droughts; (2) more pronounced climate variability as warming continues, with a pattern of wet regions becoming wetter and dry regions drier; and (3) evaporation will increase, especially between June and August. These conditions will make the current water-waste-electricity conundrum even more of a challenge to local water utilities. Lower water levels reduce



Intake for water supply system in Bukoba, Tanzania.

© Re-Solve Consulting

availability of hydroelectric power just when more is needed to pump, treat and deliver water, while energy costs increase and extreme weather events damage equipment. If they are to continue cost-effective water distribution in the area, utilities must (1) quantify the risk of projected climate change impacts on supplies; and (2) plan adaptation strategies that increase resilience for both periods of drought and flooding.

Promising practice in brief: Integrated water resource management

Enhancing the capacities of local utilities is the key to proper water management in the basin. In 2010 and in conjunction with UN-Habitat, the Alliance to Save Energy (ASE) published a landmark *Climate Change Vulnerability and Assessment Guidebook for Small-Scale Utilities*. Based on its recommendations, water utilities in the Lake Victoria basin have begun to turn to innovative integrated water resource management methods. This includes scenario-based planning that can include short-term (e.g., land use change) as well as longer-term (e.g. climate change) simulations, and involve local stakeholders. That is how utilities mainstream climate change in their ongoing management and planning, instead of adding another layer of planning.

Promising practice (1): An innovative methodology

Up until recently, all those involved in water management paid little attention to potential changes in local and regional climatic conditions. Climate change comes as a challenge to conventional water utility management, which can no longer rely solely on historic hydrological patterns, since the water cycle on the ground is bound to change on a large scale. The model now used by utilities in the Lake Victoria basin is known as *Water Evaluation and Planning* (WEAP). This software from the Stockholm Environment Institute can predict the effects of climate change on water resources and the supply-demand balance; this in turn enables utilities to evaluate the planning and management issues associated with water resources development.

Promising practice (2): Flexible scenarios for water supply and demand

Any local hydrological system is represented in terms of its various water sources (e.g., surface water, groundwater, desalination and water reuse elements), withdrawal, transmission, reservoirs, wastewater treatment facilities and water demands

(industry, mining, irrigation, households, etc.).

Climate change and water supply: As opposed to past data, factors such as rainfall, temperature, humidity and wind speed can be derived from global and regional climate change scenarios. Simulation of natural hydrological processes (e.g., evapotranspiration, runoff and infiltration) enables assessment of the availability of water within a catchment. The two together make it possible to calculate how much of the rainfall in a particular area ends up as run-off into streams, recharge to groundwater, or evapotranspiration through vegetation.

Communities and water demand: On top of available supply, utilities now can also assess the way local communities influence water resources and their allocation in any given area.

Promising practice (3): Flexibility and priorities

A flexible model: The model (now in use in 30 locations around the world) can be applied to both municipal and agricultural water systems. Against the background of local (including socio-economic) conditions, the model can also address a wide range of issues including sector demand analysis, water conservation, water rights and allocation priorities, hydroelectric dams, streamflow simulation, reservoir operation, ecosystem requirements as well as project cost-benefit analysis. The data structure and level of detail can be customized (e.g., by combining demand sites) to correspond to the requirements of a particular analysis and the constraints imposed by limited data.

Setting priorities: The model maximizes water coverage (i.e., the percentage of demand satisfied) for all human and ecosystem demands, subject to mass balance, demand priorities, supply preferences and other constraints (e.g., system storage and conveyance capacities). The WEAP software uses a priority-based optimization system to allocate water in times of insufficient supply. All demand sites are assigned a priority between 1 (highest) and 99 (lowest). When supply is limited, the system gradually restricts water allocation to lower-priority demand.

Promising practice (4): How an integrated model benefits utilities

The WEAP model rationalises existing functions, instead of requiring a wholesale operational overhaul of utilities. It includes a toolkit that enables utilities to assess their own operational vulnerability in their three main functional

areas: technical, institutional and financial. Complementing the tool kit is the *Climate Change Vulnerability and Assessment Guidebook* and the UN-Habitat-sponsored *Global Water Operators Partnership Alliance* (GWOPA).

Technical functions include drafting climate-change adaptation and mitigation plans, implementation and monitoring.

Institutional functions include training for utility staff to ensure proper implementation, together with assistance (best practice sharing, etc.) from the GWOPA.

Financial functions: The scenarios show utilities where existing or fresh expenditure is going to be required to meet specific desired outcomes. This in turn exposes any needs for additional/external financing. Streamlined operations at the service of a sound, long-term business plan are more likely to attract market or donor funding.

Broader benefits: Sitting at the cusp of water supply and demand, water utilities find themselves in a privileged position to identify the needs for public intervention (e.g., regulatory changes, infrastructures) as well as changes in community behaviour (e.g., wastage, leaks, waste disposal), backed by the broader supportive socio-economic development framework provided by governments and international institutions. The WEAP model also enables utilities to maximise the specific advantages the private sector can contribute to climate change adaptation, namely, a broader resource base and more streamlined decision-making processes than local authorities.

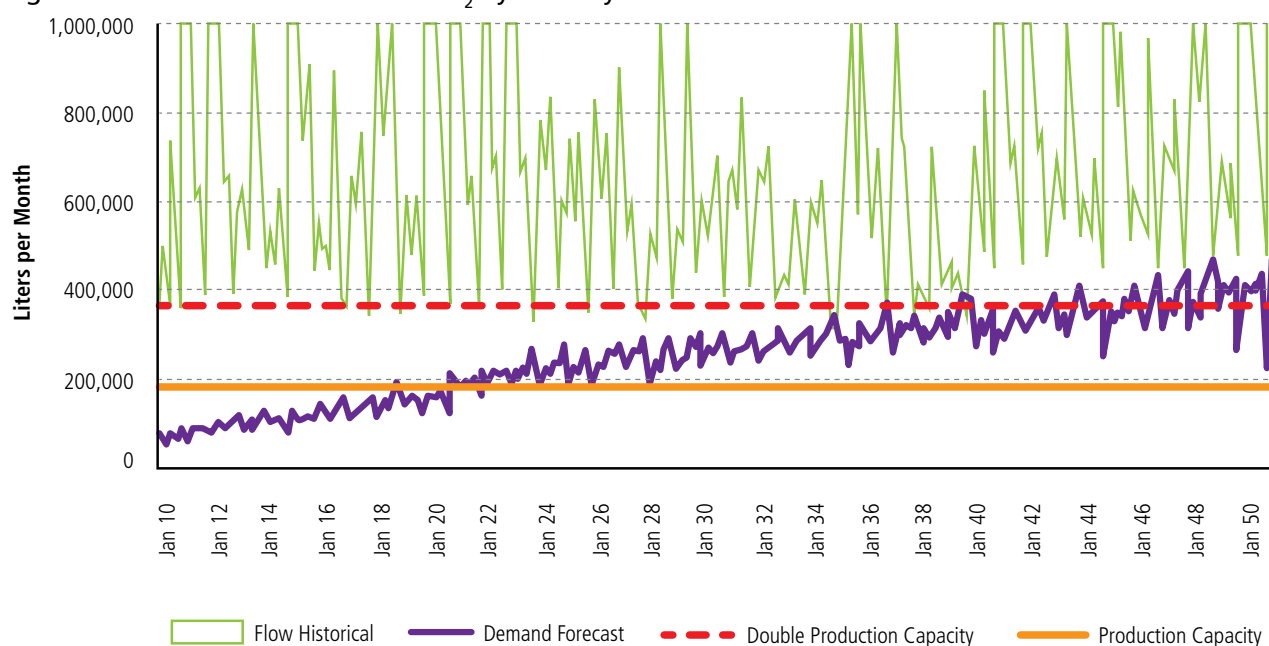
Promising practice (5): Initial results in three towns

Experience shows that the WEAP model calls mainly for the rehabilitation of existing water supply systems with well-known, relatively inexpensive, established technologies. Most plans focus on adaptation rather than mitigation, calling for behaviour change among communities. Modelling exercises have been completed for 2010-2050 in three cities with water coverage of 50 to 70 per cent.

Outcomes - Masaka: Wetlands can continue to supply all demand until 2050 ('wet' scenario) or 2032 ('dry' scenario, subsequently requiring infrastructure estimated at USD 10.8 million).

Outcomes - Kisii and Bukoba: Reducing leakage from 50 to 20 per cent and doubling waterworks capacity would meet all of demand until 2025-2028. In Kisii, 120 adaptation measures have been identified.

Figure 1: Cumulative emissions of CO₂ by Country 1900-2002



Source: Timeforchange, 2008

INSTITUTIONAL FEATURES

- The crucial role of local water utilities in the region is formally recognised and supported by the East African Community's Lake Victoria Basin Commission in close coordination with UN-Habitat's *Lake Victoria Water and Sanitation (LV-WATSAN)* initiative in favour of selected secondary cities with help from several UN institutions, other funding agencies and non-governmental organisations
- These organisations support utilities and other stakeholders with handbooks and capacity-building in all aspects of water management and socio-economic development
- National governments and local authorities are involved.

For further information

- Global Water Operators Partnership Alliance: <http://www.gwopa.org/>
- Stockholm Environment Institute: <http://www.sei-international.org/>

CHAPTER 2

MOMBASA: A YOUTH INITIATIVE TO SUSTAIN MANGROVES AND LIVELIHOODS



Kenya's second largest city, Mombasa (population: 0.9 million) is an Island in the Indian Ocean separated from the mainland by two creeks. It is a port of long-standing, major national and regional importance, as well as a cultural heritage centre and a popular tropical tourist resort. The surrounding inland area is host to small-scale agriculture, livestock production and fishing, but food security is low while poverty and unemployment rates remain high. The city joined UN-Habitat's *Cities and Climate Change Initiative* in 2009.

The problem

Being built on low-lying flat land, Mombasa is flooded every year, with the associated damage to property and even loss of life. In October 2006, some 60,000 people were affected in the city and further inland. It could take only a 0.3m sea-level rise to submerge close to 20 per cent of Mombasa, with a larger area rendered uninhabitable or unusable for agriculture because of water logging and salination. On top of higher sea levels, farming and tourism could also be affected by rises in already high temperatures and humidity rates. Faced with these challenges, the city needs to reconcile socio-economic development with climate change mitigation/adaptation while also enhancing public awareness of the issues.

Local issues related to climate change and sustainable urbanisation

- Kenya's coastline is one of the top five most vulnerable in Africa
- coastal storm damage, erosion and flooding have increased

- salt water intrusion into estuaries, freshwater aquifers and springs
- decreased light penetration and loss of biodiversity (coral reefs, food for marine fauna)
- loss of livelihoods (fishing, recreational opportunities)
- health-related problems (heat stress) on land and in the ocean
- associated ecosystem disruption, migration and the possible extinction of various species of fauna, flora and micro-organisms; bleaching of coral
- increased use of fossil fuels to power air-conditioners
- high population densities and large numbers of unplanned settlements have encroached into areas demarcated for roads, drainage, sewerage, etc., increasing the risk of flooding
- sea level rise will displace communities and destroy livelihoods



Majaoni Youth Development Group planting mangroves in abandoned coastal wetlands in Mombasa, Kenya.

©Green Teams Initiative

- flooding draws out soil nutrients and brings salt to agricultural lands
- flooding causes changes to sediment patterns
- flooding undermines house foundations.

Promising practice in brief: A youth-led, multi-dimensional nature conservation project

The project rehabilitates and sustainably manages the local mangroves and fish-related activities in a bid to counteract the damage wreaked by emerging climate change effects – desertification, drought, erosion, flooding and extreme weather events – with the associated poverty, unemployment and rural-to-urban migration. The small group of unemployed local young people at Majaoni (population: 15,000), 26km north of Mombasa on Mtwapa Creek, develop local awareness of the vital functions of mangroves as dense barriers against storms and defences for property, e.g.: trapping sediments to stabilise shores, providing vital ecosystem services (breeding sites for (shell) fish; herbal medicines; fibre and wood); improving water quality by filtering runoff and polluted waters; and acting as carbon sinks.

Promising practice (1): Pioneers, networking and elders

The project was launched in 2003, i.e., the young people behind it saw the joint need for wetland preservation and local socio-economic development years before the issue was highlighted by various scholars, and before the City of Mombasa joined UN-Habitat's *Cities and Climate Change Initiative*.

Recruitment: The three youths at the origin of the project spread the word through local mosques, and 20 out of 80 interested individuals eventually formed the launch group, soon known as the Majaoni Youth Development Group.

Land issues: Since dry lands are controlled by village elders, young people could only concentrate on the abandoned wetlands by the shore.

Promising practice (2): A multi-dimensional project

The project addresses eight major socio-economic and climate change-related concerns, as follows:

- joblessness among youth in the area
- making the community more aware of the importance of the mangrove eco-system as a mitigation factor for climate change and sea level rise
- showing how mangrove/wetlands can be managed sustainably

- enhancing local communities' awareness of the importance of mangrove growing
- encourage coordination and co-operation among all stakeholders in mangrove conservation and management
- opening channels for further discussion and extension of research findings to local people on the usefulness of mangroves
- providing basic material for scientific study and research
- promoting eco-tourism in Kenya's Coast province.

A number of these objectives have since been met, notably a more sustainable mangrove eco-system and employment opportunities.

Promising practice (3): Mangrove reforestation and eco-tourism

The group rehabilitates the deforested areas with mangrove nurseries and transplants. In the process, they enhance local awareness of the natural heritage and the need to preserve it for future generations. The Majaoni project also provides 15 youth members and 30 volunteers from the community with much-needed work experience/employment, with associated food security against a background of severe drought.

Bee-keeping: Bees pollinate mangroves, increasing plant propagation. This is why the group manages a 16-beehive apiary. Each hive can produce 14.2kg of honey selling for USD13 a kilo.

Tourism: The group has laid out a boardwalk across the mangrove in order to monitor the site and the seafood farming areas. The boardwalk has also given rise to eco-tourism, another added source of revenue.



A boardwalk built through replanted mangrove areas permits monitoring of the site and promotes ecotourism in Mombasa, Kenya. ©Green Teams Initiative

Promising practice (4): Seafood farming

The group is taking advantage of mangroves as breeding sites for (shell)fish. Crabs used to be found in abundance in the creek, and as a delicacy are very much in demand from tourists on the coast. The group has revived the tradition, taking to crab farming in floating cages and pen ponds. Fish breeding, too, was on the decline along Mtwapa Creek, impoverishing local communities. The group now manages eight fish and prawn ponds. Prawn sells for three to six US dollars a kilo, depending on quality and market conditions.

Promising practice (5): Employment and gender

Members are paid monthly for the number of mangrove seedlings they have planted (based on detailed records) and/or the number of beehives they have been assigned to care for (honey harvesting). Like any others, female members (currently five, to 10 males) can be given supervision tasks for which they are paid every month. As of early 2011, one female member held an elective management position. Among volunteers the current female-to-male ratio is 4:6. Volunteers are paid from the earnings they generate.

Promising practice (6): Membership, decision-making and transparency

The Majaoni Youth Development Group is a formally registered community-based organisation with its own charter.

Membership: A 2,500 shilling (or 23 US dollars) entry fee (and a one-dollar monthly fee) is charged as a token of commitment for new members, who must be local residents. The targeted age bracket is 18-35, with a maximum of 40 years. Older members are barred from leadership positions and only stay on to advise younger ones. As of early 2011, the group had eight members between 30 and 40 years old and five below 30, of which four were Muslims and nine Christians, by and large reflecting nationwide confessional patterns. Membership rules ensure that successive local age groups have an opportunity to participate in the project and gain valuable experience. Degrees of individual motivation vary and there have been some drop-outs while other members have found better opportunities.

Decision-making: Decisions are made collectively and the charter includes a conflict-resolution mechanism. The chair, secretary and seconds are elected every year (secret ballots) by the membership, as is the treasurer.

Financial transparency: The group is funded by donors. All grants and financial dealings are duly documented in detailed records that are kept and audited by the membership.

Promising practice (7): Community ownership and contribution

Ownership: The (largely illiterate) Majaoni community has no formal say in the management of the group or the project. However, moral support from elders has proved valuable from the start; on top of ensuring security, cooperation and coordination, this support has contributed to community pride in, and moral 'ownership' of, the youth group and its achievements.

Contributions: The community volunteers labour and materials for project execution.

Constraints and opportunities

Constraints: The main factor preventing the Majaoni Group from realising its full potential is none other than lack of adequate financial resources. Only a few members have been able to acquire new skills through training, because most lack the time as they need alternative sources of income outside the group. Still, training and capacity-building have helped the group provide self-employment. On the other hand, the on-the-job training which the group has provided the community has generated moral support for the project and for others along the coast. This is despite the fact that many people depended on the now-protected mangrove for livelihoods (household construction or fuelwood).

Opportunities: Since mangroves act as natural 'carbon sinks', one potential additional source of income for the Majaoni Group would be to claim carbon credits, which could be traded for cash on the international market. Taking advantage of the newly developed methodology for calculating mangrove carbon storage for the purposes of the UN Clean Development Mechanism would require some specific capacity-building, as would diversification into new activities. Marketing skills are needed as well, in order to publicise the group across Kenya and attract more visitors. Motor-boat tours and extension of the boardwalk rank among potential projects.

From mitigation to adaptation: Beyond ongoing mitigation, the next natural step would be to help the local community adapt to the effects of climate change, and sea-level rise in particular. With external expertise and support, prior vulnerability assessments could be carried out on a local scale, such as identifying the causes of coastal erosion,

among which natural factors (tidal waves, etc.) tend to prevail. However, in Mtwapa Creek, human causes may have a role, too, as poverty, unemployment and demographic pressure can lead local populations to over-harvest sand or mangroves, or use coral for building material, for instance. In this case, young people must adapt to

the predictable effects of climate change, and be equipped with the alternative skills enabling them to strike a balance between the needs of local communities and those of coastal eco-systems north of Mombasa. As things stand, the project has great replication potential.

MAJOR PARTNERS

The Kwetu Training Centre, the Anglican Church of Kenya, the Rotary Club, Recomap (Regional Coastal Management Programme), Toyota Japan and the Green Teams Initiative.

INSTITUTIONAL FEATURES

- The youth group was backed from the start by the YES Kenya Country Network (linked to the YES Africa Regional Hub of 23 countries)
- a worldwide (55 country networks) multi-stakeholder network, YES supports sustainable, entrepreneurial youth livelihood projects
- UN-Habitat's Cities and Climate Change Initiative supports YES Kenya's climate change mitigation 5-day Green Teams training schemes for youth in Mombasa, Kampala, Kigali and Saint Louis
- YES-Kenya supports the 'Green Teams Initiative' solutions-based approaches and practical tool application
- YES Kenya maintains/develops links with local authorities, other institutions and agencies in the region as support structures
- in March 2011, YES trained eight youth groups, including Majaoni, in climate change mitigation, and the City Council of Mombasa was involved in the training and workshop.

