

Unjust waters

Climate change, flooding and the protection of poor urban communities: experiences from six African cities



Front cover image:

Lagos, Nigeria

Gideon Mendel/Corbis/ActionAid

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Summary of the key findings and urgent call for action

“Our houses are built in low areas. We have no place to take shelter when the flood starts. The house owners do not help us to drain out water from our houses. People use buckets to remove water themselves. Though water has just gone, the real disaster has just begun. That is diseases.”

Residents of Mafalala in Maputo, Mozambique

The right to adequate housing and ‘continuous improvement of living conditions’ was recognised more than three decades ago by the governments that ratified the International Covenant on Economic, Social and Cultural Rights. Six years ago, at the UN Millennium Summit, world leaders set a specific target for realising that right, by pledging to achieve ‘a significant improvement in the lives of at least 100 million slum dwellers’ by 2020. However, in Africa – the world’s fastest urbanising region – climate change is already threatening that goal, putting the continent’s already strained urban cities under additional stress.

‘Environmental refugees’ from climate-related droughts and floods are already swelling the tide of rural-to-urban migration across Africa, and the trend is expected to intensify as drought increases its grip over large swathes of the continent. By 2030, the majority of Africa’s population will live in urban areas. Unfortunately, however, global warming is also bringing chronic flooding to the cities, which can be just as disastrous for poor urbanites as droughts are for farmers. Urban floods spread disease, interrupt schooling and destroy houses, assets and income.

In participatory vulnerability analysis (PVA) with slum dwellers in six African cities, one of the major problems ActionAid uncovered is that there are few, if any, collective mechanisms either for reducing flood risks or for managing floods once they do happen. Instead, poor people are left to fend for themselves with whatever individual coping strategies they can muster. As one resident of Mabatini in Nairobi pointed out, this represents an enormous lost opportunity: *“We are not included in decision-making processes.... If we were, we could form residents’ associations to improve our own welfare and response to emergencies. We can partner with City Corporation of Nairobi to plant trees along the riverbank, dig canals, trenches and drainage next to our houses.”*

Climate change impacts severely upon women and children through urban flooding. Some families contacted by ActionAid reported seeing children drown in floods. Many more children were directly affected by flood-caused ill health and interruptions to their education. It poses extra burdens on women. It increases the need for rights to human security in conflicts and emergencies to be made to include

assistance during disasters such as urban flooding. It emphasises the need for good, just and democratic governance to allow people to participate in the mitigation of flooding and to ensure the delivery of government services to all the people, whatever their security of tenure.

Disaster reduction is now a priority for African governments and is incorporated in many planning documents, but the achievement of actions that will help the urban poor is far from being realised. The key messages are:

- Flooding greatly aggravates poverty. The worsening of the flood situation as a consequence of climate change thus increases poverty.
- The case for special assistance to help poor people adapt to climate change is clear.
- Special assistance is needed to: tackle the four types of flooding as listed on page eight; help local communities manage their own environments to reduce flood impacts; help local government manage flooding on local totally urban streams; help national and international river basin agencies manage flooding on major rivers; and help coastal towns and cities deal with encroachment on the wetlands that should be places for the natural storage of flood waters.
- Limited access to critical services such as food, income, health, water, education during flood time is the key factor reducing poor people's ability to adapt to a worsening flood situation.
- Flooding has to be seen as one of the factors preventing poor people improving their quality of life.
- Both climate change and local causes of flooding need to be tackled.
- To ignore the role climate change plays in urban poverty is to deny disadvantaged urban people one way of getting a better life.

The urgent tasks ahead

The solutions to the severe flooding of poor urban communities in Africa are relatively simple. Many people understand what needs to be done. Communities can do much for themselves. However, the tasks are best tackled through partnerships with national and international support. All parties concerned need to collaborate in:

- Making sure the growing human challenge of urban flooding is addressed in all national and international development policies, planning and actions by governments, UN systems, IFIs and NGOs.
- Investing in proper and safe infrastructure, such as drainage, as locally appropriate.
- Ensuring that poor people participate in all decision-making processes equally with experts in flood reduction policies.
- Taking all possible measures to ensure that poor people's rights to adequate and disaster-safe housing are realised and their tenure is secured.
- Making sure that critical services such as health, water and sanitation are disaster prepared, which means they are able to provide adequate services during floods.
- Implementing the Hyogo Framework of Action, agreed at the World Conference on Disaster Reduction in 2005, at all levels of urban planning and service delivery.

Chapter 1: Introduction

Climate change will increase the vulnerability of the urban poor throughout Africa. Already the urban poor are forced to live in hazardous places. Many build their homes and grow their food on river flood plains in towns and cities. Others construct their shelters on steep, unstable hillsides, or along the foreshore on former mangrove swamps or tidal flats. Whether already vulnerable to destructive floods, damaging landslides or storm surges, climate change is making the situation of the urban poor worse.

Floods are natural phenomena, but damage and losses from floods are the consequence of human action. The increasing climatic variability, storminess and more frequent flooding driven by climate change will affect poor urban communities far more than other people living in towns and cities. Although driven by human activities ranging from modernisation and development to land degradation by poor farmers and grazing flocks, climate change in Africa has uneven impacts, affecting the poor severely.