For further information

- <http://majaonidevelopment.blogspot.com/>
- AFDB, Checklist For Gender Mainstreaming In The Infrastructure Sector: <http://www.afdb.org/fileadmin/uploads/afdb/Documents/Policy-Documents/Checklist%20for%20Gender%20Maintstreaming%20in%20the%20Infrastructure%20Sector.pdf>

CHAPTER 3

KAMPALA: MOBILISING WOMEN FOR CLIMATE CHANGE ADAPTATION

In Africa's low-income urban areas, women bear the brunt of household tasks involving water, cooking fuel and waste. This gives them a significant role to play with regard to the local environment and climate change, both as (admittedly unwilling) factors and potentially prime victims of the threats these may pose. This is particularly the case in Kampala, where as many as 70 per cent of slum residents are female. Uganda's capital (population: 1.4 million) sits close to the northern shores of Lake Victoria, combining wetlands and hills under a tropical dry and wet climate (two wet seasons). Kampala was a pioneering city in UN-Habitat's *Cities and Climate Change Initiative* (CCCI) as early as 2009, and as part of the exercise undertook a broad-ranging survey of its vulnerability to the effects of climate change, including the gender dimension. This recognised that the division of domestic tasks can create a two-way causal relationship between gender inequality and climate change, with the potential of reversing the gains of the past two decades in terms of women's advancement in Kampala.

The problem

Assessment of the gender dimension of Kampala's vulnerability survey called for answers to three interrelated questions: (1) how do functional gender inequalities (imbalances in access and control over resources and opportunities) intensify the impacts of climate change? (2) how do climate change impacts reinforce or worsen functional gender inequalities? and (3) can gender inequalities restrict the effectiveness of adaptation and mitigation strategies at city and national level?



Local issues related to climate change and sustainable urbanisation

- Steady demographic growth (about six per cent per year, largely through natural increase) keeps outpacing the capacities of municipal infrastructure
- The major sources of environmental degradation and pollution include :
 - wetland encroachment and destruction (settlements, farming)
 - increased water pollution and land use/cover change, which reduces the ecological services from the natural environment
 - solid and abattoir waste accumulation
 - inadequate sewerage/sanitation and drainage systems



Open sewers pose a threat to public health and can overflow as a result of intense storms, which reduces mobility and can lead to children drowning in Kampala, Uganda.

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- atmospheric (including traffic) pollution
- inadequate housing
- The daily influx of nearly one million people has an impact on greenhouse gas emissions (consumption, production, disposal of waste, transport etc...) within the city's boundaries.

Promising practice in brief: A gender-responsive exploratory walk

If gender is to be mainstreamed into any urban assessment, women must be given an equal opportunity to register their specific concerns, knowledge and experiences. With regard to the effects of climate change, the Kampala Capital City Authority adapted the 'exploratory walk' methodology as advocated by UN-HABITAT in another gender-sensitive area ('safety audits' in the community). In order to identify and subsequently reconcile differences in perceptions, the walks (held in April 2011) involved each gender, then both. The interests of younger, older or disabled residents were included in a set of seven-easy-to-interpret questions, which were derived from the UN-HABITAT checklist. Gender-disaggregated data provided insights into respective interests and potential policy responses from the municipality. Exploratory walks include: selection of a suitable neighbourhood; recruiting eight-member local groups (women-only, men-only and mixed-sex groups); briefing the groups before separate-sex and mixed sex group discussions; taking an exploratory walk to validate the findings; and separate then mixed discussion of practical findings. The exercise ends with a consensus-building session focusing on priorities for climate change adaptation. Lessons learned are recorded for replication in other developing cities.

Promising practice (1): Grassroots exploration of neighbourhoods

Neighbourhood selection: Kampala Capital City Council selected Kasubi-Kawaala and Makerere II, two areas in north-western Kampala that sit at the junction between wetlands and informal land/housing areas. These neighbourhoods are already particularly vulnerable to weather conditions as heavy rains inundate homes, overflow sewers, silt up drains and contaminate water, restricting mobility and destroying backyard gardens, which forces resettlement in churches/community centres.

Walking around: Participants define their experiences and interpret the environment around them using local languages. This is an opportunity to merge grassroots with expert knowledge. Adding value is the fact that each gender group is

free to choose the route, distance and time for the walk, with their observations consigned in writing by the group leader/secretary as they walk around. Labour division: Women focused mainly on how weather conditions (can) affect their domestic and commercial responsibilities and daily mobility. Men instead emphasised infrastructure and service needs in commercial places.

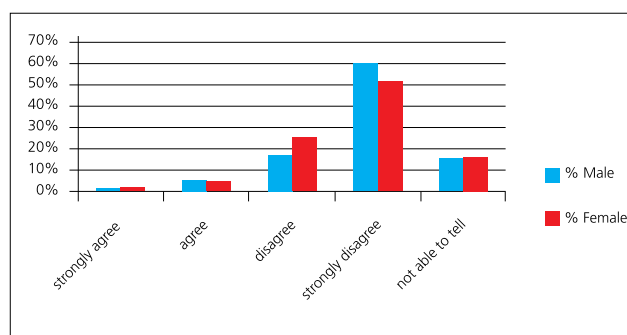
Shaping consensus: These gender differentials shape consensus-building on priorities for adaptation, as well as on a gendered end-user perspective on how urban infrastructure and services are affected by climate change, including the resultant gender differentials in impact.

Promising practice (2): Fresh attitudes and recommendations

Before the project, 60 per cent of male and 50 per cent of female participants 'strongly disagreed' that there was a relationship between gender and climate change (see *Figure 1*). After the project, the proportions were more than reversed as 67 per cent of males and 65 per cent of female participants 'strongly agreed' that the relationship was a reality (see *Figure 2*).

More specifically, males came to appreciate that women's comparatively lesser socio-economic status made them more vulnerable to the effects of climate change and constrained their capacity to cope.

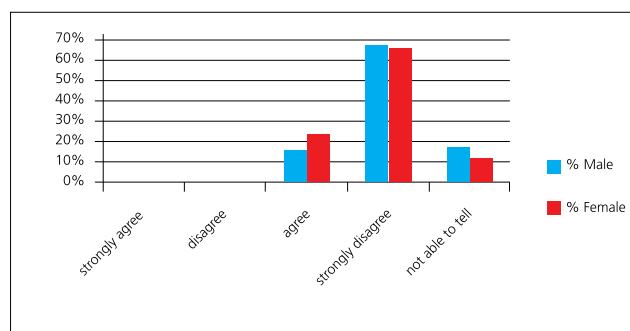
Figure 1: 'Before'-project attitudes, disaggregated by gender, on whether there is a relationship between gender and the experience of the effects of climate change



Source: © Buyana Kareem

Men's' recommendation: Climate change-related capacity-building through local environmental management committees (which bring together residents, non-governmental organisations and city authorities), in order to disseminate information about the effects of the changes on livelihoods. The purpose would be to promote behaviour change and jumpstart a culture of sustainable enterprises.

Figure 2: 'After'-project attitudes, disaggregated by gender, on whether there is a relationship between gender and the experience of the effects of climate change



Source: © Buyana Kareem

Women's recommendation: Women saw urban agriculture and its multi-purpose functions (see the Freetown brief in this Compendium) as an apt response to their unequal status and roles vis-a-vis climate change. The perceived benefits include: an alternative source of income, inculcating a culture of 'green space' maintenance, productive use of urban waste (composting) and reduction in energy consumption and greenhouse gas emissions through local production. If the municipality lifted the 2007 ban on urban agriculture, urban farmers could enter into partnerships with schools, churches and non-governmental organisations to reduce flood intensity through planting of trees, for instance.

For the time being, women's greater access to, and control over, arable land remains an issue.

Joint recommendation: Through its Community-Driven Development scheme, the city should promote and reward investment in climate-compatible agro-enterprises and green businesses, such as those that turn waste into energy or briquettes, handbags, etc.

Promising practice (3): Mainstreaming outcomes in municipal policies

The information from the walks was integrated into the municipality's interim progress report on gender policy. As a result, the policy goal was stated as "reinvigorating urban systems and service delivery for a liveable, green and socially inclusive city while enhancing diverse and gendered local socio-economic opportunities." The report set out a number of climate-sensitive strategies in pursuit of this goal, including incentives for local economic groups that invest in green enterprises, and establishing an information centre on livelihood-based adaptation measures. The policy goal and strategies were to be discussed and finalized by all stakeholders (central government,

municipality, civil society, and the private sector and development partners) during a consultative workshop.

Findings (1): Averred gender inequalities

Male socio-economic control: This transpires through use/ownership of motorised transport, professional involvement in mechanical repairs; control over household health expenditures and arable land, superior awareness of climate change effects, selection of site and materials for housing, paying for waste disposal.

Female socio-economic subordination: Women mainly use non-motorized transport (walking) to balance domestic and bread-winning tasks. They typically take care of sick children, spouses and the elderly, which together with other domestic tasks interferes with bread-winning activities, mobility and access to information. Women have access to, but less control over, arable land. Women take greater control over daily cleaning and maintenance routines, including collection and disposal of solid waste. They manage waste water (pit latrines, communal disposal channels, sewer pits), and use charcoal and firewood for cooking and to supplement household incomes.

Findings (2): Gender inequality and climate change: A two-way link

Male socio-economic control: Men's dependence on motorized private transport makes their breadwinning activities difficult during heavy rains and flooding. Their control over the location of waste dumping sites (since they are usually the landlords) contributes to the accumulation of wastes and emission of gases resulting in air and water pollution. Men excavate open wastewater pits which women use for disposal of liquid/solid waste, exposing the neighbourhood to air and water contamination during dry spells and floods, respectively. The resultant burden of disease is shouldered by men financially while women invest time and labour in care work.

Female socio-economic subordination: Floods interfere with women's dependence on public and non-motorized transport, as well as with their roadside businesses (with loss of saleable goods lessening their financial capacity to adapt). Women's dependence on charcoal for domestic and commercial roles contributes to deforestation in the urban periphery. Their domestic cleaning roles contribute to the release of contaminated water, faecal matter and solid waste into drainages, with stronger health impacts during floods. Women's dependence on child labour to balance domestic and commercial activities exposes children to water-

borne epidemics during rainy seasons, interfering with school attendance. Poorer women prevail in flood-prone areas, which makes commuting and access to clean accommodation more difficult for them. Domestic violence occurs as women are blamed when children drown.

Lessons learned

Kampala's exploratory walk highlighted the two-way causal relationship between gender and climate change.

Consensus - and awareness-building: The methodology enables both sexes to assess the capabilities of city policies, structures and

institutions and enhances their own adaptation capacity.

Replication: Similar approaches are in use in Nigeria and Liberia.

Limitations: For the purposes of planning and policy, the method should ideally be complemented with a survey questionnaire, because it does not, by itself, bring quantitative gender-disaggregated data on vulnerability and adaptation by function, settlement or socio-economic status.

INSTITUTIONAL FEATURES

- The walks were organized by the city council in cooperation with UN-HABITAT, and took place in the presence of municipal officials
- the municipality integrated the recommendations from participating groups in a progress policy report
- A municipal consultative workshop (involving stakeholders and donors) was to decide on ultimate climate change policy goals and strategies.

For further information

- UN Water, Gender, Water and Sanitation: A Policy Brief: <http://www.unwater.org/downloads/unwpolbrief230606.pdf>
- UN-Habitat, Women's Safety Audits: <http://ww2.unhabitat.org/hd/hdv8n4/forum7.asp>

CHAPTER 4

NIGERIA: BUSINESS LAUNCHES GREEN BUILDING COUNCIL FOR CLIMATE CHANGE MITIGATION



Sub-Saharan Africa stands to bear some of the worst effects of climate change over the decades to come despite its minor contribution to global greenhouse gas emissions. This implies that the region, and especially its ever-expanding cities, cannot sit idle, especially as most of the population is to become urban in the meantime. Just as sub-Saharan governments are looking better to control and improve urban conditions for ever-growing populations, they, and the local building industries, must also grapple with the technical challenges of climate change adaptation and mitigation for all types of buildings. In this respect, Nigeria comes as an apt case study given its size and unabated urban momentum.

'Green' buildings, cities and climate change

Cities transform the biophysical environment. They modify energy exchange patterns (the 'heat island' effect). They also alter hydrological patterns (e.g., a reduction in vegetal cover leads to declines in evaporative cooling, and an increase in surface sealing results in increased surface runoff, with the associated risks of flooding and depleted aquifers). These effects are amplified by climate change. Cities are also primary consumers and producers, and as such emit greenhouse gases. Building materials have a role to play, too (insulation, energy-consuming modes of production, etc.).

The problem in Nigeria

Nigeria is one of the most populated and urbanized countries south of the Sahara. In a comparable tropical country, Mexico, buildings are responsible for 17 per cent of all energy and

25 per cent of all electricity consumption, 20 per cent of all carbon dioxide emissions, five per cent of potable water consumption and 20 per cent of waste generation. Nigeria is sensitive to oil prices as it refines only a minor portion of its own huge production, and must aim at energy-efficient buildings like any other African country. Therefore, Nigeria's construction sector must adapt designs, techniques and building materials to help mitigate the effects of climate change. Short of adaptive efforts, climate change could dent Nigeria's gross domestic product by two to 11 per cent by 2020 and six to 30 per cent by 2050 (or US\$97 to 445 billion, compared with US\$40 billion annual oil revenues).

Local issues related to climate change and sustainable urbanisation

- Higher temperatures and rainfall can only accelerate the deterioration of the housing stock
- in power-poor Nigeria, there will also be increased energy consumption (air conditioning, private generators and associated greenhouse gas emissions)
- extreme weather events and sea level rise will increase these threats
- planning regulations are too recent for proper enforcement (lack of public awareness)
- thermal plant capacity lags electrical power demand
- household and office equipment is largely energy-inefficient
- transportation is dependent on fossil fuels
- wood fuel for cooking causes deforestation
- global warming increases desertification
- Nigeria's urban centers are mostly unplanned

- preference for concrete paving (no gardens/trees)
- urban waste management remains a problem
- no water management systems to speak of (urban storm water runs to waste)
- lack of action will reduce economic growth, making adaptation and mitigation more difficult
- urban populations must be familiarized with energy efficiency, waste reduction and recycling material, water harvesting, etc., if greenhouse gas emissions per head are to be reduced.

Promising practice in brief: A private-sector initiative in favour of 'green' building standards in Nigeria

UN-Habitat's May 2010 conference in Nairobi on 'Green Building Ratings in Africa' defined 'green building standards' as *"evaluation factors for building design, construction and operation, not only aimed at reducing greenhouse gas emissions in buildings, but also at the conservation of other essential exhaustible resources such as water and building materials."* At the conference, five representatives from Nigeria's building sector (Association of Professional Bodies, Town Planners Registration Council, Council for the Regulation of Engineering, Institute of Building, and Institute of Quantity Surveyors) became aware of four major imperatives in the face of climate change: build better and more prudently, increasing use of renewable energy sources, reducing the use of fossil fuel-generated energy in buildings, and more energy-efficiency in general. They also recognised that long-term savings would outweigh initial costs. They decided to put in a joint 'expression of interest' to the World Green Building Council (WGBC), which was accepted in August 2010.

Promising practice (1): Recognising the benefits of 'green' standards for Nigeria

- Avoid the mistakes made by industrialised countries
- favour renewable construction materials and energy sources
- clean, 'green' and healthy environmental development and maintenance
- designing buildings to be more resilient to weather extremes (e.g. heat waves, storms)
- limiting property development in high-risk areas
- improved public health.

Promising practice (2): Rallying collateral sectors

Nigeria's construction professionals early on made sure they built a broad base for the country's Green Building Council and managed to involve the following collateral sectors: land/property surveyors and valuers, the legal profession, the manufacturing sector, general business and the media.

Promising practice (3): Side-stepping obstacles

Nigeria's Green Building Council was expecting formal legal incorporation by August 2011, complete with endorsement of its charter and by-laws, and a Board of Trustees. At its first meeting in January 2011, the Board of Directors recognised the Council faced a number of obstacles, as follows:

- lack of interest among the country's 36 federated States, to the exception of Lagos on the Atlantic coast
- poor enforcement of urban planning statutes and structures
- inadequate legal systems (a National Building Code is now about to be enforced)
- business's response to the Green Building initiative remains slow
- widespread lack of awareness – a major challenge
- lack of political will
- inadequate funding, at least until statutory registration of the Green Building Council.

Still, by spring 2011 the Council came up with a first version of its *Rating Tools Fact Sheet for Office Buildings*. Since then, work has started on marketing and media plans (to be launched in October 2011) and a business plan, as required by the World Council. The Nigerian Council was also planning training programmes as well as a professional and public awareness campaign. A Website was to be launched by mid-June 2011.

Promising practice (4): Customising South African ratings

Nigerian professionals early on decided that South Africa's own 'green building' practice (itself based on Australia's) would provide an apt template for countries south of the Sahara. South Africa, too, faces a tall demographic challenge and its construction sector experiences a boom, all

against the background of serious climate change-related challenges. This is why, as its first tangible achievement, Nigeria's Council has based its own *Rating Tools Fact Sheet* on South Africa's 'Green Star' system (see *boxed item*), with the right amount of customisation. The Nigerian Council recognises that the system must be dynamic, corrective and creative, taking into account specific geo-politics, national development, social, industrial, growth and environmental patterns. Any system must also contribute to national development control regulations, and this is why the Nigerian Council would like to add more broadly 'sustainable' standards like social, gender and physical handicap awareness for all types of buildings.

Promising practice (5): Experts call for government involvement

The Nigerian Council early on advised the Minister for Lands, Housing and Urban Development of its initiative, but as of May 2011 was still waiting for a response. In the meantime, a newly-elected, reformist president took office in May against a background where the construction sector is attracting more and more domestic investors.

Cross-currents: As the fledgling Nigerian Green Building Council soon found out, two-way adjustment between a global and a national template can entail some problems. Some of the standard requirements from the World Green Business Council run foul of certain Nigerian statutory regulations. At the same time, the Nigerian Council needs government to step in if the process is to come to fruition, whereas the World Council usually insists on a private-sector-only process. In developing countries, 'green' standards are best implemented when endorsed by government and mainstreamed into planning regulations.

Another wake-up call to policymakers: Two years after a landmark DfID report, in mid-March 2011 a consortium of three consultancies

known as the *Building Nigeria's Response to Climate Change (BNRCC)* Project (funded by the Canadian International Aid Agency) published a major consultative document, *Towards a National Strategy and Plan of Action (NASPA)*. The document reviewed every relevant sector and made a number of recommendations for government and other stakeholders. Stressing the need to put in place "a regime of guided change with full government support", the authors called for an integrated (as opposed to piecemeal) implementation strategy that would mainstream climate change issues into development. More specifically, the report stressed the need to develop housing/settlement practices that enhance climate change adaptation/resilience, and to discourage those that are ill-adapted. In particular, the authors wrote that the relevant Federal and State ministries should review and change housing designs and building codes to incorporate new requirements (e.g., roofing or water-harvesting building materials).

Promising practice (6): Call for sub-region-wide replication and networking

Since sub-Saharan countries share many common features, the Nigerian Council is urging its South African counterpart to "blaze the trail" for the whole sub-region. This should go beyond using South Africa's 'green star' rating system. The effort should also involve networked training programmes, with South Africa undertaking to 'train the trainers' across the sub-region. This leadership role would create the appropriate degree of momentum behind climate change mitigation south of the Sahara. The South African Council has responded with special events and conditions for African delegates at its late October 2011 convention in Cape Town. Green Building Councils are under preparation in Botswana, Ghana and Kenya; Burkina Faso and The Gambia have shown interest.

INSTITUTIONAL FEATURES

- The Nigerian Council has been formally endorsed by the World Green Building Council
- As any other in the world, Nigeria's Green Building Council is an independent, non-profit, membership-based organisation
- The Council made itself known early on to Nigeria's Minister for Lands, Housing and Urban Development
- The Council needs formal Nigerian government recognition before its rating standards can be mainstreamed into building regulations across the country.

SOUTH AFRICA'S 'GREEN STAR' RATINGS

"Green" ratings set standards and benchmarks for objective assessment of the environment-friendly nature of any commercial, industrial, office or residential building. The five-fold rationale is to (1) establish a common language and standard of measurement; (2) promote integrated, whole-building design; (3) raise awareness of the benefits of 'green' buildings; (4) recognise environmental best practice; and (5) reduce the environmental impact of socio-economic development.

Several rating systems are in use across the world. The South African Green Building Council has set out its own 'menu' of all the 'green' features in a building. Points are awarded for each and, after weighing, the total score determines the rating (on a scale of one to six 'Green Stars'). The nine features under assessment in South Africa are the following: management; indoor environment quality; energy use; transportation; water use; materials; land use and ecology; gas emissions; and innovation. Building owners apply to the Green Building Council for certification, and it is for independent experts (not public authorities) to assess and score the building. At the same time, the promoters of 'green' standards advocate mainstreaming of the rating system into national planning regulations, in order to embed them in designs in every country.

MAJOR PARTNERS

- The World Green Building Council (Toronto, Canada)
- Nigeria's professional associations in the construction and collateral sectors
- Networking with the South African Green Building Council and the Economic Community of West African States (ECOWAS).

For further information

- World Green Building Council: <http://www.worldgbc.org/>
- Towards a National Adaptation Strategy and Plan of Action (NASPA): http://nigeriaclimatechange.org/docs/2011/TowardsNASPAConsultative_Document-1.pdf
- Green Building Council of South Africa: <http://www.gbcsa.org.za>
- UN-Habitat Conference on Promoting Green Building Rating In Africa Report: <http://www.unhabitat.org/categories.asp?catid=640>

SECTION

2

ADAPTATION: INFRASTRUCTURE, SLUMS AND DESERTS

Bobo-Dioulasso:

Rooting sustainable development and desert prevention in local communities



Cape Town:

Ceilings improve livelihoods in the face of climate change



Antananarivo:

Responding to climate change involves infrastructure and socio-economic emergencies



CHAPTER 1

BOBO-DIOULASSO: ROOTING SUSTAINABLE DEVELOPMENT AND DESERT PREVENTION IN LOCAL COMMUNITIES



Drylands are as highly vulnerable as coastal areas to increased human pressures and climate change. Instead of sea-level rise and inundation, numbers of cities in the Sub-Saharan hinterlands are under threat of desertification, water shortages and deforestation, though against a similar background of demographic expansion and widespread poverty. Burkina Faso is one of those many countries where climate change already acts as a major constraint on food security and poverty reduction efforts due to high dependence on agriculture (86 per cent of gross domestic product). Climate change further adds to Africa's imperative of adjusting outdated basic urban services to the needs of expanding populations and to the requirements of sustainable development. Local authorities must face these challenges with a dearth of financial, technical and other resources.

Bobo-Dioulasso (estimated population: 455,000) is the second largest city and the economic capital of Burkina Faso. Part of the population increase in this south-western Sahel city reflects migration away from desertification in the North of the country, with low-rise migrant shacks causing significant urban sprawl. Population growth increases consumption of fuelwood and exposes the shortcomings of water/sanitation systems. The conurbation includes three urban districts and 37 villages, where urban agriculture (and food processing) plays a significant role in an economy dominated by trade, services and the textile (cotton) industry. Located on an arid plateau with spring water sources, the city is exposed to strong winds. Bobo-Dioulasso has deployed a number of schemes with support from a variety of partners since the early 1990s; this brief focuses on those deployed more recently under the *Sustainable Cities Programme* (which combined

UN-Habitat's *Environmental Planning and Management approach* with a *Local Agenda 21* as advocated by the UN Environment Programme) and those coming under UN-Habitat's *Cities and Climate Change Initiative* since 2009.

The problem

Water, sanitation, energy (fuelwood), food security and desert prevention are critical to Bobo-Dioulasso's sustainable, climate-resilient future. Climate change calls for action on a larger, peri-urban scale, as man-made and natural soil erosion combines with prospective rises in temperatures to reduce water supplies and increase desertification. A related challenge for the resource-poor municipality is to change patterns of behaviour among largely illiterate local populations that are steeped in traditional culture and religion.

Local issues related to climate change and sustainable urbanisation

- The population of Bobo-Dioulasso is expected to reach one million by 2026
- some 25 per cent of the population live below the poverty threshold
- with climate change, the wet season starts later and ends earlier, quasi-droughts and flash floods are more frequent, rains and winds more violent, and the cool season is warmer
- climate change and urbanisation cause loss of trees and shrubs that are normally used for cattle feed, medicines and livelihoods
- wood contributes 91 per cent of the country's energy consumption, and forests provide livelihoods to over 70 per cent of the population
- the need for fuelwood combines with extensive

- (low-productivity) agriculture in peri-urban areas to cause deforestation and desertification
- peri-urban gardening is under threat from soil erosion, hydric stress, higher temperatures and a dwindling Houet River, rather than pressures from urban expansion or the land market
- urban farming (staple and cash crops, poultry) and basic food processing (dairy products, honey) are practised in 33 per cent of urban and 67 per cent of peri-urban areas
- some vegetables can no longer be grown because of poor soil conditions
- proper water management and soil fertility are seen as the best available defences against climate change.

Promising practice in brief: Rooting sustainable and climate change policies in local communities

Bobo-Dioulasso's priorities – water, food security and forests – coincide with those of the national government and keep attracting financial and technical support from a variety of national, international and foreign sources. The municipality has made full use of its existing planning powers, including enforcement of the planning master scheme (SDAU), a revised municipal development plan (PDC) and improvement of basic urban services in a pilot district (PASUB–UN-Habitat). On top of those, Bobo-Dioulasso has deployed strategic and master plans for sanitation (PSAB), solid waste management (SDGD) and rainwater drainage (SDEP). Adaptation to climate change also involves prevention of desert expansion through forest preservation/regeneration. This includes tree-planting on the periphery of the city centre and preservation of wooded shrines, together with participatory management. The city takes full advantage of the country's extensive decentralisation and promotion of 'locally-rooted planning' (*gestion des terroirs*), leveraging traditional leaders, culture and religion to mobilise a largely illiterate population.

Promising practice (1): Household-centred sustainable basic services

The pilot scheme: The UN *Sustainable Cities Programme* has enabled the municipality of Bobo-Dioulasso to implement a string of national policies regarding urban services through a single pilot project. A Basic Urban Services scheme (*Programme d'amélioration des services urbains de base – PASUB*) started in early 2004 with support from UN-Habitat, the UN Environment Programme as well as national and foreign partners. The pilot site, known as Secteur 21 (population: 45,000),

was representative of the many underserved areas of the city. Another three secteurs have also been involved in a female-run waste collection scheme, and a small-width sewerage network has been deployed in one of those.

Achievements: The pilot waste collection scheme has been a success (the proportion of households paying for a private service has soared from under six to over 20 per cent). A wastewater management system was put in place and rainwater drains and access to fresh water (including through micro-credit) were improved. Informal waste disposal sites were cleared. These efforts were complemented by awareness-raising and education campaigns among civil society and the community.

Success factors: The project (Phase 1 of PASUB) was entirely funded by external donors. Close coordination was required with central government under the Municipal Development Partnership. Based on an initial environmental profile, the project used the 'household-centred environmental sanitation' (HCES) methodology as part of an integrated, multidisciplinary approach to the community's needs. Under municipal supervision, a dynamic steering committee was established, and a more hands-on coordination committee brought together strongly committed municipal and central government officials as well as foreign expertise. There is no formal monitoring, but lessons learned are mainstreamed into daily practice.

Promising practice (2): Combating the desert with forests: The project

With its humid climate, Bobo-Dioulasso has an abundance of forests, some of them listed on account of a rich biodiversity. However, forests are eroded by the need for fuelwood and encroachment from extensive, low-yield agriculture, leaving the city surrounded by a desert ring where informal settlements can spread out.

Forests v. deserts: Forests mitigate climate change since they act as carbon sinks. Trees and shrubs break or reduce wind speed and contribute to climate change adaptation as they prevent soil erosion (i.e., desertification). Tree roots preserve arable land, fixing the soil and nutrients against the strong Sahel winds. The roots also help hold water in the ground for the benefit of crops in the vicinity, rather than letting it run off across rocky, barren fields into gullies, flooding villages and destroying crops. Economic benefits include pod-feeding to cattle and essential components for traditional and modern medicine.

The project: Peri-urban 'green corridors' (*trames vertes*) have been deployed over some 15km

north, west and east of Bobo-Dioulasso, and are now mandatory in any new development plan. The Houet River banks, which are important for market gardening, have been stabilised (with World Bank support), and dedicated public support is now reinforcing and encouraging urban agriculture.

Wooded shrines: In Bobo-Dioulasso, reforestation



A preserved 'wooded shrine' in one of the outlying suburbs of Bobo Dioulasso, Burkina Faso. ©Municipality of Bobo Dioulasso

specifically includes the wooded shrines in the area. No hunting, housing, farming or woodcutting is allowed in these sacred groves for cultural and religious reasons, and access is restricted. The municipal scheme preserves existing wooded shrines (including those falling in disuse) and encourages the creation of new ones.

Promising practice (3): Combating the desert with forests: The framework

The role of CCCI: The Initiative helps the municipality to implement the major national policy frameworks adopted by central government in 2007 (adaptation to climate change (PANA), poverty reduction (CSLP), rural development (SDR) and integrated management of water resources (PAGIRE)). CCCI involves risk assessment, capacity-building, networking, the gender dimension as well as improved local-national links and synergies, together with technical and financial support.

Institutional approach: Reforestation is ongoing as per national government policies and through implementation of the Framework Agreement on the management and protection of listed forests between the municipality of Bobo-Dioulasso and the central government, with support from the Luxembourg development aid agency. Achievements are reviewed every year but lack of proper statistics is a problem.

Supporting frameworks: The forest project

complements other institutional instruments that extend municipal planning and control across peripheral areas (the 37 villages). More specifically, the project fits in well with the municipal urban master plan (SDAU), which among other things determines land use. Reforestation also fits with formal municipal schemes in support of urban agriculture, which is now mainstreamed in urban planning. Custom can play a role, too, as village elders protect market gardening and its symbolic value against encroachment.

Success factors: Reforestation is in line with national government policies. These (including nationwide reforestation campaigns) respond to the need (1) to regenerate this major socio-economic resource in the face of various pressures, and (2) to rationalize the fuelwood business. The scheme will hopefully allay fears that once they are given control of local forests, municipalities may use them as much-needed sources of cash (communities and civil society have a role to play here). Behaviour patterns are also expected to change, as promotion of household/individual ownership of trees highlights their function as valuable capital to be treated with care for household or commercial purposes. Professional and labour associations support the scheme.

Promising practice (4): Leveraging local traditional culture

In both urban and peri-urban areas, the basic services and the reforestation schemes rely heavily on local traditional culture for proper communication with, and mobilization of, local communities.

Local languages and traditional structures: Although the Basic Urban Services scheme was formally advertised at regional and national level, in the underprivileged pilot *Secteur 21* the municipality of Bobo-Dioulasso relied on word of mouth and traditional structures. Ample use was made of local languages as well as traditional wisdom and sayings for the dissemination of new sanitation rules in the *cours* (the central spaces shared by several dwellings) as well as door-to-door canvassing. Local committees brought together community and spiritual leaders, elders and other people of influence. The media and an information campaign in primary schools complemented the efforts.

Traditional religion: The local population is steeped in animism, with 'sacred' ponds, crocodiles, etc.; therefore, mobilizing wooded shrines in favour of forest preservation and desert prevention came naturally. In wooded shrines, ecosystem services and spiritual functions can be seen as coinciding, as they associate sustainability

in the face of climate change with the intransience of ‘invisible’ forces.

Promising practice (5): Decentralisation and urban governance

Overall policy: Under the 1991 Constitution, more and more formal (if not always financial) powers have been transferred to municipal bodies. Central government has kept launching numbers of occasionally overlapping schemes, frameworks and action plans in a bid to keep some control over local authorities. More recently, the focus has been on locally-rooted development (*gestion des terroirs*) and participatory village self-governance.

Benefits: Municipal bodies can be better placed than other local authorities to the extent that being closer to local problems, mainstreaming environmental and climate change concerns into rules and policies is made easier, as is participatory local governance. The UNEP–UN-Habitat *Basic Urban Services* scheme under the *Sustainable Cities Programme* has encouraged cross-sector coordination across municipal services in Bobo-Dioulasso, and plans for reforestation, support to urban agriculture are having the same effect.

The benefits of including peri-urban areas: The fact that on top of three urban districts, Bobo-Dioulasso also has 37 villages under its jurisdiction can only enhance the ability of the municipality to plan for its own sustainable, climate change-

resilient future, including in terms of food and socio-economic security. Much-needed urban-rural linkages make it easier to mainstream urban agriculture into municipal development agendas. These local efforts are backed up (if only politically) by national framework policies on forest planning, locally-rooted development and natural assets management.

Drawbacks: As in many other countries, devolution of powers to the local level is not fully matched by transfers of technical or financial capacities. The voluntary sector is dynamic, but “participatory fatigue” can set in among ‘village development committees’, as annual investment plans run against the crippling effect of inadequate human, technical or financial resources.

Conclusion

Under the Sustainable Cities Programme, the municipality of Bobo-Dioulasso has mainstreamed environmental concerns and participatory governance into rules and planning routines. This made it easier to take advantage of ongoing decentralisation and face up to climate change with an eye on food security, and the city’s extensive spatial jurisdiction is an asset in this regard. As the forward-looking projects are steeped in the language and culture of local communities, these can continue to project themselves into the future – only in a more sustainable way.

INSTITUTIONAL FEATURES

- The 1991 Constitution formally recognises the principle of ‘free local authority management’
- increased devolution to municipal authorities generates a proliferation of central government policy frameworks, strategies and action plans
- since 2003, municipal authorities are in charge of urban services, although tax collection remains inadequate
- municipal authorities remain dependent on external technical and financial resources
- partnerships with civil society and the private sector can have significant roles to play.

CHAPTER 2

CAPE TOWN: CEILINGS IMPROVE LIVELIHOODS IN THE FACE OF CLIMATE CHANGE



More and more Sub-Saharan cities are finding that on top of basic water and sanitation, they must provide proper low-income housing to ever-expanding slum-dwelling populations. On both counts, current and prospective local environmental/weather conditions must be included in an integrated approach, one that reflects multiple dimensions such as socio-economic development (poverty reduction) and public health. Since this demographic expansion consists of second- or first-generation migrants from national or foreign rural areas, any improvements must come hand in hand with awareness-raising efforts and participatory management at grassroots level, for the sake of sustainability in the face of climate change.

From 1994 onwards, the South African government has been faced with a huge low-income housing backlog, and this is why its experience is so valuable for other countries across the continent. As part of the new political dispensation and under the Reconstruction and Development Programme (RDP), some 1.8 million housing units were built in the 10 years to 2005 (due to continued demographic growth, the backlog reached 2.2 million in 1997). By late 2004, though, the authorities recognised that this unprecedented, worthy scheme was flawed and had not always benefited the low-income public it was aimed for. Therefore, the National Department of Housing launched a new housing policy, *Breaking New Ground*, which represents a radical shift “from quantity to quality” as well as a more participatory, multi-dimensional approach.

Local issues related to climate change and sustainable urbanisation

- The Cape Town population has doubled (to 3.5 million) over the past 20 years or so, making it the second largest city in South Africa; the recent slower expansion reflects the effect of HIV/AIDS and a probable drop in rural migration
- between 1993 and 2005, the number of informal dwellings grew from over 28,000 to 98,000. By early 2009, over 140,000 households still lived in makeshift houses (77 per cent in informal settlements, and the balance in backyard shacks)
- today's slum population is over 400,000 and the housing problem has grown more acute
- poverty affects 23.6 per cent of the Cape Town population (or more than 183,000 households), with 20.4 per cent of native Africans unemployed
- Cape Town is South Africa's largest city for land area, with 307km of coastline
- according to the city's 2010 *Energy and Climate Action Plan*, climate change in Western Cape province is to combine warmer temperatures, a rise in sea levels, reduced annual rainfall and more frequent and severe storm events
- the project discussed here is located north of the city in a poorly served township, Mamre (population: 10,000, largely unemployed), where RDP housing had been built in a 'Condensation Problem Area' prone to particularly challenging weather conditions (rain, strong winds, damp and cold).

The problem

At Mamre RDP took the form of a 500-house project launched in 1997. The municipality in charge worked to what were at the time considered as high standards, and the local community was consulted (as opposed to genuine participation). However, there were no ceilings to insulate the interiors from the raw corrugated iron roofs. On top of damp and cold, residents' health was further damaged by the spores and associated fungi that bred on either side of the roofs. By the time (2003) the Western Cape province began receiving additional central government subsidies in acknowledgement of the need for extra protection from the climate, all the housing units had already been built without insulating ceilings. Residents were already experiencing poorer health conditions, as were thousands across Cape Town. On top of this and as noted in a 2006-2007 report from the UN Commission on Sustainable Development, *"low-cost houses have been built with no consideration to energy-efficient design principles, thereby condemning already poor and suffering households to low-quality, uncomfortable and 'costly' houses. Poor households have to spend large amounts of money on fuel for space heating and normally, dirty, polluting fuels such as paraffin and coal are used."* The report continued: *"building without attention to thermal performance may reduce initial costs slightly, but will expose residents to a lifetime of low thermal comfort, high energy*

costs and cause the high levels of energy-related air pollution encountered in low-cost residential areas to prevail in the future."