Flooding in urban areas is not just related to heavy rainfall and extreme climatic events; it is also related to changes in the built-up areas themselves. Urbanisation aggravates flooding by restricting where floods waters can go, by covering large parts of the ground with roofs, roads and pavements, by obstructing sections of natural channels, and by building drains that ensure that water moves to rivers more rapidly than it did under natural conditions. As people crowd into African cities, these human impacts on urban land surfaces and drainage intensify. The proportions of small stream and river catchment areas that are urbanised will increase. As a result, even quite moderate storms now produce quite high flows in rivers because much more of the catchment area supplies direct surface runoff from its hard surfaces and drains. Where streams flow through a series of culverts and concrete channels, they cannot adjust to changes in the frequency of heavy rain as natural streams do. They often get obstructed by silt and urban debris, particularly when houses are built close to the channels. Such situations frequently arise where poor people build their shelters on low-lying

flood plains, over swamps or above the tidewater on the coast. The effects of climate change are superimposed on these people-driven local land surface modifications.

The links between changes in land use and in heavy rainfall patterns, the frequency and depth of flooding and the problems of the urban poor are clear. Poor people and poor communities are frequently the primary victims of floods, partly because they cannot afford to live in safer areas and have crowded, makeshift houses. Flooding hits poor families particularly severely because injury, disability and loss of life directly affect their main asset, their labour.

ActionAid carried out participatory vulnerability analysis (PVA) with people living in vulnerable areas of six capital cities (listed below) where climate change impact is most predicted. Policy analysis was also carried out as a part of PVA to understand whether there is a gap between poor urban people's experiences of climate change impacts and current disaster management policies. An international desk study was carried out to evaluate current understanding of urban flooding and climate change in 10 cities (including the six capital cities where PVA was carried out).

Sub-region	Cities and country
East Africa	Nairobi (Kenya), Kampala (Uganda)
West Africa	Lagos (Nigeria), Accra (Ghana), Freetown (Sierra Leone)
Southern Africa	Maputo (Mozambique)

Chapter 2: Urbanisation and climate change in Africa

“Africa is not a driver of climate change, but a victim.”

Commission for Africa, 2005

“The weather is becoming increasingly volatile in Africa.”

Commission for Africa, 2005

Climatic variability and the frequency and intensity of severe weather events are likely to increase. In 2000, devastating floods in Mozambique cost 700 lives and left half a million people homeless. As populations expand and flood severity increases, millions of people are affected (Table 1).

Table 1 Millions of people in selected African countries affected by flood-related disasters 1990 to mid-2004

Sudan	3.74
Mozambique	3.43
Kenya	2.09
Malawi	1.63
Ethiopia	1.01
Tanzania	0.41
Zimbabwe	0.31
South Africa	0.09

From the EM-DAT database maintained by the Centre for the Epidemiology of Disasters, Brussels.

The increased frequency of such flood events with the growing impact of climate change could be seriously destabilising for Africa (Commission for Africa, 2005). The historical climate record shows that most of Africa warmed by approximately 0.7°C during the 20th century. Over large portions of the Sahel rainfall decreased, but

it increased in east central Africa (IPCC Working Group II, 2001). Future changes in rainfall will depend on the amount of global warming. Hurrell and Hoerling's (2005) analysis of Africa's past and future climate shows that the Sahel, which experienced catastrophic drought until rains returned in the 1990s, could experience wetter monsoons for decades to come, but that southern Africa will get drier. However, the intermediate degree of warming used by climate modellers indicates that profound seasonal changes in rainfall will occur. By 2050 north Africa and the interior of southern Africa will experience decreases during the growing season that will exceed the normal year-to-year variation. In parts of equatorial east Africa, rainfall is predicted to increase in December-February and decrease in June-August. Unfortunately, the diversity of African climates, high rainfall variability and a very sparse observational network make predictions of future climate change difficult at the sub-regional and local levels (IPCC Working Group II, 2001).

Climate changes are strongly influenced by the behaviour of the El Niño/Southern Oscillation (ENSO) system that has been characterised by unprecedentedly large and prolonged episodes over the 1980-2000 period (Adger et al, 2003). Such events may account for the high rainfall variability from year to year around Lake Victoria in Africa and for some of the apparent increasing frequency of high rainfalls from storms. The 1997-1998 ENSO event resulted in extreme wet conditions over eastern Africa, and the 1999-2000 La Niña caused devastating floods in Mozambique (IPCC Working Group II, 2001).



Freetown, Sierra Leone

ActionAid Sierra Leone

Flooding from rising sea levels as a result of climate change is a potential hazard for the quarter of Africa's population living in coastal zones (IPCC Working Group II, 2001). Modelling the effects of a 38-cm mean global sea-level rise in 2080, Nicholls et al. (1999) estimate that the average annual number of people in Africa impacted by flooding could increase from one million in 1990 to a worst case of 70 million in 2080. Jallow et al. (1999) estimate that the capital of The Gambia, Banjul, could disappear in 50-60 years through coastal erosion and sea-level rise, putting more than 42,000 people at risk.

Africa's urban population is growing faster than that of any other continent. By 2010 there could be 33 cities with over one million population in sub-Saharan Africa.

Around 72% of the people in African cities and towns live in slums, with over 80% doing so in Ethiopia and Chad (Commission for Africa, 2005). Such slum dwellers often have no alternative but to build dwellings in flood-prone areas.

Urbanisation itself increases flood risks as compacted, paved and roofed areas yield more runoff than vegetated land. Often bridges and culverts become too small to cope with the increased flows from upstream areas, where new urban developments increase the impermeable area. Slum areas themselves usually have no organised drainage system, or the drains that do exist are choked with plastic debris and silt. Frequently, individual householders have to use sandbags or other devices to divert water away from their premises.