Promising practice in brief: A pilot programme for improved weather resilience

As the building programme was already completed, the Western Province decided to retrofit RDP housing units with ceilings. The scheme was unprecedented and Mamre was chosen for a pilot project starting in 2010. The relatively cheap technology tackles health, livelihood and energy issues in low-income households. The township was selected due to its comparative small size and the ability for the funding to retrofit a larger proportion of the RDP houses (240 out of a total 500) within a single community. The participatory scheme was an opportunity for local skills development and awareness-building.

Promising practice (1): Insulation for improved health, lower energy costs

Reduced heat loss and energy spending: Heat loss through the roof is often greater than any occurring in other areas of a house, and therefore a ceiling is one of the most effective ways to insulate a house. In cold conditions, a ceiling can reduce heating costs by up to 50 per cent.

Improved health conditions at Mamre: Early evidence (including residents' testimonies) shows



RDP house prior to ceiling installation in Mamre, City of Cape Town, South Africa.
©ICLEI Africa



RDP house after 2010 ceiling installation in Mamre, City of Cape Town, South Africa.
©ICLEI Africa

that health conditions, especially among children, have improved since ceilings have been retrofitted. This comes as a significant achievement in communities that are already exposed to serious health risks through lack of proper water and sanitation facilities (cholera, typhoid), heating (pneumonia, tuberculosis) or electric power for lighting and cooking (respiratory diseases caused by paraffin or coal); they also stand to suffer the economic consequences in terms of time off revenue-earning occupations, healthcare costs or performance at school.

Promising practice (2): A participatory process

Empowerment: At the formal project launch with ICLEI-Africa and the City of Cape Town in June 2010, a 'volunteer community committee' of project beneficiaries was set up and approved. The committee is accountable to both the City of Cape Town and ICLEI with regard to the following: (1) proper standards for the installation of the ceilings; (2) household safety during retrofitting works; (3) enhancing education, communication and awareness regarding climate change and related issues; and (4) carrying out community surveys and passing on the data to ICLEI and the municipality. Members received training on climate change and its likely effects at global and local level.

Enhancing public awareness: Plain language and pictures were prominent among awareness-raising efforts (based on ICLEI-Africa's Interactive Climate Change and Climate Impact Tool (ICCCI)). Committee members disseminated the information all around them and facilitated informal working groups within the community to encourage participation and enhance the adaptive capacity of the community. Councillors, leaders and community members from various ages, gender and cultural backgrounds have been mobilised.

Conducting ex-post surveys: The committee was also shown how to conduct an early *Livelihoods and Risk Assessment* survey among the population to gather qualitative and quantitative information on the effects of the ceilings on living conditions. The rationale behind this mutual confidence-building exercise was to broaden the survey sample for better statistical reliability.

Mobilising young people: Some 30 local young people were split into groups, each of which was handed a camera to enable them to illustrate what 'energy' meant to them. This gave rise to discussions on the socio-economic role of energy and alternative sources in the face of climate change.

Promising practice (3): Local skills development

The retrofitting work was carried out by members of the community after training into various skills: labourer, foreman, carpenter, painter and security guard. This skill development programme ensured that money spent on the ceiling works went back into the local economy. More broadly, expectations are that the capacity-building will allow beneficiaries (with support from the municipal 'Livelihoods' department) to set themselves up as service providers within the local area.

Promising practice (4): Monitoring and replication

Monitoring outcomes: The sharp contrasts in weather patterns (extreme south-east winds in the summer and very uncomfortable and unpleasant cold and wet weather in the winter) called for seasonal surveys to gauge the effect of ceilings on living conditions in Mamre. Members of the community committee conducted comparative surveys in both retrofit and non-retrofit houses before and after the summer and winter seasons. It takes several rounds to ascertain the results but early survey findings have been encouraging. Potential effects include improved health, better thermal efficiency (warmer homes and/or reduced energy consumption), and enhanced household resilience to weather conditions. A third round will lead to a detailed analysis by ICLEI in late 2011 (final report available on request from ICLEI). The final assessment will include evidence of the improvements in quality of life, sense of self, ownership and livelihoods, in the hope that the remaining RDP houses in Mamre can be retrofit with ceilings.

Replication: The City of Cape Town will use the full report when turning to the national government and donors for replication of the Mamre pilot project in the area, where some 40,000 RDP houses would need retrofitting. The Western Province is also keen to replicate the scheme in other locations. Donor involvement is indispensable: once completed, a government-built house becomes the property of the beneficiary household, and it is next to impossible for the municipality to allocate taxpayer money to privately-owned property.

Lessons learned: After a recent change in regulations, new houses built under government programmes must come equipped with healthier or energy-saving fixtures like solar panels, insulation, plastered walls, ceilings, water-saving shower heads, etc.

Conclusion

Mamre's experience shows that in their worthy efforts to provide affordable housing to expanding populations, municipalities must not overprivilege quantity over quality. Poverty reduction and adaptation in the face of more frequent extreme weather events call for a degree of energy efficiency from which other benefits are to be derived in terms of energy savings and health. Sustainability requires a participatory process and capacity-building among the community.

INSTITUTIONAL FEATURES

- Under the Constitution, local government is in charge of housing (planning and implementation)
- the project was decided and supervised by the Environmental Resource Management Department of the City of Cape Town
- the Mamre municipality leads the retrofitting scheme, having allocated the budget for the ceilings and the skills development programme
- ICLEI will provide a thorough survey-based assessment of the outcomes, which will hopefully trigger support for replication both in Mamre and elsewhere in Cape Town.

PARTNERS

- The Mamre scheme was part of a three-year project formally known as *Sub-Saharan African Cities: A Five-City Network to Pioneer Climate Adaptation through participatory Research and Local Action* launched by the African section of ICLEI (International Council for Local Environmental Initiatives), which was funded by DfID and the International Development Research Centre under the *Climate Change Adaptation in Africa programme*
- In Mamre, funding was provided by DANIDA.

For further information

- ICLEI, Climate Change Resilience in Mamre (North Atlantis), Cape Town, South Africa: <http://www.iclei.org/index.php?id=11470>
- City of Cape Town, Mamre residents benefit from new ceilings: <http://www.capetown.gov.za/en/Pages/Mamreresidentsbenefitfromnewceilings.aspx>

CHAPTER 3

ANTANANARIVO: RESPONDING TO CLIMATE CHANGE INVOLVES INFRASTRUCTURE AND SOCIO-ECONOMIC EMERGENCIES



Sitting in the Indian Ocean some 400km off the south-eastern tip of the African continent, Madagascar ranks third on the World Bank list of countries most vulnerable to the rising frequency and intensity of storms which global warming is expected to bring. Average temperature has been rising over recent decades, accompanied by lower volumes of rainfall, the pattern of which is influenced by global warming and also possibly altered micro-climates (80 to 90 per cent of forest cover has been lost over the last century). The capital Antananarivo (population: 2.3 million) sits on highlands (1,200-1,400m) some 200km west of the ocean, and enjoys a temperate sub-tropical climate. Under current forecasts, average temperatures, rainfall volume and intensity are to increase in the city; storms will become more frequent, but cyclones less (four or five a year so far) although they will be nearly 50 per cent more intense. Runoff, river levels and the water table will rise, resulting in increased flooding from both the river and the drains, and heightening the risk of flash floods.

In 2008 Antananarivo found itself at the core of a political tug of war between her mayor and the then president of the country. Basic services were already in poor condition when the president moved to deprive the capital from major sources of revenue as well as from any responsibility in sanitation management. In early 2009 and after months of strife, the president went into exile and the mayor took over as unelected head of state, antagonising the international community and triggering sanctions from the African Union. In the meantime and just as the effects of climate change are increasingly felt, public services have all but collapsed in the capital, now known as the dirtiest in Africa.

Local issues related to climate change and sustainable urbanisation

- According to the World Bank, it takes five years for a local economy fully to recover from a cyclone
- the annual municipal budget for Antananarivo amounts to USD4.00 per head, compared with USD28 for Senegal's capital Dakar
- the legal, institutional and operational frameworks for housing, water and sanitation are wholly inadequate and poorly resourced
- only 37 per cent of the population benefit from solid waste collection, with only 17 (often defective) trucks; there are only 460 dumpsters (or one per 5,000) in the conurbation and only two dumping sites, one of which seasonal, both unsupervised and uncontrolled
- basic urban equipment (lamp posts, manhole covers, dumpsters, vehicles) has been either used as weapons/defences in riots or sold off for individual profit
- food insecurity remains a reality for some 30 per cent of the population and high food (especially rice) prices the major concern for a vast majority
- the second and third major concerns among the population are lower incomes (over two-thirds) and health (50 per cent)
- incomes dropped an average 15 per cent between 2006 and 2010, with women and the poorest hardest hit
- 25 per cent of housing units are informal (no water or sanitation, makeshift building materials) and average surface area is 31sq m, or an average 3.7 residents per room
- only 17 per cent of homes are connected to sanitation networks (and hardly any in peri-

urban areas), human waste is left on public thoroughfares or dumped in canals, and open-air defecation remains widespread (1/5 of residents); in one UN intervention area (17 wards), there are 48 public toilets (more than half of which in a poor state of repair) for 422, 000 residents

- only half the population had access to drinkable water in 2008, compared with nearly two thirds in 2005; there is one water point for 1,663 residents and one individual connection for 17; 42 per cent of supplies are 'non-revenue' (leakages, etc.)
- because of the relief of the area, extension of water/sanitation networks is a technical challenge and would be too expensive
- individual septic tanks may be the more viable solution for the future (despite land scarcity), but one that calls for proper maintenance
- vulnerability to flooding is far from negligible, but the main waste and rainwater drainage system is outdated, poorly maintained, inadequate in scope (does not extend to peri-urban areas) and cut off from local networks.

The problem

Political tension and instability are compounding the effects of climate change, including dilapidated sanitation systems, higher pollution, spreading diseases and accelerated deterioration of the urban environment. These combine to create a socio-economic and sanitary emergency situation. National policies are in limbo since the international community, which used to provide up to 50 per cent of the country's budget, does not recognise the unelected government that took over in 2009. With political instability foreign investors have left, unemployment is even more severe than before and crime, violence and prostitution have been on the increase as rural migrants keep flowing in. Given the socio-economic and political situation, tax and fee collection has become a challenge. Against a confusing background of excessive bureaucratic centralisation and inadequate decentralisation, the resource-poor Antananarivo municipality had to step in but risked being left to its own devices in the face of alarming, interlinked problems.

Promising practice in brief: Mobilising donor and local communities in the face of multiple present and future challenges

The dire conditions prevailing in Antananarivo have enabled the municipality to attract financial and technical support from a wide range of international and foreign partners under the 'Human security' and 'Disaster risk reduction'

frameworks, with community mobilisation substituting for largely ineffective public utilities. Civic rehabilitation and empowerment through participatory governance and job creation provide the local basis for sustainable projects and the longer-term perspective required for climate change adaptation.

Promising practice (1): A multi-disciplinary approach that leverages local potential and structures

Responding to a variety of needs: Since the needs of the more vulnerable informal settlements are multi-dimensional, the UN system is responding accordingly, coordinating with donors (including 'decentralised cooperation' from French regional and urban authorities), public bodies and relevant national and international non-governmental organisations. Multi-disciplinarity is a must for any project as a whole, and for the various components. Local socio-economic and human development is closely linked to basic services, which in turn must anticipate the compounding effects of climate change on an already difficult living environment.

Participatory project development: Participatory governance is critical if projects are to respond effectively to averred needs and to elicit ownership among beneficiaries. In Antananarivo now, priorities and planning schedules are determined jointly with local communities, local authorities and government technical staff, together with non-governmental and grassroots organisations also acting as facilitators in each neighbourhood. Changes in individual behaviour patterns have a major role to play in water and sanitation projects, but can be problematic among freshly settled rural migrants. In the absence of any effective public enforcement authority, ward, sub-sector and sector chiefs have important suasion and educational roles to play.

Leveraging and complementing existing structures: For the sake of expediency and emergency, in Antananarivo the UN system can rely on ongoing or legacy local project structures and associated research. This makes it easier to dovetail new and existing complementary plans and schemes, heightening a clear sense of convergence and consistency among participants and enhancing ownership at grassroots level.

Promising practice (2): Revenue-earning waste management in the conurbation

Rapid mapping of past, current and prospective actions regarding solid waste management across the Antananarivo conurbation has identified a lack of processing and commercial recycling. On this

basis, the project is devising the technical linkages and methods as well as commercial opportunities for processed, recycled and recuperated waste. The rationale is to generate jobs for individuals and revenue for municipalities, while reducing the volumes to be handled by municipal utilities as well as any greenhouse gas emissions (methane, carbon dioxide) from processing/recycling activities. The project brings together the Antananarivo Urban Community, a group of peri-urban municipalities and the various local bodies in charge of waste management and sanitation.

Promising practice (3): Piloting a multi-function sanitation block in a vulnerable neighbourhood

This pilot project, known as 'Tana Service', has been deployed in a particularly vulnerable informal neighbourhood. It has been jointly developed as part of an integrated, participatory exercise involving the whole range of stakeholders, including local groupings, local authorities and UN institutions. The 'sanitation block' coordinates all the dimensions of sanitation and job generation, including solid and household waste management, water distribution and a 'Wash' (water, sanitation, hygiene) scheme. The project will be operational by late 2011 and is to be replicated in three to six other vulnerable informal neighbourhoods under the UN 'Human Security' scheme. French NGO ENDA-Océan Indien is organising the preliminary collection rounds for a fee (USD0.10 to 0.25) and is reasonably happy with fee-collection rates.

Promising practice (4): Risk and disaster management across the conurbation

The project consists of the development of a Risk and Disaster Management plan. This includes a set of early warning indicators enabling ward (*fokontany*) leaders and municipal authorities to prevent, manage and mitigate man-made and natural (seasonal) disasters; also included are any socio-economic factors that might interfere with proper access to, or operation of, basic services, as well as any present and prospective compounding effects of climate change.

Participants include a group representing all risk- and disaster-exposed *fokontany*, the Urban Community and peri-urban municipalities. Also contributing are the National Risk and Disaster Management Bureau (BNGRC), the

Emergency Prevention and Management Unit (CPGU) and the technical divisions of relevant government departments, along with grassroots, non-governmental, national and international institutions.

Promising practice (5): Improving multi-dimensional security in 25 wards

The fourth UN-supported project aims to improve security under all its dimensions in 25 wards selected among the total 192 in the Malagasy capital. On top of public security and personal safety, this includes sanitation, employment, human, women's and children's rights, community cohesion and civic peace, as well as food and nutritional security. The project has been developed, established and implemented by the UN system in close cooperation with the Urban Community, government technical and low-level local authorities (wards, sectors and sub-sectors) as well as local grassroots organisations. The multi-dimensional nature of the project called for converging interventions, operational methods and monitoring/assessment systems, which in turn required faultless coordination among agencies.

Replication

As part of the European Union support programme (humanitarian and emergency aid), a training scheme is to be organised for grassroots organisations, decentralised planning and public works services, municipal technical services, non-governmental organisations as well as the engineering and construction professions. A handbook is to be prepared for the Emergency Prevention and Management Unit (CPGU) and the National Bureau for Risk and Disaster Management (BNGRC), who will help disseminate it.

Conclusion

Against a difficult institutional background, Antananarivo manages to combine service rehabilitation, community empowerment, job creation (through cost recovery) and climate change adaptation across a number of schemes and programmes. Community mobilisation substitutes for a largely paralysed national government. Municipal coordination of multiple projects is supplemented by close cooperation between UN agencies and non-governmental organisations.

INSTITUTIONAL FEATURES

- Institutional confusion due to government deadlock since early 2009 reflects the legacy of a highly centralised system and the pitfalls of inadequate decentralisation
- for lack of international recognition, central government can only contribute technical staff/resources to any project, instead of (typically sector-based) policy-making
- UN institutions coordinate very closely between themselves (One-UN) for project development and implementation, under the 'Human Security' and 'Disaster Risk Reduction' frameworks
- Antananarivo's overall humanitarian/emergency agenda attracts funding from Western and multilateral donors regardless of the government's international status
- this agenda restricts the scope of projects to the more vulnerable among urban communities, which happen to be most exposed to the effects of climate change on top of already severe socio-economic and environmental problems
- municipalities on the outskirts of the conurbation are involved in the projects, enabling them to benefit while potentially relieving the capital from the constraints which land scarcity keeps imposing on waste and sanitation projects
- the dire conditions attract assistance from non-governmental organisations and decentralised cooperation, bringing much-needed training and job opportunities.

PARTNERS

- UN system: UN-Habitat, UNICEF, Office of the High Commissioner for Refugees, UN Development Programme, UNIFEM, UN Population Fund, UN Office for the Coordination of Humanitarian Affairs, UN Development Assistance Framework, UN Trust Fund for Human Security
- Technical: Care International, Centre National de Recherche Industrielle et Technologique, Communauté urbaine d'Antananarivo, ENDA-Océan Indien, Fondation Practica, WSUP, Association Miarintsoa, Catholic Relief Services, International Committee of the Red Cross
- Financial: Multi-Donor Trust Fund of the Global Facility for Disaster Reduction and Recovery (GFDRR), Agence française de développement (AFD), European Union (humanitarian and disaster relief), Mairie de Paris, Fondation Abbé Pierre, Fondation Ensemble.

For further information

- World Bank, MADAGASCAR DISASTER RISK REDUCTION PLAN: Moving From Disaster Response To Prevention: http://siteresources.worldbank.org/INTAFRICA/Resources/FINAL_STORY_green-growth-madagascar.pdf
- UN Hay Zara – A Knowledge Management Portal for Madagascar, Knowledge Bank: Emergencies & Disaster Risk Reduction: http://www.mg.one.un.org/HAYZARA/index.php?option=com_content&view=article&id=135&Itemid=15&lang=en
- Human Security Gateway, Humanitarian Situation in Madagascar (as of 6 May 2009): <http://www.humansecuritygateway.com/showRecord.php?RecordId=29286>

SECTION

3

HOW COASTAL CITIES FACE UP TO CLIMATE CHANGE

Walvis Bay:

Integrating biodiversity, climate change and stakeholder initiatives



Banjul:

Participatory mainstreaming of international frameworks



Freetown:

Urban agriculture, secure tenure mitigate climate change and reduce poverty



CHAPTER 1

WALVIS BAY: INTEGRATING BIODIVERSITY, CLIMATE CHANGE AND STAKEHOLDER INITIATIVES

Namibia's Walvis Bay is another instance of the threats climate change poses on a complex natural environment against the background of an ill-adapted institutional and policy-making framework. A low-lying harbour city located next to a fish-rich stretch of the South Atlantic Ocean, bounded by two rivers, wetlands, one of the oldest deserts in the world and a protected coastline, Walvis Bay ('whale bay' in Afrikaans - population: 85,000) derives its prosperity and socio-economic development from biodiversity (fisheries and associated processing, saltworks, whale- and bird-spotting, sand-dune bike-riding, etc.). As the cold Benguela current off the coast interacts with the arid desert climate, strong winds and minimal rainfall are major environmental features. With one of the highest degrees of vulnerability in the world, Walvis Bay has joined UN-HABITAT's *Cities and Climate Change Initiative*. The country is bound by the conventions on Wetlands of International Importance (Ramsar), Prevention of Pollution from ships, Biological Diversity, Combating Desertification, and Climate Change (UN Framework).

The problem

Even more severe than gale-force winds and coastal erosion, the main threat from climate change in Walvis Bay is associated with flooding (extreme events), salination of water supplies and raised water-tables. Like Saint-Louis in Senegal, the city is protected from ocean swell by a narrow sand spit (Pelican Point), any breach of which would directly expose wetlands, the port and the city to tidal waves. Livelihoods and food security are at stake. As in other countries, climate change catches government short in terms of coordination



at all levels, legislative scope, decentralised powers and resources. In Namibia, decentralisation leaves major cities in a challenging predicament: (1) an absence of national redistributive policies, and scarce government transfers, (2) lack of general revenue-raising powers at municipal level, and (3) a 'pay per use' system of municipal services (e.g., the municipal police force is paid through specific annual individual and corporate contributions).

Local issues related to climate change and sustainable urbanisation

- Stronger winds and higher temperatures rank among the more predictable effects of climate change
- the marine environment and the lagoon must be protected against all sorts of pollution
- the coastline and desert must be protected against encroachment, including by tourism, for the sake of economically poor native communities
- rural-to-urban migration is set to bring the population to some 120,000 by 2020, partly on the back of a project for a container-handling port facility
- the population and industry (mainly fish processing) rely on a small coastal aquifer for water supplies
- salt already intrudes into supplies and rationing is the only available water management method, with direct detrimental effects on industry; desalination is now under consideration
- the city sits less than two metres above mean sea level
- whether the sand spit can hold or not against rising sea levels remains a moot though crucial point

- a sea level rise of 0.3 m would flood significant parts of Walvis Bay
- with a one-metre rise, most of the town would be inundated during high tide, and worse during storms
- severe flooding is expected every year from 2030 onwards (from 3m above mean sea level in low-lying to 1.5m in sheltered coast areas)
- flooding will pose a problem for the maintenance of all underground services (water, sewerage and electricity)
- permanent flooding of low-lying areas is a long-term threat
- the coastline may recede by 100m (or possibly as far as the first line of dunes), forcing the harbour, services and industry to curtail operations or relocate to higher ground
- together with more than 20,000 properties, loss to permanent flooding of road, water, sewer and electrical infrastructures would cost USD3.8 billion.



Bird life along the coast of Walvis Bay, Namibia.
©UN-Habitat/Bridget Oballa

Promising practice in brief: An all-integrating city strategy for biodiversity and climate change

Driven by a determined mayor and inspired by the 1992 'Rio Declaration on environment and development', the Walvis Bay Municipal Council in 1993 took four strategic decisions with regard to climate change and biodiversity management: a single integrated long-term policy, partnerships, coordination, and taking advantage of existing plans and programmes. The 2001 Local Agenda 21 and an ICLEI partnership have further emphasised the participatory dimension of municipal policies.

Promising practice (1): Evolving municipal policies

The municipal strategy started off in 1995 as a commitment to health and safety, based on existing municipal by-laws and policies with regard to housing, environmental health, town planning, public participation, and littering, among others. Also in 1995, the wetlands to the south of Walvis Bay came under Ramsar Convention protection.

Agenda 21: By 2001, the municipality took a major step further with a Local Agenda 21 that sought to address six complementary needs: (1) development of a clear legal framework on environmental management; (2) increased awareness of natural resource savings and other environmental issues; (3) development and adoption by Walvis Bay Municipality of local environmental policies and strategies that recognize LA21 principles; (4) establishment of a coherent picture of natural and human impacts that is reflected in environmental policies and strategies; (5) provision of funds for environmental management and cross-sector initiatives; (6) reduction of water and energy demand to manageable levels. Implementation was hindered by an inadequate decentralisation framework.

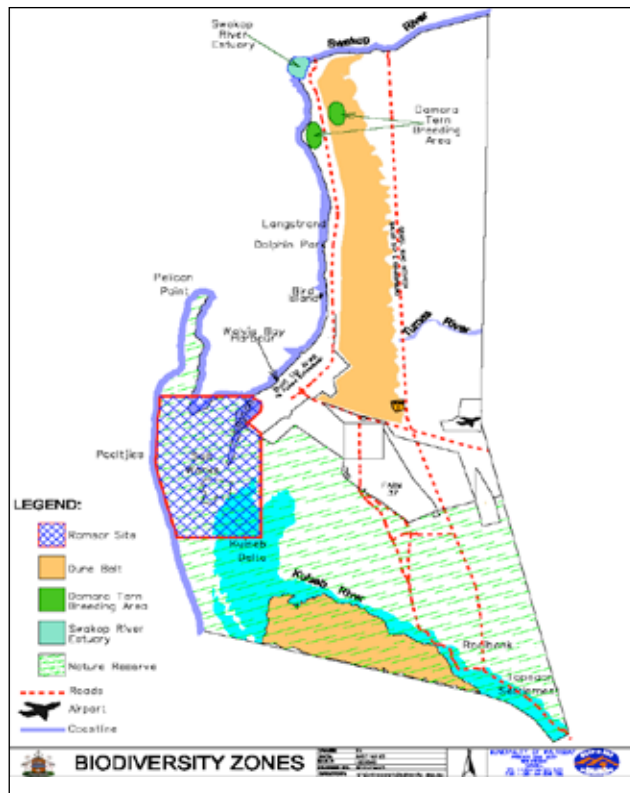
Promising practice (2): Integrating biodiversity, climate change and development

Integration of biodiversity, climate change and socio-economic development came in a bid to overcome sector-based segmentation of municipal departments. The 2002-2008 Integrated Environmental Policy did not recognize the importance of biodiversity conservation and climate change mitigation or adaptation. This was rectified in March 2008 in the successor (2008-2015) policy, which emphasises a number of tools and initiatives like the *The Economics of Ecosystems and Biodiversity (TEEB) report*, *Leaders for Climate Change*, the *Mayors' Handbook*, Local Government Climate Risk Tool, Climate Reports, and the Walvis Bay Adaptation Framework

A dedicated municipal section - The municipal Environmental Section was established in 2001 for the coordination and implementation of environmental policies. It has since been supported by various dedicated participatory steering committees (Local Agenda 21, Coastal Area Action Plan, etc.).

Major achievements: The 2003/04 Dune Belt

Management Plan and Regulations promotes sustainable use and improved environmental protection of the area. The Walvis Bay/Swakopmund Coastline Strategic Environmental Assessment integrates the environment, urban planning and development.



The biodiversity zones of Walvis Bay, Namibia. ©Walvis Bay Local Action for Biodiversity (WBLAB) Project Report 2009

Promising practice (3): Stakeholder participation and the Forum

Stakeholder participation: With its 'pay per use' system, the poorly resourced municipality maintains a 'supplier-customer' (as opposed to top-down) relationship with the citizenry in a bid to respond to effective demand. This demand-driven approach in turn tends to ensure stronger public mobilisation behind, and 'ownership of', projects.

Need for institutionalised coordination: To avoid overlaps, or working at cross-purposes, with other municipal services or initiatives, or unknown to main stakeholders, the municipality has decided to institutionalise partnership with the citizenry, interest groups and institutions (i.e. churches, sports and social clubs, schools, old age homes, voluntary organisations and industry associations, among many others).

Promising practice (4): A permanent, broad-based stakeholder forum

The Walvis Bay Environmental Management and Advisory Forum (WEMAF) held its first meeting in March 2011. The purpose is to ensure the sustainable management of the local environment, facilitating long-term positive interaction between nature, society and the economy. This permanent broad-based, multi-stakeholder body will assess, advise, share, raise awareness, provide support and take a leading role in the development, promotion, enforcement and implementation of various environment-related policies, programmes, plans, projects, etc. in partnership with the municipality. The body is made up of a number of general-interest stakeholders (including UN-HABITAT and ICLEI) and four area-specific groups. It will be involved in the forthcoming revision of municipal plans, policies and programmes. WEMAF is funded mainly by member organisations. The second meeting was held in August 2011 during the UN-HABITAT/ICLEI Climate Change Declaration Conference.

Promising practice (5): Outsourcing functions to stakeholders

In Walvis Bay, stakeholder mobilisation goes further than awareness-enhancing and policy-shaping efforts: outsourcing some functions (monitoring, projects) to stakeholders, including the community, enables the municipality to overcome its own inadequate technical and staff resources.

Monitoring: Among all the factors behind climate change in the area, the Benguela current has a significant role to play, but scientific data is scarce. Since change is to happen gradually, monitoring is critical. The Coastal Area Study resulted in an intensive monitoring scheme that has not just the municipality, but also the port authority measuring sea levels, temperature and other variables in the bay and the lagoon.

The Environmental Fund: An emanation of *Local Agenda 21*, the Fund exemplifies the municipality's customer/demand-driven approach. Every year since 2003, the scheme grants a total USD60,000 to selected projects from individual residents, businesses or civil society at large. Selected projects contribute to the proper management of the environment and natural resources in Walvis Bay, consistent with municipal policies. Residents or institutions with innovative and viable environmental projects may apply for grants.

Projects implemented so far include the following: a water-saving competition in schools; substituting bicycles for municipal motor vehicles; production of curriculum material (posters, booklets, CDs) on local environmental issues; pilot planting of vegetables; an environmental Internet-equipped 'Green Corner' for youth in a low-income suburb; a *Recreation and Conservation plan for the Coastal Plains and Dune Belt*; solid-waste recycling and a dedicated information centre; training for cleaner production in the fishing industry; training in coastal area monitoring in Denmark; an eco-tourism map for schools; beach and culvert clean-up campaigns; and a video about the effects of urbanisation on the environment.

Promising practice (5): The strategic partnership with ICLEI

The municipality has participated in, and contributed to, various local, national, regional and international meetings and workshops, resulting in a number of various draft assessments and guiding documentation. Coalition-building with other domestic local government bodies is continuing. Apart from UN-HABITAT (urban sector profiling) and the Namibian Ministry of Regional & Local Government, Housing and Rural Development,

most potentially fruitful for Walvis Bay is a strategic partnership with the International Council for Local Environmental Initiatives (ICLEI). This took the form of the Local Action for Biodiversity (LAB) project (until June 2009), with a wide range of stakeholders serving on the steering committee. The municipality also endorsed the Countdown 2010 Declaration and the Durban Commitment on biodiversity preservation.

As a 'Biodiversity City', Walvis Bay can benefit from an enhanced international profile, workshops and opportunities for best-practice and information sharing – provided that the municipality can afford the USD40,000 fee.

Conclusion

The case of Walvis Bay comes as another illustration of the way a determined municipality can overcome an ill-adapted decentralised framework in order to face climate change. As with Saint-Louis, Senegal, lack of financial resources is the major obstacle and decentralised cooperation (in this case, with Kristiansand, Norway) does not seem to extend to climate change. However, with its demand-driven approach Walvis Bay has effectively mobilised stakeholders and the community.

INSTITUTIONAL FEATURES

- Environmental protection is embedded in Namibia's Constitution, providing some political support
- decentralisation laws make no specific mention of the environment or direct central government support
- international platforms to support implementation of international treaties: the 1992 Rio Declaration on environment and development, a Local Agenda 21 and ICLEI
- as authorized by the decentralization framework, cash-strapped Walvis Bay has received grants from foreign governmental (Denmark's DANIDA, to develop an Agenda 21) and private sector donors
- stakeholder participation is embedded in the process and supports local political will.

Further information

- Walvis Bay Climate Change Strategic Decisions: http://locs4africa.iclei.org/files/2011/03/David-Uushona_Municipality-of-Walvis-Bay1.pdf
- UN-Habitat (2010), Supporting local action for biodiversity: <http://www.unhabitat.org/pmss/listItemDetails.aspx?publicationID=3135>

CHAPTER 2

BANJUL: PARTICIPATORY MAINSTREAMING OF INTERNATIONAL FRAMEWORKS



One of Africa's most vulnerable areas to climate change is The Gambia, with its capital Banjul facing complete submergence by 2060. Over the past few years, the city has stood out as a good example of local implementation of international frameworks and guidelines on biodiversity and climate change.

The problem

Banjul (population: 35,000; conurbation: 400,000) is built on an island where the Gambia River enters the Atlantic Ocean. Its territory is 1/3 dry land and 2/3 wetlands. Located on a flood plain, its highest point is no more than 50cm above sea level, and flooding is frequent. The surrounding Tanbi mangrove must be preserved as a defence against soil erosion. The climate is Sahelian with a short wet season. Poor compliance with physical planning regulations and inadequate drainage infrastructure exacerbate flooding. An exiguous topography is another concern, as well as the need to preserve the country's steady socio-economic progress of the past several years. The economy is highly sensitive to climate change, being dominated by farming, fishing and tourism. About one third of the population lives below the poverty line and public authorities have undertaken to develop productive capacities at all levels.

Local issues related to climate change and sustainable urbanisation

- Climate change may exacerbate wind patterns and already heavy seasonal rainfall
- sea level rise and flooding are to continue, but

- weather patterns are increasingly unpredictable
- coastal erosion is significant (2.5 to 3m or more per year)
- preservation of mangroves and the associated biodiversity is vital, including for the livelihoods of upstream communities
- living conditions are increasingly cramped for rural-to-urban migrants and refugees from Casamance
- rice is the main staple diet but fields are destroyed by salination of low-lying areas, adding to the country's food deficit
- food security is at risk (food is purchased every day (70 per cent of income), bamboo shacks do not hold water, no room for urban agriculture)
- enforcement of urban planning rules is poor
- demographic expansion puts toilets, water and electricity systems under serious pressure
- illegal dumping of waste is widespread
- oil spills from mechanical workshops pollute the river and marine waters.

Promising practice in brief: Participatory mainstreaming of international frameworks

The Ramsar Convention on wetlands and the Hyogo Framework on Disaster Reduction are mainstreamed into legislation and policy-making at all government levels in order to strengthen implementation. Action is taken against soil (coastal) erosion. The population is mobilised through newly-created ward committees, with help from religious leaders. Youth self-employment is encouraged, and drainage, sewerage and waste systems are improved.

Promising practice (1): Mainstreaming the Ramsar Convention on wetlands

Mangroves act as seaward barriers as they dissipate the energy of flood waters that cause soil erosion along coasts and salination of back swamps; they also nurture biodiversity (birds, (shell)fish) on top of serving as carbon sinks. Banjul is surrounded by the Tanbi Wetland Complex, which is protected under the 1971 Ramsar Convention (“on wetlands of international importance”).

The Convention provides a framework for national action in favour of the conservation and “wise use” of wetlands and their resources.

‘Wise use’: The convention defines this as “the maintenance of the ecological character of wetlands, achieved through the implementation of ecosystem approaches, within the context of sustainable development”.

Mainstreaming–Legislation: In The Gambia, the protection of marine and coastal biodiversity has been enhanced by the 1995–2005 Forestry Policy as supported by the 1998 Forestry Act and Regulations, as well as by the 2003 Biodiversity Act and associated policy. This includes: fisheries legislation and rules on fishing gear or the release of fish in aquaculture facilities; protection of many wildlife species; discouraging forest clearance and conversion into farmlands; bans on alien invasive species, the exploitation of certain animals or plants or the burning of charcoal.

Mainstreaming and policy-making: The Banjul City Council, which is represented on the National Climate Change Committee, has fully mainstreamed the conventions on climate change and biodiversity in its projects and programmes, both at council and community (ward) levels. The various steps thus taken either directly or indirectly preserve the quality of the water stored in the Ramsar-protected wetlands; this includes more effective enforcement of regulations on planning (prohibition to build in certain areas), on pollution (spillage of oil-soiled ballast water in the harbour) or on dumping garbage in the drains, among others.

Physical protection of mangroves: A major (shell)fish breeding ground, the mangrove is under threat from sea level rise. In Banjul, planting coconut trees to prevent beach/soil erosion by storm water has proved to be more effective and considerably cheaper than dykes/sandbags. Construction of a ring dyke and a pumping station to evacuate storm water has reduced flooding in low-lying areas.

Promising practice (2): A safer environment secures socio-economic development

Political will: The Gambia’s 2007 *National Adaptation Programme of Action* (NAPA) stands out in Africa for its close association between climate change adaptation and poverty reduction. Although central government resources inevitably remain under various constraints, the political will at the top is relayed by a dynamic Banjul municipality, with some of the resource gaps met by community mobilisation and civil society.

Fisheries: This is a major source of jobs, incomes (export and local markets) and nutrition (proteins, etc.) for the local population, and a major plank in the government’s poverty reduction strategy. Artisanal fishing is supported by relaxed rules and new storage facilities and the industry is organising itself (including a dispute-settlement mechanism), in a bid to retain or attract young people who might otherwise be tempted by migration to the West. Seafood from the wetlands provides livelihoods to many women, who have also regrouped in order to impose sustainable practices including stock regeneration and mangrove preservation. Women have also taken to shellfish aquaculture (to relieve pressure on the wetlands) and fish smoking.

Tourism: Tourism creates all sorts of jobs for local people and Banjul’s wildlife-rich wetlands (birds, etc.) are a major attraction for foreign visitors. As the population stops using drainage systems as dumping grounds for waste, a cleaner Banjul can attract more tourists. Flooding would be reduced, as would the stagnant waters that serve as breeding grounds for malaria-infected mosquitoes.

Further opportunities: The dynamic triggered by the action plan is expected to bring a number of spinoffs: infrastructure improvement is ongoing, with promotion of alternative energies and environment-friendly building scheduled for the longer term.

Promising practice (3): Decentralisation and institutional coordination

Decentralisation: The Hyogo Framework recommends a fair amount of government decentralisation for effective prevention and handling of disasters. Under The Gambia’s Local Government Act 2002, good governance and decentralization have seen the establishment of wards, whose sole responsibility is to plan, develop

and implement works of public interest. The Banjul City Council is comprised of nine elected ward representatives, and three appointed councillors representing youth, women and commerce.

Institutional coordination: The National Climate Change Committee brings together the Banjul City Council and other relevant local authorities, enabling them to work together and support all stakeholders in climate change issues. The government has also set up of a National Disaster Governing Council and a National Disaster Management Agency.

Cooperation: The three institutions together set up dedicated committees to mobilise staff and financial resources for the execution of projects (with representatives from government, local authorities and communities).