Chapter 3: Trends in urban flooding in Africa

“All countries are vulnerable to climate change and instability in weather patterns but the poorest countries and the poorest people within them are most vulnerable, being the most exposed and having the least means to adapt.”

IMF and World Bank Development Committee, 2006

“The pattern of floods has been changing every year. The worst flood this year was in June. Comparing the floods in July and August, the one in August was more severe. The climate is changing. The rains have been coming more than before and the weather has been getting hotter.”

Mrs Fatu Turay, Kroo Bay community, Freetown, Sierra Leone, in an interview with ActionAid representatives, September 2006

Climate change appears to be altering the pattern of flooding in Africa. Modelling of the effects of possible future climate on floods shows that the pattern of rare large floods is going to change much more than long-term average river flows. Also prolonged heavy rains may increase in volume and occurrence (Mason and Joubert, 1997). This year (2006), the Lake Victoria basin where Kampala is located has been receiving intermittent outbreaks of showers and thunderstorms since the last week of August. There is a likely to be a decline before the steady rains are established in late September and early October with a peak in mid November. Overall in Kampala, there are enhanced probabilities for near normal to above normal rains (Department of Meteorology Sept 2006).

Many African cities have experienced extreme flooding since 1995. Heavy rains and cyclones in February and March 2000 in Mozambique led to the worst flooding in 50 years and brought widespread devastation to the capital city, Maputo. Upwards of one million people were directly affected. Water and sanitation services were disrupted, causing outbreaks of dysentery and cholera. Newspaper reports described the disaster as

destroying the rehabilitation efforts of what had been, until only a few years before, the world's poorest country. Floods caused large-scale loss and catastrophic damage to cities, towns and villages.

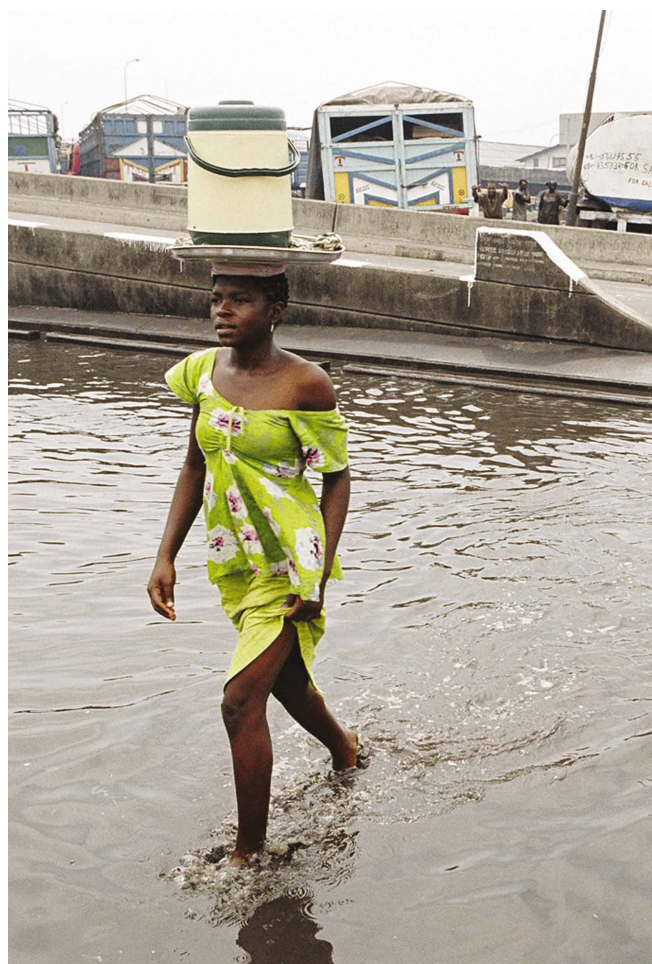
In 2002 heavy rains caused by unusually high temperatures over the Indian Ocean killed more than 112 people in east Africa. Floods and mudslides forced tens of thousands of people to leave their homes in Rwanda, Kenya, Burundi, Tanzania and Uganda. Rwanda suffered the heaviest toll, with more than 50 dead in 10 days, many of the deaths caused by landslides. At least 1,557 homes were destroyed and many cattle were killed. In Kenya floods and mudslides killed 46 people in two weeks. In central Kenya, 15 people died when mudslides overran their homes as they slept. Supplies of food and water to several urban areas, including Kenya's capital Nairobi, were affected. In Tanzania at least nine people died in floods and hundreds of families were left homeless, with severe damage to crops threatening food security.

In August 2006, in Addis Ababa, floods killed more than 100 people and destroyed homes in eastern Ethiopia after heavy rains caused a river to overflow. The overflowing Dechatu river hit Dire Dawa town at night drowning 129 people and wiping out 220 homes.

In Nigeria, several studies of the hydrological changes associated with urbanisation (Akintola, 1994) have described the contribution of topographic conditions, rainfall characteristics, land use changes (especially the expansion of paved impermeable areas), uncontrolled waste dumping and construction on the flood plain, to local flooding (Oriola, 1994; Babatolu, 1997). The roles of rainfall amount and intensity have also been well discussed (Olaniran and Babatolu, 1996). The perception of, impacts of and adjustments to urban flooding in Nigeria have been extensively studied (Muoghalu and Okonkwo, 1998; French et al., 1994; Ayoade and Akintola 1980; Ologunorisa, 1999). The Nigerian coastal lowland cities of Lagos and Port Harcourt are particularly vulnerable to coastal flooding and flash flooding from heavy rains. Parts of Lagos are two metres below sea level. Many slum dwellings are built on stilts over swamps and other wetlands.

An extreme 10-hour rainfall in Port Harcourt on July 14 2006 drove 10,000 residents out of their homes and caused widespread traffic chaos. The Niger delta frequently experiences flood problems that are aggravated by structures such as the Port Harcourt-Patani-Warri highway that cuts across natural drainage lines and acts as a barrier to floodwaters (Abam et al, 2000). Blockage of channels by debris and obstruction of floodways by new construction were seen as the main obstacles contributing to the Port Harcourt flooding.

Since 1995, floods have tended to cause increasing damage in Ghana, particularly in coastal areas. The cities of Accra and Kumasi have been particularly severely affected, with many forced to leave their homes. Similar events are reported from other African cities. Worsening urban flooding is affected by both global climate change and local changes to drainage systems and rivers. The local changes are due to construction, blockage of drains and increased local runoff from hard, paved and compacted surfaces. These local and global changes work together to increase



Lagos, Nigeria

Gideon Mendel/Corbis/ActionAid

flood frequency, magnitude and duration. The urban poor are suffering more than other urban residents from these changes.

In the Kroo Bay community, Freetown, Sierra Leone, several dwelling houses have been lost due to flooding since 1966. The local pre-school was damaged. Public health has also suffered as flooding has enhanced the number of outbreaks of cholera, causing several deaths. Millions of Leones worth of goods and services have also been lost. Much of the problem arises from changes in land cover on the hills outside Freetown, partly due to pressure on the land from migrants driven to the periphery of the city by the civil war. However, urbanisation itself has helped to channel flood waters towards the low-lying area of Kroo Bay.

The clear messages emerging are that:

- urban flooding is becoming an increasingly frequent and severe problem for the urban poor
- climate change is altering rainfall patterns and tending to increase storm frequency and intensity, thus increasing the potential for floods
- local human factors, especially urban growth, occupation of flood plains and lack of attention to waste management and maintenance of drainage channels, are also aggravating the flood problem.

In resolving these problems it is helpful to note that there are four types of urban flooding in African towns and cities: **1)** localised flooding due to inadequate drainage; **2)** flooding from small streams whose catchment areas lie almost entirely within the built-up area; **3)** flooding from major rivers on whose banks the towns and cities are built; and **4)** coastal flooding from the sea, or by a combination of high tides and high river flows from inland. Floods of the first and second types are much more frequent than those from major rivers. The fourth type of flooding occurs where settlements have been built on coastal wetlands and mangrove swamps.

Localised flooding occurs many times a year in slum areas because there are few drains, most of the ground is highly compacted and pathways between dwellings become streams after heavy rain. Such drains and culverts as there are are often blocked by waste and plastic debris because the slums lack adequate municipal garbage collection and cleaning services.

The small streams in urban areas rise quickly after heavy rain, but often pass through small culverts under roads. Although adequate to take the flood flows when designed, changes in the urban area and in storm intensity now produce more flows that exceed the capacity of the culverts. The stream channels themselves may have so much debris and urban waste in them that their channels are effectively smaller than they were two decades ago. These changes combine to make flooding more frequent.

Major rivers flowing through urban areas are affected by land use changes and engineering works upstream. Dams can modify flows in rivers. Most dams trap sediments often causing rivers to erode their banks downstream more than they did in the past. Dam operation can lead to greater regularity of flows, but may also lead to high flows when stored water is released suddenly to prepare for high flows upstream.

Often natural levees along the river provide some protection to the towns and cities through which it passes. However, urban growth has usually expanded over some of the flood plain, making parts of the city below flood level and reducing the area into which floods can naturally overflow. Levees have been raised artificially, but with the risk that they may be breached and cause devastating urban flooding. Such flood events can cause severe losses and disrupt economic activity over large areas of the city. Depending on the size of the river, they may last several days or several weeks.

In lowland and coastal cities, wet season flooding may affect some areas for two or more months, because rain and river water combine to raise the levels of water in swamps which would have naturally been inundated at certain times of the year. Dumping of waste beneath dwellings in these areas tends to help raise levels further. Storm waves can also bring flooding to such areas.

Chapter 4: Local case studies of urban flooding

“The 2003 World Development Report notes the pronounced difficulties the poor face when disaster strikes. Developing countries are particularly vulnerable because they have limited capacity to prevent and absorb...effects [of natural disasters]. People in low-income countries are four times as likely as people in high-income countries to die in a natural disaster... Poor people and poor communities are frequently the primary victims of natural disasters, in part because they are priced out of the more disaster-proof areas and live in crowded, makeshift houses... poor families are hit particularly hard because injury, disability, and loss of life directly affect their main asset, their labour. Disasters also destroy poor households’ natural, physical, and social assets, and disrupt social assistance programmes.”

Independent Evaluation Group, 2006

Kampala, Uganda

In Kampala, Uganda, construction of unregulated shelters by the poor, in such slums as Kalerwe, Katanga, Kivulu and Bwaise has reduced infiltration of rainfall, increasing runoff to six times that which would occur in natural terrain. Some of the increase is probably due to climate change, but some is also the direct result of land cover change.