Promising practice (4): Mobilising communities

The dedicated committees resort to participatory planning and implementation of programmes and projects. The National Climate Change Committee ensures that ownership of any projects or programmes is clearly spelt out/allocated and benefit-sharing is equitable.

Grassroots participation: The poor and vulnerable are not voiceless in the selection of the committees. Each member of the committee has equal weight in decision-making. Each major decision must be approved by ward committees before it is endorsed by the City Council prior to implementation

The role of opinion leaders: Religious leaders help mobilise community support for plans and projects, as the average literacy rate in The Gambia is 40 per cent (females: 33 per cent; males: 48 per cent).

Preparedness and early warning: Hot spots and associated adaptation/mitigation action have been identified in Banjul. An early warning system is in place, as is a nationwide contingency plan on climate change, sea level rise and coastal protection.

Promising practice (5): Changing the culture

As prescribed by the Ramsar Convention, the participation of those who retain or use traditional knowledge is now built into the decision-making process. On the other hand and as per the Hyogo Framework, authorities in The Gambia and Banjul

look to build a culture of safety and resilience among the population.

Public participation: Since 2004, the Banjul population devotes the morning of every third Saturday of the month to cleaning of the environment.

Capacity-building and youth: The City Council looks to improve staff familiarity with climate issues and to provide infrastructure as required for climate change adaptation. The Council also looks to engage youth in self-employment projects in a bid to reduce unemployment, banditry, prostitution, drug abuse and dependence.

Better housing for the poor: Since 2010, rent tribunals have facilitated access to affordable decent housing for the poor and vulnerable.

More effective planning enforcement: Building on the 1995 Physical Planning Regulations, the Local Government Act 2002 enables the City Council to suspend construction of illegal buildings and other structures.

Replication

Banjul's handling of climate change mitigation and adaptation has, over the years, been replicated in Serekunda and 10 other coastal cities in The Gambia. Action includes planting coconuts and beach nourishment with sand bags (in tourist resorts), together with capacity-building for fishing villagers (sustainable use of beaches, environment cleaning and rational waste disposal at designated sites).

Conclusion

Banjul is one of those coastal cities that have recognized that their marine environment is a major asset in need of preservation for the sake of both adaptation to climate change and sustainable livelihoods for the poor. Community mobilization must support improvements in water and sanitation systems. The choice between natural and man-made (dykes, etc.) defences depends on economic (tourism) and time-scale (short v. longer term) factors, with lack of donor interest a major financial constraint.

INSTITUTIONAL FEATURES

- Mainstreaming the Ramsar Convention and the Hyogo Framework on Disaster Reduction into legislation and policy-making
- policy-making coordination is institutionalized
- decentralisation and participatory coordination at all levels, including wards
- regulatory enforcement is enhanced
- reliance on confessional leaders to help change community attitudes.

MAJOR PARTNERS

- Ministry of Fisheries and Water Resources
- Ministry of Forestry and the Environment
- National Environment Agency
- Ministry of Local Government and Lands
- National Disaster Management Agency
- UN Development Programme
- ENDA-Tiers Monde.

For more information

- Ramsar Convention on Wetlands: <http://www.ramsar.org>
- Hyogo Framework for Action: <http://www.unisdr.org/we/coordinate/hfa>
- Supporting Local Action for Biodiversity: <http://www.unhabitat.org/pmss/listItemDetails.aspx?publicationID=3135>

CHAPTER 3

FREETOWN: URBAN AGRICULTURE, SECURE TENURE MITIGATE CLIMATE CHANGE AND REDUCE POVERTY



Over 25 per cent of Africa's population lives within 100km from the coast and therefore is under serious threat from climate change. In Sierra Leone's capital Freetown and the surrounding Western Peninsula Territory, climate change adaptation and mitigation is finding a perfect fit with authorities' need to control urbanisation and promote more compact patterns of spatial development while providing livelihoods to rural-to-urban migrants.

The problem

Sierra Leone is the fourth most vulnerable country in the world, assessed by capacity to adapt to the impact of climate change. The country (population: five million) faces the risk of higher temperatures, as well as flooding and salination from the rising tides of the warming Atlantic Ocean. With 1.5 million residents, the Freetown conurbation is located on a peninsula at the foot of a mountain ridge, with the estuary of the Sierra Leone River on one side and the Atlantic Ocean on the two other sides. The tropical climate is characterised by heavy rainfall. Civil strife (1991-2002) has left a triple legacy in the area: (1) rural-to-urban migration and the resulting need for more housing; (2) deforestation, as trees are chopped down to provide fuel and room for human settlements; and (3) urban agriculture, mainly on wetlands, which due to tenure insecurity is often superseded by residential and other developments.

Local issues related to climate change and sustainable urbanisation

- Urban areas outside Freetown are very poor. The proportion below the poverty line in

Freetown in 2003 and 2004 was estimated at 22 per cent

- underemployment remains a problem. In 2006, three of every 10 young men aged 20 to 24 were neither formally employed nor in school. The problem is especially acute in urban areas
- climate computer models agree that temperatures are rising and will continue to do so, but are less certain about rainfall projections because of the El Niño effect
- climate variability interferes with achievement of the Millennium Development Goals, especially in relation to food security and the provision of clean water
- unregulated excavation of sand for building materials compounds coastal erosion which has already caused some property loss
- in the Kroo Bay slum areas, 6,000 people have created homes on low-lying land.



Wetlands-based urban agriculture in Freetown, Sierra Leone.
©RUAF/Rene van Veenhuizen

Promising practice in brief: Urban agriculture

Freetown's *City Strategic Agenda* seeks to formalise urban agriculture and forestry in order to protect and enhance their environmental and socio-economic benefits. The process is based on land demarcation and identification before plots are (re-)allocated to farming, residential or other uses in a more reliable, rational and sustainable way. Hopes are that urban agro-forestry will build integrated ecological cycles (water, nutrients, food) within the settlements.

Promising practice (1): Laying down a supportive framework

The *City Strategic Agenda* takes inspiration from the country's 2008 *National Adaptation Programme of Action* (NAPA), which recommended consistency with the needs of poverty reduction and development. In Freetown, these needs include soil management, irrigation and seed selection.

Land survey and reform: In order to secure adequate and reliable quality farmland for urban agriculture on a durable basis, all existing viable wetlands suitable for urban agriculture are systematically surveyed, demarcated and identified, a process expected to last until May 2012.

In the meantime, the Ministry of Land, Country Planning and the Environment and the Ministry of Agriculture, Forestry and Food Security have devised a nationwide land reform framework which they hope the government will endorse in the second half of 2011, with parliament approval as the final stage in the process.

In the next step, it will be for local authorities to (re-)allocate plots to urban farmers, together with full property titles and long-term tenure security, as per the *City Strategy Agenda*. The final document will be mainstreamed into the structural and land use plans of the whole area.

Promising practice (2): Entrenching urban agriculture/forestry

From leasing to secure tenure: Urban agriculture/forestry can be found on wetlands or on mountain slopes. However, any available plots in the area can only be cultivated sustainably if formally secured for urban agriculture in the long term. At the moment, leasing is the most widespread type of tenure among urban farmers. The ownership of land used for urban agriculture in Freetown is as follows: State (39 per cent), private (18 per cent), mixed ownership (18 per cent), and institutional (25 per cent). Leasing terms and conditions are so informal that farmers can be ejected at any time

for the purposes of more profitable residential or other developments. With land demarcation, allocation and secure tenure, the integration of farming in the urban settlements is expected to be entrenched for the long term.

Reforestation: Reforestation will ensure year-round good quality irrigation water, as supply through gravity (i.e., streams, springs, and artesian wells) is reinstated along the slopes. Forest preservation improves or maintains catchment areas, and water utilities are helping in this respect.

Farmer empowerment: As a first step to stabilizing land tenure and agricultural uses, a stakeholders group has been formed to oversee the process of land demarcation and also to secure access to credit and finance for farmers (with their plots as security against loans). The group is known as the *Freetown Urban and Peri-urban Agriculture Platform* (FUPAP) and is chaired by the Ministry of Lands, Country Planning and the Environment.

Since urban farmers have little if any awareness of their land rights, public authorities have allocated budgets for training and services with regard to land issues (which will also benefit non-governmental and community-based organisations), in order to entrench the new legal framework for urban agriculture. Farmers are also encouraged (at chiefdom, district and national level) to regroup into professional associations, enabling them to advocate and negotiate with stakeholders for better land security terms. Dedicated regulatory and enforcement guidelines are also being developed, on top of the *Small Holder Commercialisation Programme* of the Ministry of Agriculture.

Climate change-related benefits (1): Mitigation

Wetlands and forests mitigate greenhouse gas emissions and the urban heat island effect, acting as carbon sinks and lowering temperatures.

The heat island effect: Alteration of land surfaces by urban development (which uses heat-retaining materials) is a major cause of the heat island effect, more so than waste heat generated by energy consumption. Secondary effects may be felt on local weather conditions, including altered wind patterns, more clouds, fog and humidity, and higher rates of rainfall. Additional heat can cause more showers and thunderstorms.

Increasing the amount of well-watered vegetation is one of the more effective defences against the urban heat island effect, and is the preferred solution in Freetown. Forest preservation (forestation rate around the peninsula is two per cent) provides shade, and wetlands-based agriculture will enhance evapotranspiration (i.e.,

the movement of water from soil, water bodies and plants – an important factor in the water cycle), which results in welcome additional cooling and a reduction in noxious smog.

Preservation of biodiversity: A well-enforced framework for urban agriculture and forestry can protect a wider base of plant (and animal) genetic diversity in the whole Western Peninsula, provided that monoculture does not prevail.

Reduced greenhouse gas emissions: One of the environmental benefits of urban agriculture is the short distance (2km on average) between farms and markets. This enables farmers to reduce reliance on motor vehicles for transport, and on refrigeration for overnight conservation.

Climate change-related benefits (2): Adaptation

The effects of heavy rainfall will be reduced, as flood zones are kept free from construction; forest preservation along the slopes of the promontory will reduce rapid storm water runoff and the frequency of floods downstream.

The risk of damage to human settlements from landslides will be reduced by (agro-)forestry on steep slopes and a prohibition of any construction on these sites.

Potential benefits of urban agriculture (1): Integrating livelihoods and the environment

Effects on poverty: If implemented in an equitable manner, urban agriculture can make an important contribution to poverty reduction beyond daily food provision: diversifying income and job opportunities for the urban poor, including women and youth, and providing an economic safety net in times of economic crisis. Urban agriculture



Processing of vegetables grown in Freetown, Sierra Leone.
©RUAF/Rene van Veenhuizen

typically features small-scale production, a wide variety of production forms, and good integration into settlements. In Freetown, floriculture provides another source of agricultural revenue.

Effects on the general environment: Urban agriculture can be characterized by a very adaptable and efficient use of land resources, a development of small ecological and economic cycles, and the close proximity of producers and consumers. Urban farmers also help build up and entrench integrated ecological cycles within the settlements (e.g. water, nutrients, reduction in soil erosion from deforestation).

Potential benefits of urban agriculture (2): Food security/nutrition in the Western Area

Food security: Urban agriculture helped to sustain Freetown during protracted civil strife, and continues to do so today. Some farmers focus on Sierra Leone's staple diet of rice, potatoes, cassava and leaves. Others specialise in livestock production (pigs, small ruminants), poultry or fishing.

Self-sufficiency: In Freetown, urban agriculture secures access to diversified food resources. This reduces dependency on imported foods as well as vulnerability to periods of scarce food supply from the rural areas affected by floods, droughts or other disasters.

Nutrition: The poor have access to a wide diversity of produce at relatively low prices (no transportation or refrigeration costs). Since the distance from farms to markets is reduced, produce on sale is fresher and healthier.

Healthy standards: Formalising urban agriculture makes it possible to secure minimum quality standards for the production of healthy foods (pollutants, soil and water quality).

Potential benefits of urban agriculture/forestry (3): Empowerment and networking

Gender empowerment: As many as 80 per cent of urban farmers in the Western Area are married women, who are traditionally responsible for household welfare.

Socio-economic empowerment: Through farmers' associations, urban agriculture can help optimize and link local activities to various networks (knowledge transfer, organizing producers, economic cycles). This in turn opens up access to innovation and learning about new strategies/technologies for more land- and water-efficient food production.

Conclusion

Conditions in Freetown are largely similar to those in other low-lying coastal cities with wetlands. These municipalities must prevent flooding, including through better control over an unrestrained phenomenon – urban agriculture – which otherwise has a positive role to play in climate change adaptation. The planning controls used in this process could also tackle another unrestrained phenomenon – the proliferation of slums in bad need of upgrading.

INSTITUTIONAL FEATURES

- Central government, city and district authorities work hand in hand on a City Strategic Agenda which effectively entrenches urban agriculture in the legal/policy-making framework
- formation of a stakeholders group, with a rotating chair from a key line ministry, with the Freetown Urban and Peri-urban Agriculture Platform (FUPAP) overseeing the process
- public authorities and institutions are major land-owners, which facilitates land reform
- the City Strategic Agenda will become fully effective only after approval by government and parliament
- the Agenda involves water utilities, non-governmental and community-based organizations
- the Agenda stimulates the emergence of farmers' associations
- the national tenure reform component is funded by the International Climate Facility (ICF) for Africa.

MAJOR PARTNERS

- Freetown City Council
- Ministry of Lands, Country Planning and the Environment
- Ministry of Agriculture, Forestry and Food Security
- RUAF Foundation
- the International Climate Facility (ICF) for Africa
- the World Bank
- Food and Agriculture Organisation (FAO)
- International Water Management Institute (IWMI)
- Njala University, Sierra Leone.

For further information

- UN-Habitat, "Land, Environment and Climate Change", Global Land Tool Network, 2010.
- One World, Climate Change in Sierra Leone briefing: http://uk.oneworld.net/guides/sierra_leone/climate-change

SECTION

4

ENHANCING/ SPREADING AWARENESS OF CLIMATE CHANGE

Maputo:

A visual tool for policy-makers and the public

Saint-Louis:

Mayors can use global frameworks for external and internal benefits

Rwanda:

Mainstreaming climate change in policies and procedures

Mozambique and South Sudan:

Learning to live with disasters in peri-urban and rural areas



CHAPTER 1

MAPUTO: A VISUAL TOOL FOR POLICY-MAKERS AND THE PUBLIC



In Maputo, the capital of Mozambique, climate change is to have a direct effect on the low-income, slum-dwelling majority (70 per cent) of the population (1.1 million in 2007; 2-2.5 million for the conurbation), as rural migrants settle in highly vulnerable areas by the Indian Ocean. In 2008, Maputo was host to 45 per cent of the total urban population in Mozambique, 50 per cent of which was considered to be living below the poverty line. Since then, unabated rural-urban migration keeps contributing to higher poverty and vulnerability. Climate change is liable to compound the combined effects of high density (especially in peri-urban slums) and seasonal factors, with drought and rain in cool and warm seasons respectively.

With this background, it came as no surprise that Maputo should become one of the pioneers of UN-HABITAT's Cities and Climate Change Initiative in Africa. In April 2010, the agency and the municipal council signed a cooperation agreement which soon led to an implementation plan. The general purpose was to put the Maputo Municipal Council in a better position to develop appropriate policies, strategies, plans, tools and methods with regard to climate change adaptation and mitigation. Since informal settlements stand to bear the brunt of the effects of climate change, the need to enhance public awareness with factual, objective information is well recognised.

The problem

As any other city in the developing world looking to adapt to climate change, Maputo is faced with a lack of proper data and basic information on which to build an effective strategy. Not only are geographic maps outdated, but over the

past several decades informal settlements have bypassed formal registration; in the process, slums have kept encroaching more and more on hazardous or environmentally sensitive areas, or others that are more particularly vulnerable to the effects of climate change (flooding, etc.). If a municipality is to regain control over urban development for the sake of proactive planning, it needs to collect accurate, up-to-date ground data which, in the next step, can be integrated in an orderly, practical way with others reflecting a wide variety of socio-economic, environmental and scientific dimensions. This is why under the 2010 agreement the Maputo Council and UN-HABITAT specifically agreed to "develop methods and tools for the analysis of climate change effects in order to facilitate financial planning and decision-making".



Soil erosion on Avendia OUA in Maputo, Mozambique.

©UN-Habitat/Basilio Muchate

Local issues related to climate change and sustainable urbanisation

- 70 per cent of the population live in dense informal settlements in areas prone to storms, cyclones, floods and soil erosion
- sensitive ecosystems are also under threat, including the mangrove forests that protect the coastline
- if current trends continue, average temperature could rise 1.7°C by 2050
- a single one-day rain event can cause floods that persist for three days. If the rains persist from three days to one week, water depth rises to one metre and may take a month to disappear
- rising sea level causes salt intrusion, damaging agriculture and adding to urban poverty
- any further sea-level rises would flood the lowest-lying areas (which are the most populated), with serious consequences for the urban poor whose capacity to adapt to climate change is rather limited
- short of new coastal defences, a 5m sea level rise by 2100 would flood the entire area of the Avenida Marginal along the shore. The port and its rail links would need to be gradually relocated as the water rises
- the new coastline will be dominated by steep cliffs, turning new coastal infrastructure into a financial and technical challenge, but the city itself will remain safe on its high ground
- shrinkage of sand strips on the beaches results in serious coastal erosion with negative
- consequences for economic activity
- migration away from the zone at risk will be necessary but costly and difficult to implement, and therefore coastal settlements must be altered to protect residents.



Sea wall to prevent further coastal erosion in Maputo, Mozambique.
©UN-Habitat/Jesper Milner

Promising practice in brief: Geographic and environmental information systems

A combination of geographic (GIS) and environmental management (EMIS) information systems provides a user-friendly spatial analysis tool that can be used to monitor climate change-related effects and issues, as well as a baseline for forward-looking environmental studies. A GIS enables a municipality (1) to capture the current state, past and prospective evolution of all kinds of land uses, and (2) to manage urban and socio-economic development in a more sustainable way based on a set of data that objectively mirror a wide range of constraints. A proper, updated mapping base puts a municipality in a position to meet a variety of needs in the face of climate change, including improvements in land management, control of infrastructure development, tax administration and use of natural resources in the area. It can also stimulate political will in favour of well-adapted policies and strategies to address climate change and environmental degradation.

Promising practice (1): Geographic information systems (GIS)

GIS and remote sensing today stand out as indispensable complements to surveys based on ground observation and enumeration when it comes to modelling and analysing the dynamics behind land use change.

General features: A GIS combines three functions: (1) storing, managing and integrating large amounts of (spatially referenced) data; (2) providing analysis tools, and (3) organising and managing the data in a way that makes it easily accessible to all users. This is supported by hardware and software, a database and staff that can capture, store, update, manipulate, analyse and display all forms of geographical information. A GIS can, for instance, sort effective land use in as many as 26 classes, which come down to six major categories: residential (central and peripheral areas); business; social and other infrastructure and public services; vacant and derelict areas; water bodies and floodable areas; and other (semi-)natural and leisure areas. A well-devised GIS provides the consistent mapping rationale required for decision-making.

GIS in Maputo: The technical specifications for the GIS survey were very demanding as they must form the base map for Maputo's new *Geographic and Land Management Information Systems* from which new maps and elevation models can be developed. For the sake of superior accuracy, a temporary 5km grid of ground control points was deployed across the survey area, quite a challenge

in busy and congested streets. Five positioning (GPS) ground base stations were also used. The photographic survey of the main areas took place in June 2010.

Promising practice (2): Environmental management information systems (EMIS)

Based on GIS data, the next step consists in measuring, monitoring and visualizing land-use and other changes; this comes as part of a framework that fosters collaboration and integration of knowledge, in a bid to build a more detailed and comprehensive picture of the prospective and potential effects of climate change.

General features: An environmental management information system (EMIS) is a flexible device that can be adjusted to various degrees of sophistication (e.g., gender-responsiveness) and can assist both environmental and non-environmental managers in their daily tasks. This comprehensive, largely automatic, fully integrated (as opposed to ad hoc, stand-alone or uncoordinated) computerised system is based on GIS data and analysis but premised on public participation in environmental planning and management. A number of formalised steps capture information from various sources, including local knowledge, and link it to existing data. Fixed procedures available within the GIS and other spatial analysis applications retrieve this information and make it available to issue-specific working groups and decision-makers for strategy development and action plans.

Functionalities: Although the system strictly separates facts from policies, the functions support and help institutionalise Environmental Planning and Management (EPM). They include planning,

assessment, compliance and other monitoring, impact evaluation and tracking, task-scheduling and coordinating permits and documentation, together with emergency management.

Three main stages: In Maputo, EMIS is now (and until October 2011) in the second of the three standard successive stages: (1) Assessment and start-up (six to nine months); (2) strategy and action planning (15 to 24 months); and (3) follow-up and consolidation (open-ended).

EMIS functions in Maputo: In the Mozambican capital and as part of the Climate Change Initiative, EMIS fulfils five main functions: (1) analysis of vulnerability to flooding; (2) monitoring the effect of ongoing mitigation efforts; (3) guiding planners on suitable locations for various types of development; (4) support to ongoing schemes and projects; and (5) climate change modelling and simulations in support of planning functions.

Promising practice (3): Cross-sector sharing and analysis

Whereas GIS involves experts only to analyse past and present geographic data, by its very nature EMIS overcomes sector-based boundaries in a forward-looking perspective. This broad EMIS scope starts with the collection, updating of, and access to, the data, which is of a scientific and non-scientific nature. The large amounts of detailed data thus stored can be organised in a variety of ways to meet specific needs.

Multiple sources: Spatial information about a city is typically scattered across different public institutions, according to specific functionalities. Differences in storage systems can make it difficult to compare and combine information. EMIS is designed to link dispersed urban and environmental

Table 1: EMIS Implementation Procedure (March-November 2011)

Event/Activity	Time (Expected)	Responsible
1 Inventory of existing data and maps	15 Mar 2011	DMPUA
2 Procurement of equipment (server, software, tables,)	31 Jun 2011	DMPUA / UN-HABITAT
3 Development of base map and training of DMPUA Staff	28 Aug 2011	UN-HABITAT
4 Development of thematic maps	14 Sep 2011	DMPUA GIS / EMIS Consultant
5 Production and analysis of analytical maps (sensitivity and suitability)	31 Oct 2011	DMPUA GIS Unit / Consultant
6 Launch of EMIS and public awareness event	30 Nov 2011	DMPUA / UN-HABITAT

data to various types of maps. By virtue of its integrated nature, EMIS crosses the boundaries of logistics, data, motivation, language, culture and intellect, and manages the collective know-how of all stakeholders.

Cross-sector analysis: EMIS is an 'open' planning tool that can react quickly to rapid changes in city development. In this sense, the system complements (but does not necessarily replace) existing planning tools such as land use, master and zoning plans. The strength of the system lies in its capacity for institutional, functional and geographical cross-sector analysis, and ease of overlaying multiple environmental and development information sets to gain a deeper perspective. This approach supports improved urban governance, since it brings into the decision-making process a number of issues and norms which would otherwise be overlooked. As it integrates a variety of data, EMIS responds to queries in a comprehensive way that typically involves a variety of institutions and other stakeholders. Answers to area-specific queries integrate all linkages to the rest of the conurbation.

Central data management: In Maputo the system is lodged with, and owned and updated by, the urban planning and environmental affairs division (DMPUA) of the Municipal Council, which keeps all other departments informed. The system is linked to other ongoing data management projects, especially the World Bank-funded 'Pro-Maputo' urban revitalisation scheme.

Promising practice (4): Information and participatory systems

EMIS focuses on the interaction between environmental resources and hazards, on the one hand, and development activities on the other hand. Therefore, the policies which the system

inspires must involve a variety of stakeholders if they are to be effective in the face of climate change. EMIS is designed to illustrate the various possible results of environment/development interactions, assigning specific roles, constraints and opportunities to the various stakeholders. The objective visual information conveyed by GIS is a good way of highlighting problems and building awareness and commitment among the various stakeholders.

Awareness-building in Maputo: Ahead of the local *Climate Change Initiative*, an inception workshop was held in Maputo in May 2009. On top of public national bodies and the municipality, the large stakeholder attendance included representatives from academia, the private sector, civil society and development partners. Participants devised an inclusive participatory communication mechanism, leaving the ownership of projects in the hands of the municipal authorities. Once the second stage (strategy and action planning) of EMIS deployment is over in Maputo, an 'open day' will mark the inauguration of the dedicated municipal information centre. On top of informing the public, the event will also hopefully elicit further feedback from various stakeholders.

Conclusion

Geographical and environment management systems provide an integrated, cross-sector perspective on development and climate change, enabling the various stakeholders to keep the broader objective in mind. They can also stimulate political will in favour of well-adapted policies and action plans. However, the short-term benefits are not always obvious as commercial data products can be expensive, and sustainability is based on community 'ownership'.

INSTITUTIONAL FEATURES

- Major stakeholders involve the Ministry for Coordination of Environmental Affairs (MICOA), the National Institute of Disaster Management (INGC) and the National Institute of Meteorology (INAM)
- As part of the Climate Change Initiative, a UN-HABITAT consultant works with the municipality to deploy EMIS in Maputo.

For further information

- UN-HABITAT, Climate Change Assessment for Maputo, Mozambique: A summary
 - <http://www.unhabitat.org/pmss/listItemDetails.aspx?publicationID=2977>
 - http://www.unhabitat.org/downloads/docs/CCCI_MaputoMozambique.pdf
- On EMIS in general: www.fig.net/pub/proceedings/nairobi/decker-TS16-2.pdf

CHAPTER 2

SAINT-LOUIS: MAYORS USE GLOBAL FRAMEWORKS FOR EXTERNAL AND INTERNAL BENEFITS



Climate change calls for local action, which finds many African local authorities ill-prepared. All-too often, the wave of decentralisation that swept across the continent in the 1990s failed to give local authorities the financial resources required to carry out their newly devolved mandates. This persistent dependence on central government funding tends to favour political patronage where urgent action is in order. Activism on the global scene can provide resource-poor local authorities with alternative sources of support, as demonstrated by the municipality of Saint-Louis, Senegal.

Saint-Louis (population: 250,000) is a major port on the Atlantic Ocean, close to Senegal's northern border with Mauritania. It is located next to the wetlands of the Senegal River delta to the north and, to the east, the fringe of the Sahara (known as the Sahel) where the desert and the bush

comingle. The 350-year old multiethnic city has joined UN-HABITAT's *Cities and Climate Change Initiative*. Its low-lying territory is split between (1) an island (a rare UNESCO World Heritage urban site in West Africa), (2) a narrow sand spit hosting storm-exposed, overpopulated fishermen's villages as well as tourist resorts and a nature reserve, and (3) the wetland-surrounded mainland borough of Sor. On account of intense tropical rainfall, Saint-Louis has been named the most flooded city on the planet. As in most of Africa's coastal cities, climate change is bringing sea-level rise, heavier rainfall and higher temperatures. Socio-economic development is at stake as unemployment is already rife in a demographically dynamic city whose main activities are fishing, agriculture and tourism.

The problem

Climate change highlights the triple challenge – environmental, demographic and economic – Saint-Louis has been facing for some time with little else than poorly coordinated local institutional and policymaking systems, inadequate financial, technical, scientific and other resources, and lack of participatory governance. In 2005, the city set out its Local Agenda 21 with support from UN-HABITAT and the municipality of Lille, France. This included an environmental profile, with three areas designated for priority action: sanitation and wastewater treatment; public health and waste management; and the impact of fisheries on the urban environment. Biogas and sundrying pilot projects were implemented. However, and as in Walvis Bay, the Agenda 21 failed to overcome a fragmented, sector-based and resource-poor institutional structure. Today, Saint-Louis needs



Guet Ndar threatened by the ocean along the Langue de Barbarie, Saint Louis, Senegal.

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to (1) expand awareness and knowledge, (2) sort out issues, priorities, projects and institutional structures, and (3) mobilise resources, including scarce land.

Local issues related to climate change and sustainable urbanisation

- Population is to double to 0.5 million in 20 years (having tripled over the past 30 years), with 72 per cent under 30 years of age and largely unemployed)
- the resulting urban sprawl calls for planning and land-use responses
- urban sprawl, poor waste management and high water tables prevent rainwater runoff and increase flooding
- the ocean-facing sand spit (*'Langue de Barbarie'*) is under threat from erosion and sea-level rise, together with 80,000 residents and economically vital tourist resorts
- local fishing and agriculture (rice and market gardening) are under threat.

Promising practice in brief: Local momentum through global exposure

Climate change must be handled at the local level, therefore local authorities have a significant role to play. Like any other local authority in Senegal, the municipality of Saint-Louis enjoys an autonomous status under the country's 1996 decentralisation framework. Municipalities in Senegal are dependent on local taxes for over 60 per cent of their revenues, but poor collection rates and lack of transparency leave them unable to develop, fund and deploy climate change-related or other projects. On the other hand, Senegal's local authorities are habilitated to seek project funding and expertise from foreign and multilateral sources. This is the double rationale behind the Saint-Louis strategy of local momentum through global exposure.

Promising practice (1): A higher global profile for internal and external benefits

Enhancing the city's profile: Over the past few years, the relatively small, UNESCO-listed city of Saint-Louis has taken advantage of its historical background on the international scene. This involved direct participation by the Mayor and his team in a series of high-profile climate change-related conferences both at home and abroad where the municipality endorsed international declarations, enhanced its own profile, built awareness, and networked with a variety of officials, potential donors, experts and other

mayors. In December 2010, members of the UN International Strategy for Disaster Reduction (UNISDR) appointed the mayor of Saint-Louis the 'Champion' of the *Making Cities Resilient* campaign. A trip to China and other events exposed municipal officials to some of the best practices in the area of water management.

Internal benefits: Global events enhance awareness among city officials, civil society and communities, which helps build political will, momentum and support while overcoming dissension. Leadership roles (UNISDR) and endorsement of global commitments can strengthen the municipality's position vis-à-vis central government. Global events typically highlight the integrated nature of any adequate response to climate change, compared with existing sector-based approaches in the city; they also highlight the role of proper urban planning and governance. More generally, global events can help local authorities sort out basic priorities for action.

External benefits: Through networking and advocacy, global events can attract interest in local authorities' problems from a variety of international bodies, generating goodwill and, potentially, much-needed financial and technical support. Local compliance with the global agenda can encourage potential donors who, at the same time, may be less inclined to impose their own preferences on recipient local authorities. International events also bring together senior officials from a number of cities in a given (sub) region, and the resulting, more or less formal networking has a double benefit: (1) emulation and sharing of information, best practice and research efforts; and (2) coalition-building, advocacy and better recognition in climate change-related international fora and negotiations.

Promising practice (2): Stimulating and sharing integrated research

Integrated research: Saint-Louis has received *pro-bono* expertise from Arcadis for an assessment of coastal dynamics and practical recommendations. The resulting analysis and insights in possible options were in line with the most up-to-date practice (i.e., eco-sustainable principles (building with nature)). Dissemination of the results among communities has opened up a dialogue between them and the municipality.

A regional project: An integrated response to climate change can only be based on well-coordinated, synthesised facts and knowledge, as opposed to sector-based approaches. This is why, in March 2011, the municipality of Saint-Louis, together with the local *Université Gaston*

Berger, launched a regional integrated research project known as *Climate Change and Urban Vulnerabilities in African Cities*, funded by a USD5 million grant from the European Union (of which USD1.16 million for Saint-Louis).

Participants: The three-year multidisciplinary project was initiated by 10 African and Western research institutions and involves four other African cities: Douala, Cameroon; Ouagadougou, Burkina Faso; Dar Es Salaam, Tanzania; and Addis Ababa, Ethiopia.

Purposes: The rationale is to mobilise knowledge and research, developing methodologies in the areas of vulnerability assessment and reduction as well as climate change resilience/adaptation. On top of environmental risks (flooding, storms, drought, bushfires, desertification, etc.), the assessment will include socio-economic development. Recommendations will be directed at research institutions, local authorities and civil society.

Promising practice (3): A dedicated regional mayors' association

In December 2010, the city hosted an international forum on the theme "*Climate change and local governance: African cities commit themselves.*" On top of sharing experiences, the Forum sought to attract national and international support. Representatives from cities in 22 countries agreed to establish an *African Local Government Alliance on Climate Change*, complete with a steering committee (involving relevant national government departments, UN-HABITAT, the French development aid agency, and others); another committee, focusing on initiatives and monitoring, is chaired by the Mayor of Saint-Louis.

In a related development, delegates also decided to set up a *Local Fund for Climate Risk Management*, asking United Cities and Local Government Africa (UCLGA) to advocate for the scheme across the continent as well as with development partners. Another request from forum delegates was that Saint-Louis should serve as the pilot site for any climate-change prevention, adaptation or resilience plans to be deployed in African cities.

Promising practice (4): Global advocacy for local project funding

In 2007, local authorities across the world endorsed a *World Mayors' and Local Government Compact* on climate change, complete with a *Local Government Roadmap* in a bid to influence ongoing climate change negotiations.

At the Saint-Louis forum in December

2010, delegates rallied around an *African local government call on climate change*, pledging their determination to act on climate change and mainstream adaptation/mitigation in municipal budgets. They stressed the need for local government access to global funding mechanisms for risk reduction/adaptation (including the *Global Environment Facility*, the *Copenhagen Fast Start Facility* and the *Cancún Long-term Finance facility*). Taking further advantage of decentralisation, the mayors also called for national delegations to global climate-change negotiations to include local government representatives.

Early practical outcomes

Improvements to roads and waste management in the Pikine neighbourhood (population: 80,000) in 2009 have reduced the size and frequency of flooding, thanks to a one-million dollar grant from the European Union.

UN-HABITAT procured a USD2 million grant from the Japanese Government for the construction of low-income housing. The development will be built away from the shoreline, and the space vacated by beneficiaries will protect the new housing units from sea-level rise.

The mayor has also pledged to provide training for a public awareness campaign.



Public intervention during the launch of UN-Habitat's Cities and Climate Change Initiative in Saint Louis, Senegal.

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Ongoing issues

Mainland coastline: The need for integrated coastal zone management (including the mangrove as per the Ramsar Convention) is well recognised.

The sand spit: The main environmental threat to Saint-Louis is largely man-made. In late 2003 and as an emergency measure, a 4m gap was

opened up in the sand spit facing the ocean in order to avoid large-scale flooding of the city by the Senegal River. Since then, joint pressure from the river and the ocean has widened the gap to 800m. As a result, cross-currents have killed dozens of fishermen, the mainland is directly exposed to flooding, buildings are undermined, wetlands (and fish/bird breeding grounds) are under threat, and agricultural land is destroyed through salination. Protection of the city's 17km coastline would cost over USD6.5 million. Alternatively, or in the meantime, protection would cost USD3.2 million in pumping, excavating and other equipment.

Flooding: An annual pre-winter scheme involves building an embankment along the low-lying areas of flood-exposed neighbourhoods, with USAID support through NGO Plan Sénégal. The municipality has purchased motor-pumps (with financial assistance from the French municipality of Toulouse) to be deployed in those nine (out of a total 22) neighbourhoods most vulnerable to flooding.

Potential problems with international cooperation

Costs: Travel to international events is costly and time-consuming, and risks diverting funding and focus away from local emergencies, with the risk of political backlash.

Project coordination: Financial and technical support from external partners leaves the city largely dependent on donor priorities, agendas and resources. The integrated approaches called for by climate change, such as Saint-Louis's Vision 2030, need coordination capacities that may be limited.

Decentralised cooperation and its limitations: Cooperation with Western local authorities supplements the lack of funding and technical expertise of a resource-poor municipality, but all-too often external experts have little time to build local capacities or share know-how.

Conclusion

Saint-Louis seeks to bypass the financial shortcomings of decentralisation while making the most of the external opportunities opened up by the national legal framework. The experience so far illustrates the ins and outs of this approach, suggesting that even under decentralised conditions, more focused climate change policies from central government might be in order. Leveraging opportunities at global level calls for a well-devised approach for productive partnerships with other municipalities, donors and technical experts.

INSTITUTIONAL FEATURES

- Decentralisation remains largely formal in the absence of local tax revenues
- Local authorities are habilitated to seek foreign/international financial and technical cooperation
- The municipality advertises its problems and needs in international fora
- The municipality relies on external support for projects, and on coalitions for advocacy.

For further information

- UNISDR, La Ville De Saint-Louis Face Au Changement Climatique: http://www.unisdr.org/preventionweb/files/12709_ChangementClim.PULLMANNov2009Doc.pdf

CHAPTER 3

RWANDA: MAINSTREAMING CLIMATE CHANGE IN POLICIES AND PROCEDURES



Rwanda is particularly vulnerable to climate change and natural disasters. As many as 87 per cent of the population (total: 10.6 million in 2010; 14 million by 2020) live off rain-fed agriculture. Unabated demographic growth remains a major challenge and sustained economic growth is a vital imperative in the face of widespread poverty, putting the country's rich natural environment under stress. The population is young (median age: 18.7 years in 2010). A majority (57 per cent, mostly women) live on less than one US dollar a day. Fragile ecosystems and a rich biodiversity are coming under increasing pressure from the highest demographic density of the whole continent (463/sq km in 2010; UN projections: 667/sq km in 2030 and 821/sq km in 2040; 1,000/1.1sq km of arable land in 2007). As the small country borders East Africa's Rift Valley, the potential for disasters is associated with a volcanic chain in the north-west and a seismic epicenter under Lake Kivu to the west. Like other Sub-Saharan countries, Rwanda has experienced changes in its tropical temperate climate (two wet seasons), including higher temperatures, more irregular and more intense rainfall (with associated floods and landslides) and droughts (these two weather extremes being more persistent in the north and south, respectively). Against a background of poor farming practices, vulnerability to both climate change and natural disasters is exacerbated by deforestation for fuel wood (the main energy source, including for some industries). Environmental degradation is also linked to unstable neighbouring countries, and refugees add to pressures on Rwanda's ecosystems. Lack of proper sanitation systems comes as an additional threat to wetlands and the country's abundance of water resources.