Fifty-nine-year-old Masitula Nabunya, of Bwaise III Parish in Kampala, Uganda, said that after the 1960 floods a channel from Nsooba to Lubigi was dug and workers were employed to clean it regularly. There were no further flood problems until the 1980s but since then she has had to re-build her house after flooding six times. Flooding in these places is now much more frequent, every small downpour appearing to produce intense flooding. Some of this is because the main drainage channel, originally two metres deep, is now only 30 cm deep because of an accumulation of sediment and rubbish. It is also linked to the increased number of houses which yield much more runoff from a given quantity of rain.

Local Kampala people claim that floods are now more frequent and more severe. The flooding used to occur in predictable cycles in the two main rain seasons of April-May and October-November, but now occurrences have become erratic and unpredictable.

Maputo, Mozambique

In Block 40B of the Luis Cabral slum neighbourhood of Maputo, Mozambique, residents argue that flooding has worsened since 1980, pointing out that the 2000 floods completely destroyed the area. A single one-day rain event can cause floods that persist for three days. If the rains persist from three days to one week, the water depth rises to one metre and it may take a month to disappear.

Lagos, Nigeria

Residents of the low-lying coastal slum settlement of Iwaya/Makoko in Lagos argue that the climate is changing and flooding is becoming more frequent. In these settlements, homes are built on stilts above swamps that are natural flood basins. The increasing peak flows, combined with higher spring tides, are

affecting more homes more often. Local people are concerned about property damage and the impact on child health, in an area with totally inadequate sanitation. Flood waters can carry all sorts of organic waste into people's homes.

Nairobi, Kenya

Flooding is a major problem in all informal settlements in Nairobi. In the Maili Saba slum, part of Dandora, next to the river, flooding is a normal occurrence. Poor people's houses are built of weak, inadequate building materials. Migration has led to more houses being built close to rivers, with consequent greater disruption when floods occur. To many residents, the El Niño associated floods were particularly severe. Many local residents link increased flooding to both local activities and climate change. Many long-term inhabitants of slums like Mabatini in Mathare agree that floods now occur in places where they did not two decades ago. Similar reports come from other African cities, whether inland or coastal. For the residents, floods are getting worse and climate change is contributing to this situation.

Accra, Ghana

Women in Alajo, Accra, observed that patterns of rain and flooding have become unpredictable since the 1980s. *"In some years the rain will fall greatly and destroy everything and other times nothing will happen."* They noted that it used to rain heavily in June and July but since 2000, the heavy rains sometimes start earlier than June and in other years after July. Consequently, it is difficult to prepare for flooding in Alajo.

Men in Alajo described the impact of the flooding on their lives: *"Flooding makes people go hungry for days."* Slum dwellers' livelihoods depend on such activities as small-scale commerce, petty trading and artisanal trades, which get disrupted by floods. *"Flooding makes the inhabitants of Alajo unable to do anything."* People lose working time, economic opportunities and income during floods. Several Alajo residents engage in petty trading and petty merchandising in wooden kiosks which do not withstand the force of the floods. The immediate impact is the loss of livelihood support for food and bills, including children's education and health bills.

People's perceptions of the causes of flooding

In Uganda, people sampled in the Bwaise, Kalwerwe and Katanga districts of Kampala view the general flooding problems as arising from poor drainage conditions and general flat terrain and lowlands. Specifically, Bwaise is the lowland surrounded by five hilly locations of Kawempe, Nsooba, Kamwokya, Mulago and Makerere. Most of the floods arise from storm water, high water table and human activities. Local people cited the following causes of flooding:

- even when drainage channels are occasionally unblocked, the excavated silt is dumped alongside the channels and gets washed back in
- acute poverty means that day-to-day survival takes a much higher priority than care for the environment
- tree cutting for firewood, charcoal, mining and quarrying have contributed to changes in the weather patterns, and hence to increased flooding
- the reclamation of wetlands, by both commercial property developers and industrial activities, into which flood waters used to drain has increased flooding elsewhere
- discriminatory enforcement of wetland policies, that allow the rich to block natural drainage areas, have greatly disadvantaged the poor through flooding
- factory building on wetlands has blocked water flows and polluted the water
- unregulated construction of shelters has blocked many small drainage channels
- failure to de-silt the main drainage regularly has greatly reduced its capacity
- small culverts under road crossings are easily blocked by solid waste
- along open drains, bank erosion supplies silt that reduces their capacity
- poor construction of the drainage system means that the stone linings and concrete banks become degraded and begin to collapse

- because the lower end of the main drain into the swamp has not been de-silted for a long time, flood water flows backwards into the Bwaise settlement
- the rebuilding of the main highway from Kampala to Gulu in a new location and the recent construction of the northern bypass road have interfered with water flows and aggravated flooding
- removal of the eucalyptus trees along the main drainage that used to absorb some of the flood water has led to increased flooding
- privatisation of solid waste collection has led to much waste being dumped into the drainage channels, thus blocking them and aggravating flooding
- shelters built on hills around the city lack rain-harvesting facilities, which would have reduced the run-off water that contributes to flooding.

This long list of locally perceived causes of flooding contains many drivers that could be dealt with by local action, but it also refers to how the survival of the poor leaves little time to care for the environment and how resource exploitation aggravates climate change, which in turn affects flooding.