Rwanda faces these problems with a thoroughly

decentralised government framework which reflects specific natural constraints and recent history. The country experiences the two basic dimensions of environmental scarcity: (1) high population densities are associated with high demand for natural resources, and (2) as these deteriorate, supply scarcity sets in. Both become structural when uneven dispensation across regions is not redressed by appropriate policies, including redistribution. In the early 1990s, deteriorating agricultural productivity in some areas caused mass migration to better endowed regions of the country. A highly centralised government lost legitimacy when it failed to respond in a balanced sort of way. The 1994 genocide resulted in millions of refugees and displaced persons which public authorities have since then sought to stabilize in every way as they returned.

The primary aim of Rwanda's decentralisation is to improve the funding and delivery of public goods and services to the population, the secondary and complementary objective being to improve general well-being through a more participatory type of governance. Under the new decentralised framework deployed since the year 2000, the country is split into four provinces (and the capital Kigali), 30 districts, 416 sectors, 2,086 cells and 14,953 villages. Once fully implemented, the new administrative dispensation could break with two of the major drawbacks of decentralisation in Africa: (1) political and administrative functions would be clearly separated, and (2) local authorities would rely on various sources of income on top of local taxation, instead of remaining entirely dependent on central government for funding. Functional separation should prevent any overlaps, encroachments, duplication or confusion, enhancing transparency and accountability. So

far, though, 10 years' experience have exposed two non-structural deficiencies which Rwandan authorities are now looking to address: (1) effective decentralised participatory government requires degrees of awareness and mobilization that so far have been found wanting among local communities in Rwanda, while at the same time (2) central government must make sure that environmental and climate change concerns are mainstreamed in local policies and plans. This brief focuses on mainstreaming climate change/the environment into policy-making and on Rwanda's first major steps towards a 'green economy'.

The problem

Rwanda's ecosystems and biodiversity must be preserved against human encroachment and climate change, and the beneficial uses must be impartially and sustainably distributed across a previously fractious population whose prosperity is largely determined by the condition of its natural resources. The population is 70 per cent literate but, with widespread poverty, the environment and climate change are not major concerns among the public. Central government must make sure that these issues are mainstreamed into district budgets and better understood among the public.

Local issues related to climate change and sustainable urbanisation

- agriculture remains the main economic sector, and only sustained growth can dent poverty
- less than 10 per cent of the working population is educated beyond primary level
- population density induces intra-rural and rural-to-urban migration (the major cause of urban demographic expansion)
- lack of basic sanitation or water supplies is widespread
- the livelihoods and security of the poor often depend directly on ecosystems, and the diversity of goods and services they provide
- Rwanda ranks among those Sub-Saharan countries where soil erosion is among the most severe
- major flood events (1997, 2006, 2007, 2008 and 2009) cause costly infrastructure damage, fatalities and injuries, landslides, loss and damage to crops, soil erosion and environmental degradation. Some regions have also experienced periodic droughts (1999-2000, 2005-06)
- a steady rise in temperature can be expected (1.5 to 3.0°C by the 2050s)
- as temperatures rise, so will the natural mosquito habitat, catching up with a majority

of the population in this hilly country, and increasing by 150 per cent the number of people at risk of malaria by 2050 (potential healthcare costs: USD50 million per year)

- welcome as it is for economic development, expansion of manufacturing and services (tourism) can add to pressures on the environment
- tourism is generating more and more revenues; under a dedicated national strategy, receipts soared from USD5 million in 2002 to USD33 million in 2006 and USD200 million (666,000 visitors) in 2010
- without adaptation, the economic cost of damage caused by global warming in Rwanda could amount to one per cent of annual GDP by 2030, according to the Stockholm Environment Institute (SEI)
- Rwanda's 2007 *National Adaptation Programme of Action* (NAPA) and the small number of adaptation projects in progress are going in the right direction, according to the SEI. But adequate adaptation efforts would require Rwanda to spend an annual USD50-300 million a year by 2030
- half of Rwanda's budget is financed by aid (about 12 per cent of GDP), and revenues are still among the lowest in East Africa.



Waste management in Kigali, Rwanda.

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Promising practice in brief: Mainstreaming climate change in government and the economy

Having largely mainstreamed environment and climate change concerns into statutory and policy frameworks, the Rwandan government is now looking to embed them in critical procedures and targets. Districts are now required to integrate climate change into development plans, an

'environmental unit' has been added to the country's police force and confessional leaders help spread the message among local communities. Preservation of natural capital is the main plank of the country's 'green economy' strategy.

Promising practice (1): Fostering a 'Green economy'

Protection and management of the environment ('natural capital') is one of the pillars of Rwanda's *Vision 2020* strategy, with a 'green economy' as a prominent objective. The first two major steps so far have been the development of ecotourism and preservation of wetlands. Hopes are that the jobs thus created will go to rural people who quit farming as the 'green revolution' improves productivity in the agricultural sector.

Ecotourism: Preservation of a rare species of gorilla is attracting increasing numbers of tourists to the Virunga National Park (from 1,200 in the year 2000 to 7,417 in 2004). Individual charges of USD375 have been generating some USD3 million in revenues every year, enabling the creation of many maintenance and other jobs. Some of the revenues are reinvested in the park, and some go to local community projects.

Preservation of wetlands: Wetlands represent 7 per cent (165,000ha) of Rwanda's total surface area. The marshy lakeside Akanyaru complex in Nyabarongo and Akagera National Park features rich biodiversity, especially birds. The Association for the Conservation of Nature in Rwanda is combating intensive illegal farming along the Nyabarongo River. The local community is trained in the production of high-quality products made from materials harvested sustainably from the wetland, such as papyrus and pennisetum. High-quality products (e.g., baskets) open up new markets and generate higher revenues.

Promising practice (2): Community police enforces environmental law

Since early 2011 and at the request of the Rwanda Environment Management Authority, police enforce a 2005 decree that punishes environmental degradation with fines and prison sentences (up to two years). The decision came as it became

evident that a previous awareness campaign had failed to improve citizen behaviour vis-a-vis the fragile eco-systems and biodiversity that are so vital to the population. The crackdown, with the Rwandan Police head of 'Disaster Response' in charge, comes in support of a fresh awareness campaign.

Main offences: The more common environmental offences involve direct damage to eco-systems, such as encroachment on wetlands, pollution of water bodies and lack of waste management, as well as unauthorised felling or burning of trees and use of plastic bags (polyethylene bags are already banned). Other offences include spitting and smoking in public places.

Community policing: The move is consistent with Rwanda's pro-active, 'community' type of policing that seeks to address the causes of misbehaviour. Through partnership (consultation and communication) with local communities and other bodies, policing takes on a 'multi-agency' dimension for the sake of general security. In this instance, district police commanders, district community, judicial police and district intelligence officers have attended a two-day training session, including on how best to sensitise the population to the need for environmental preservation. In a separate development, Rwanda's military academy in June 2011 held a workshop on "Environmental Security" (sustainable waste management, contaminated land and unexploded ordinance, site investigation and cleanup).

Conclusion

Both Rwanda and Burkina Faso have deployed far-reaching decentralisation frameworks that require capacity-building at all levels including funding, civil society and grassroots mobilisation to cope with the challenge of climate change. This is a two-way process between central government on the one hand, and local authorities and the citizenry on the other hand. Striking the right balance between process and targets, or 'bottom up' and 'top down' perspectives, is a challenge when local awareness, 'voice' or ownership are too weak, whether this is due to inadequate civil society involvement or ineffective political accountability on the part of local authorities.

INSTITUTIONAL FEATURES

- The number of districts has been reduced from over 80 to 30, and additional (devolved) powers are to be matched by increased staff resources, including for planning and management
- local authorities implement national policies as well local policies/programmes taking into account the aspirations of local communities
- individual government departments make earmarked transfers for specific purposes (nationwide priorities: health, education, farming, etc.)
- the national Community Development Fund allocates grants to specific local projects
- for the sake of efficiency and transparency, budget structures at national and district level are consistent with each other
- environmental protection is mainstreamed in the community police agenda, complete with effective enforcement and a new public awareness campaign
- confessional leaders are called upon to campaign in favour of environmental protection.

For further information

- SEI/DfID: The Economics of Climate Change in Rwanda, 2009
- IUCN, Rwanda – restoring nature for future prosperity: <http://www.iucn.org/what/tpas/greeneconomy/?6875/Rwanda--restoring-nature-for-future-prosperity>

CHAPTER 4

MOZAMBIQUE AND SOUTH SUDAN: LEARNING TO LIVE WITH DISASTERS IN PERI- URBAN AND RURAL AREAS

Over the past decade or so in Africa, natural disasters have forced hundreds of thousands away from homes and villages that proved to be woefully unprepared (and this does not include just adobe huts and buildings). The dramatic floods in the year 2000 in Mozambique and Southern (now 'South') Sudan highlighted the vital, urgent need for disaster-resilient designs for housing, water and other amenities. In those areas, poverty reduction efforts, socio-economic development and urban food security were jeopardised as subsistence farming and cash crops were devastated.

The problem

Whether they have recently migrated to peri-urban areas or opted to stay away from towns or cities, the populations living in villages or small towns need to adjust their housing and other daily living conditions to the increased threat of extreme weather events (mainly floods, plus cyclones and earthquakes in Mozambique). Simple, affordable materials and designs for the built environment provide a good basis for improved disaster resilience among resource-poor communities. At the same time, largely illiterate populations must also change their behaviour patterns if they are fully to benefit from those improvements and make them sustainable.

Promising practice in brief: Changing construction and behaviour patterns in the face of climate change

To be prepared for climate change, we must change ourselves: this is the rationale behind the didactic material originally devised by the UN and a professional architect for Mozambique

and South Sudan. The didactic effort is two-pronged: (1) disaster preparedness and resilience calls for technical changes to building or planning methods, and the decision is largely for public bodies; at the same time, (2) longstanding patterns of individual behaviour and daily routines must change and new notions must be appropriated. With clear depictions of what is and what could be, the choice of vulnerability or resilience is squarely placed in the hands of individuals. The changes are straightforward, as demonstrated in the didactic material, which consists of self-evident technical drawings as well as vividly coloured, unsophisticated pictures. These reflect the typical subtropical environment and look attractive to all ages. Any comments attached are short and set in plain language, which facilitates translation into local languages or dialects.

Promising practice (1): Floods: A handbook, a card game and a cartoon

In 2003, together with Mozambique's Ministry for Coordination of Environmental Affairs and National Institute for Disaster Management, UN-HABITAT devoped an awareness-raising strategy on the theme "*Living with Floods*". This included a dedicated 50-page handbook and a card game.

The handbook shows simple adaptation measures for buildings. These include building on elevated platforms and reinforcing walls. Special protective techniques have since been devised for adobe buildings (as are widespread in Namibia). For the sake of message consistency, non-technical pictures are taken from the card game.

The card game complements the handbook and aims at improving awareness among individual members of the community. The game enables

players of all ages to familiarise themselves with a number of notions involving water and sanitation, like "Drain", Contaminated water", "Rain water harvesting", "Deforestation", "Reinforced roof" or "Elevated latrine", etc. One of the cards illustrates the concept of the "supporting platform" to isolate individual or public buildings from rising floodwaters, in the process saving lives and private property. One pair of cards illustrates the differences in a settlement "Before Planning" and "After Planning."

Posters were also produced based on the handbook and the cards, for dissemination in public amenities.

A cartoon was produced in 2007. The 12min. video (on DVD, entitled "*Sometimes the River...*") highlighted the importance of preparedness for floods.

Dissemination/replication: The handbook and the card game were disseminated in Portuguese and four local languages through training sessions, workshops and schools across the Limpopo and Zambezi valleys. The DVD was disseminated in Mozambique and also shown in South Africa, Zimbabwe and Botswana.

Partners: MICOA, INGC and UN-HABITAT.

Promising practice (2): Cyclones: A building handbook

In early 2007 in Mozambique, floods were followed by a cyclone which uncharacteristically moved deep inland. Winds up to 260kmh flattened towns and villages and left at least 36,000 homeless, highlighting the need for specific adaptation schemes.

In a matter of months, UN-HABITAT came up with a handbook entitled "*Building with winds*". The booklet includes a plain-language primer on cyclones on top of practical recommendations for more resilient traditional or new buildings.



Illustrations from *Living with Winds* and *Living with Floods* handbooks. ©UN-Habitat

Dissemination/replication: As with didactic material on floods and droughts, the handbook is disseminated through schools and public bodies and is also used for capacity-building and training programmes all over Mozambique.

Partners: European Commission (humanitarian aid), INGC, UN-HABITAT

Promising practice (3): Climate change: The River Game

Concept: The idea is to show the various weather-related events that may seriously interfere with daily life along the course of a river all the way to the sea. 'Winning' and 'losing' situations come associated with rewards (leap forward, play again) and setbacks (move back, lose your turn). The game highlights climate change adaptation and good practice in an ordinary subtropical, rural or small-town living environment.

Format: The game comes in the familiar 'snakes and ladders' format. Over a succession of 66 squares, threatening and disaster situations alternate with instances of good (i.e., largely pre-emptive/adaptation) practice. The game is over when all players finally reach the sea.

Didactic contents: The best practice of all, a "well-prepared community", is depicted in the middle of the board and is even better rewarded than tree preservation (against soil erosion), building refuges, elevated housing, water tanks and proper embankments. Most penalised are badly prepared community or housing that are either located in river beds or destroyed by flooding. Appropriate symbols (aerial, cell phone, radio set, megaphone, TV) appear next to major threats, highlighting the need for early warning mechanisms. The 2006 River Game originates in a 2005 poster produced for the four riparian countries around Limpopo River (Botswana, Zimbabwe, South Africa and Mozambique).

Dissemination/replication: The River Game was disseminated largely through the (non-) governmental bodies involved in disaster risk reduction, as well as schools, in Mozambique, South Africa, Zimbabwe and Botswana.

Partners: European Commission (humanitarian aid), INGC, UN-HABITAT

Promising practice (4): A booklet for daily routines

Concept: The booklet ("*Your Choice*") focuses on nine health- and environment-related daily routines, linking them to the predictable effects of climate change (higher temperatures, drought, flooding) on a (semi-)arid area (South/ern Sudan).

Format: Over the course of 37 A5 pages, each

selected theme is handled in two or three sentences and two full-page, colourful pictures illustrating the “choice” which individuals or communities can make day after day for their living environments.

Didactic contents: With its twin plastic armchairs – one damaged, the other ready for use – the cover picture (like the introduction) says it all: whether we ‘sit’ comfortably or otherwise in our daily living environment is up for each of us to decide. The nine themes highlight the links between public health and a well-preserved environment: drain, road, toilet, waste container, mosquito net, the market, bush clearing, borehole and rainwater. A short introduction highlights the specific dangers incurred at present and makes practical recommendations for a better future, with the subsequent twin pictures highlighting the difference ‘choice’ can make. Fragments of photographs are inserted to strengthen the visual reference to the reader’s everyday environment.

Targeted public: The booklet was originally designed in early 2009 (in Arabic) for Southern (now South) Sudan after a particularly severe drought.

Dissemination/replication: Each set of twin didactic pictures has also been produced to poster format and under the same generic heading (‘Your Choice’) for wider dissemination in schools, health centres and other public amenities or buildings.

Partners: The booklet was part of a UN-HABITAT Rapid Impact Emergency Project – Public Works Programme – Community Awareness Component in Southern Sudan, with the UN Development Programme, the Multi-Donor Trust Fund for Southern Sudan and the then Government of Southern Sudan.

Promising practice (5): Climate change effects and adaptation: A cartoon

In 2010, UN-HABITAT, UNDP and other partners published a new educational video, ‘The Change’, on the benefits of preparing for natural disasters caused by climate change.

Format: A 15min. full-colour cartoon on DVD with expressive voices instead of words (i.e., undetermined language) and music (like the previous cartoon).

Didactic content: The explicit focus is on adaptation to climate change, with implicit

references to mitigation (e.g., tree planting for soil preservation, reduced industrial pollution, and water retention). The clear and simple message focuses on taking responsibility for our living conditions as well as building more resilient villages and cities. “The Change” shows a village family who are forced to adapt to changes in their climate and natural surroundings (higher temperatures, stronger winds, increased rainfall, drought). The over-consuming, urban-looking “machine”, which causes problems through its chaotic destruction of natural (mainly water) resources, finally learns how to respond to the changes and live in harmony with the natural environment. The cartoon shows how climate change can disturb family routines and living conditions (fetching water, farming), causing destruction and impoverishment which in turn result in social unrest. Village people finally understand the need to build on flood-resilient elevated platforms as well as to collect and preserve rainwater for domestic and agricultural uses. As crops and trees grow, the community reaps the benefits of mobilisation in favour of change, including prosperity, improved living and farming conditions, security and peace.

Dissemination/replication: The cartoon was aired for the first time during World Habitat Week at the UN Pavilion at the Shanghai World Expo in 2010. UN-HABITAT has used the cartoon in Myanmar for the benefit of those communities affected by the 2008 cyclone.

Partners: UN-HABITAT, the Millennium Development Goal Achievement Fund, the European Commission (humanitarian aid), the UN Development Programme and the Government of Mozambique.

Conclusion

Clear practical visual messages build awareness, with games adding the basic interaction and emulation required for mobilisation and consensus in the community. The novelty effect has proved attractive to all generations and social segments. Schoolchildren once exposed to the material have been seen to behave as agents of change among peers and adults alike. The self-explanatory material and flexible formats can be used in any developing country, with only a modicum of basic translation required.

Promising Practices on Climate Change in Urban Sub-Saharan Africa

Humankind faces a perilous threat. Fuelled by socio-economic development and manipulation of the environment in the industrial age, the effects of urbanization and climate change are converging in dangerous ways. Although urban areas, with their high concentration of population, industries and infrastructure, are likely to face the most severe impacts of climate change, urbanization will also offer many opportunities to develop cohesive mitigation and adaptation strategies to deal with climate change.

This compendium presents a series of promising practices in Sub-Saharan African cities that take into account the multiple dimensions of climate change. The featured practices cover four main topics: major roles for gender, youth and business; adaptation: infrastructure, slums and deserts; how coastal cities face up to climate change; and enhancing and spreading awareness of climate change. Through sharing and learning across cities, it is hoped that these practices will eventually come to be considered 'best'.

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UNITED NATIONS HUMAN SETTLEMENTS PROGRAMME

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