Maputo, Mozambique

Pers-Anders Pettersson/Getty

Chapter 5: Adaptations to urban flooding

“When we see very dark clouds up the hills, we expect heavy rains to come. So we get ourselves prepared by transferring our valuable things on our very high beds which are reached by climbing ladders. Also children who sleep on the floor are transferred to the high beds.”

Mrs Fatu Turay, Kroo Bay community, Freetown, Sierra Leone



Gideon Mendel/Corbis/ActionAid

Lagos, Nigeria

In Lagos, both the slum dwellers and the mainland local government council believe the constant clearance of the drainage channel running through Iwaya/Makoko would prevent the ponding of water from other parts of the metropolis. Standard drainage facilities along major streets within Iwaya/Makoko would help to solve the flood problem. The slum dwellers have also suggested

using sand to raise the entire area to a higher level. At present, individual coping strategies include, “*bailing water out of the house with buckets.*” Some wealthier community members use mechanical water pumps to evacuate water from their homes. People build temporary plank bridges between houses across the wetlands to be able to move about during floods.

In the slums of Nairobi adaptations, or responses, to flooding include: **a)** baling water out of houses to prevent damage to belongings; **b)** placing children initially on tables and later removing them to nearby unaffected dwellings; **c)** digging trenches around houses before and during floods; **d)** constructing temporary dykes or trenches to divert water away from the house; **e)** securing the structures with waterproof recycled materials; **f)** relocating to the highest parts of the dwelling that residents think are secure; and **g)** using sandbags to prevent the ingress of water.

In the Alajo community in Accra people dealt with the June and July 2006 floods in a variety of ways: **a)** using blocks, stones and furniture to create high places on which to put their most critical valuables during floods; **b)** putting goods on top of wardrobes and in the small spaces between ceilings and roofs; **c)** sharing such high places with others who have no similar 'safe' sites; **d)** temporarily moving away from the area to stay with friends and family during the flood.

One woman in Alajo described her experiences as follows:

"As soon as the clouds gather I move with my family to Nima to spend the night there. When the rain starts falling abruptly we turn off the electricity meter in the house. We climb on top of our wardrobes and stay awake till morning. Our house was built in such a way that ordinarily water should not flood our rooms, but this is not so. Our furniture has been custom made to help keep our things dry from the water. For instance, our tables are very high and so also are our wardrobes, they are made in such a way that we can climb and sit on top of them. These measures are adaptive strategies as old as I can recollect. I have two children but because of the flood my first child has been taken to Kumasi to live with my sister in-law."

When residents of Alajo were in danger, they resorted to self-help or were rescued by other members of the community using locally manufactured boats, for example, not by any government disaster agency. *"When the rain and the floods come, women and children suffer. You can be locked up for up to two days with the flood. Sometimes we take our children*

out from the room to the rooftop. Then people bring boats to evacuate people." People said that their complaints to government authorities brought no results.

Similar strategies were adopted by individuals in slums in Kampala, Uganda. The response to floods in July 2006 was characterised by ad hoc individual short-term efforts to survive and protect property. In addition, **a)** some residents undertook collective work to open up drainage channels; **b)** some permanent residents temporarily moved to lodges and public places like mosques and churches until the water level receded; **c)** many residents constructed barriers to water entry at the doorsteps; **d)** some made outlets at the rear of their houses so any water entering their homes flowed out quickly. There were limited collective efforts at the community level, and virtually no significant intervention by the relevant local government at the division level. What helped the residents most was the fact that the rains that caused the flooding were not the continuous peak rains that last several days, such as those experienced in April and November. What limited the response of the residents was the fact that almost all activities are un-coordinated, and are at the individual level, types of survival-of-the-fittest struggles. Another big limitation is that there was significant flow-back of the water from the direction that the flood water would naturally take due to the silting there.

Essentially these are all individual coping strategies. Sometimes people share protective storage or accommodation on higher ground. Spontaneous community action to unblock drainage channels is relatively rare. No coordinated action for emergency shelter or rapid response to flooding appears to exist in these cities. However, local people in poor communities have an acute awareness of the solutions that are required and possible.

Perceptions of solutions to the flooding problem

In Kampala, Uganda, considerable divergence of opinion on the prioritisation and sequencing of the necessary remedial actions that must be undertaken exists. However, there is an emerging consensus over what substantively must be done. This involves re-constructing the drainage system and enforcing

sanitation measures to manage garbage and solid waste better. Specifically, the following were mentioned by the groups and individuals met during ActionAid's fieldwork:

- build new planned houses
- technically construct a deeper and wider main drainage to accommodate the increased flooding water
- construct feeder channels that are covered to channel water into the main drainage
- have a permanent workforce to maintain and clean the drainage system
- proper garbage and solid waste disposal together with increased awareness of it
- strictly enforce by-laws on construction of houses and sanitation
- make stakeholders aware of their roles, responsibilities and duties in averting the floods, and the danger if their roles are neglected
- construct public toilets in slum areas in wetland places where it is expensive to construct private toilets for individual homes
- prohibit construction of human settlements in the remaining existing swamps and strengthen the building inspection unit of Kawempe division. In addition, the activities of the unit should be de-politicised to allow them take action impartially
- increase advocacy for increased budgets for improving drainage channels and flood-related control activities
- plant more trees, as was done before, along the main drainage channels.

In Maputo, Mozambique, local people told ActionAid that the solutions included:

- building secondary drains linking to the main one already existing
- cleaning up the main drainage channel that is now partially silted up
- removing all the houses built in natural flood pathways
- improving the drainage culverts under the N4 highway
- ensuring that local drains feeds effectively into the main drainage channel
- educational campaigns for the communities on flood avoidance
- creation of industrial zones outside cities and towns
- more public participation and involvement in resolving environmental issues.

In Nairobi, slum tenants thought that their possible interventions are limited, because of their high level of individual vulnerability and their exclusion from decision-making processes regarding the land that they occupy and housing tenure. However, they could form residents' associations to improve their own welfare and response to emergencies. They could partner with others to plant trees along the riverbank, dig canals, trenches and drainage next to their houses. Landlords should be prevailed upon to build humane and habitable houses and business premises. The buildings should be able to withstand floods. They should not construct houses near the river where they can be washed away during high flows. They should build toilets to contain human waste and avert disease outbreaks.



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Other recommendations by the Nairobi slum dwellers included:

- government reform of housing policy to compel landlords to provide basic services such as toilets, drainage systems and other sanitation facilities
- Nairobi city council to include informal settlements in their waste management programmes
- the council should ensure that there is proper planning and provision of essential services that can sustain people's lives and their livelihood
- the council should develop infrastructure including bridges, access roads and dykes along the river bank
- the Kenya government should relocate people living along the river to safer areas
- The government should reclaim the land as it did in the case in the adjacent upgraded Mathare 4A project.

People are aware of the solutions and have strong views on who is responsible for taking action. However, there are different levels at which the various stakeholders in flood mitigation can operate to contribute to creating solutions. This requires an analysis of responsibilities and actions, the subject of the next chapter.

Chapter 6: Responsibilities and actions

“Following a disaster, solutions that will directly benefit the poor are found at the micro level. As one disaster expert interviewed by the study team put it, governments have ‘thick fingers for such fine-scale work.’

Independent Evaluation Group, 2006

Responsibility: theoretical framework

The principle of local, regional or national action at the appropriate scale applies to managing urban flooding. Where the problems are essentially internal to a specific community, then that community should manage them. Where they lie totally within the boundaries of a single local authority, then the local authority should manage them, but where they cut across many administrations then national governments, or even international consortia, should manage them.

Applying this principle of management as close to the communities as possible, the management of localised flooding due to inadequate drainage should be undertaken by the local communities themselves. This is where local voluntary groups, assisted by national or international NGOs and with support from both local government and national disaster reduction organisations, could be highly effective. Local communities are stakeholders in the good drainage and rapid water removal from their own areas. They would benefit from their own actions in improving and maintaining drainage channels, prevention of the blocking of waterways and culverts by waste, installation of roof rainwater collection tanks for their own use and avoidance of construction on drainage lines. They could also organise local shelter for the people in their communities who are most affected by flooding.

Local authorities are best placed to cope with flooding from small streams whose catchment areas lie almost entirely within the built-up area. They administer the

regulations and by-laws concerned with land use planning and should be involved in local disaster management. However, most African local authorities lack the human resources and financial power to carry out such responsibilities effectively. They may be able to form partnerships with NGOs, but they should be supported by national governments and regional agencies to map flood risk areas, maintain urban stream channels, control building in flood channels and on flood plains and provide emergency assistance.

Where towns and cities get flooded by major rivers overtopping their banks, their flood protection has to be seen in the context of the entire river basin, which may include more than one state. Where a river basin lies within a single nation state, integrated river basin management principles should be applied by an agency cutting across ministries concerned with both rural and urban interests to ensure that activities in upstream areas do not worsen the flood situation for towns and cities downstream. For large, international rivers, river basin commissions are required to manage the water resources of the entire basin for the benefit of all communities in the different nations occupying the basin. Such management would include measures to mitigate flooding. In the Mozambique floods of 1996–1997, for example, the trigger was heavy rains in the Shire river basin. If the Shire and Zambezi rivers were managed as one basin system, it would have been possible to alleviate flooding in the Zambezi delta by manipulating Zambezi river flow, using the flood control capacity of Lakes Kariba and Kabora Bassa (IPCC Working Group II, 2001). Individual urban authorities may campaign for, or act to build, extra flood protection

embankments. However such works only serve to direct the flood waters elsewhere. The natural flood plain should be retained to hold flood waters and should not be built upon.

Cities faced with coastal flooding from the sea, or by a combination of high tides and high river flows from inland, have to integrate both river basin and coastal zone management, ensuring that the natural wetlands can continue to function as flood storage areas as far as possible. Where settlements already exist, filling of those areas to prevent flooding may be desirable, but the implications for adjacent areas need to be considered. Social factors may lead people to move on to other nearby wetlands.

Present practices

While these general principles are fine in theory, it is necessary to ask what is currently happening. In Ghana, as in other countries, relatively little has been undertaken by local government. Local authorities had not done any work on the drains and were not doing any cleaning and maintenance. The city's big drains were, *"choked with weeds and filth, while developers, possibly factory owners, have built structures and walls over some of the drains,"* the Ghana News Agency reported.

In Uganda, despite high sounding and noble ideals in the national disaster management strategy, the ActionAid research team found that the translation of the disaster management policy into practice is far from being realised. Local council leaders are failing to enforce regulations that govern building houses and sanitation. No district disaster management committee exists in Kampala district, and floods are not seen as a key issue afflicting slum dwellers.

Following the war and severe flooding in Mozambique, the government established a new organisation, the National Institute of Disaster Management, with the aim of assuring effective emergency coordination and establishing a new perspective, based on prevention. With this new organisation the annual contingency plans were institutionalised and are now part of the state general budget. The contingency plans are based

on forecasts made by the Southern African Development Community (SADC) for the rainy season, and the main objective is to identify the resources needed to mitigate disasters as well as identify the resources available that will be at risk to assure prompt intervention (the budgets are presented considering provincial and district numbers as well as by governmental sectors). The purpose of this exercise is a previous planning of intervention actions in case of occurrence of a disaster (floods, droughts and cyclones).

A policy of disaster management was also approved by the Mozambique government in 1999 and, with the consolidation of the second national poverty reduction strategy, a new master plan for prevention and mitigation of natural disasters was approved in March 2006, with a focus on reducing the vulnerability of those communities most exposed to natural disasters. The master plan is part of the strategy for poverty reduction for the period 2005-2009, and also addresses the issues at a national level, but does not give special attention to urban areas.

In Nigeria, disaster reduction is a key priority in such planning documents as the Poverty Reduction Strategic Plan and National Plan, but its implementation and the budget to carry it out remain problematic.

South Africa is showing some sensitivity to the needs of differing communities in the development of flood management programmes, Viljoen and Booysen (2006) noting that South Africa has a spectrum of communities with different circumstances, cultures, needs and expectations. These communities thus have different degrees of vulnerability to disasters and hazards. The challenge is for the disaster management strategy to be sensitive to all these differences.

The National Adaptation Programme of Action (NAPA) on vulnerability to climate change is funded by the Global Environment Facility (GEF) for least developed countries. NAPA aims to prepare urgent priority projects on adaptation by the sectors of society considered to be most vulnerable at the moment of climate change. The process of developing the NAPA for Senegal, Kenya and Mozambique involved a cross-section of

consultations with many stakeholders in the public and private sectors. This included non-governmental organisations and vulnerable communities. While the preparation of these plans showed that the respective governments recognised the losses caused by climate change, especially drought, floods and landslides, the NAPAs do not emphasise, or focus on the way flooding affects the urban poor.

The Hyogo Declaration (so named after the Japanese Prefecture in which the World Conference on Disaster Reduction was held in 2005) contains an international Plan of Action which points out that, *“Disasters in Africa pose a major obstacle to the African continent’s efforts to achieve sustainable development, especially in view of the region’s insufficient capacities to predict, monitor, deal with and mitigate disasters. Reducing the vulnerability of the African people to hazards is a necessary element of poverty reduction strategies, including efforts to protect past development gains. Financial and technical assistance is needed to strengthen the capacities of African countries, including observation and early warning systems, assessments, prevention, preparedness, response and recovery.”*

The Hyogo Plan of Action sets out a framework for national initiatives. Several African countries have produced national reports on the implementation of the Hyogo framework, including Eritrea, Kenya, Madagascar, Niger, Nigeria, Senegal, South Africa and Zimbabwe. These reports can be accessed and downloaded on the International Strategy for Disaster Reduction website: **www.unisdr.org/eng/hfa/hfa.htm** Other reports on Hyogo activities have been produced by Benin, Djibouti and Ghana.

The problem of involving others in Hyogo is illustrated by the situation in Kenya. In Nairobi, at the city council level there is limited knowledge of the existence of the framework, despite the existence of a national report on the implementation of the Hyogo framework (2005–2015). Although the report includes action to revive defunct District Disaster Management Committees, or creating them where they do not already exist, a critical reading suggests the report is basically describing what exists in terms of disaster preparedness and does not really show what is being done. To achieve the inter-

sectoral partnerships suggested by the Hyogo framework, steps are needed to create awareness and build capacity within the city council for the application of the framework and other relevant protocols and conventions for the needs of the urban poor.

International action

Internationally it is well recognised that climate variability is already a major impediment to reducing poverty and will become increasingly so given that a significant degree of climate change is inevitable (Environmentally and Socially Sustainable Development Vice Presidency and Infrastructure Vice Presidency, 2006). Immediate attention is needed for low lying coastal areas exposed to storms, such as the coastal cities of Africa. However, in assessing the country assistance strategies for Mozambique, Senegal and Kenya, only Mozambique mentioned disaster reduction as an important issue. Climate change does not feature at all in the strategy. Kenya adopts a strategy for reduction of vulnerability to environmental disaster but targets only rural areas. The Senegalese strategy makes no mention of climate change or flooding in any form.

UN Habitat emphasises that sound urban water management goes hand-in-hand with holistic, integrated land use management and sound land use planning. In most urban centres in low- and middle-income countries, either there is no coherent land use plan, or it is not adhered to by new enterprises, developers or squatters, and urban centre expansion is governed by where new investments are made. Thus development on flood plains occurs and consequent flood risks develop. UN Habitat advocates measures to constrain unregulated development and to protect catchment areas and flood plains.

The Hyogo framework promotes disaster risk reduction strategies that are integrated with climate change adaptation. It specifically calls for, *“The full, speedy and effective implementation of the enhanced Heavily Indebted Poor Countries Initiative, taking into account the impact of disasters on the debt sustainability of countries eligible for this programme.”* The framework foresees dialogue, co-ordination and information exchange between disaster managers and

development sectors. However, this will be slow in reaching the local governments and communities that need to work on alleviating urban flooding affecting poor communities. ActionAid's surveys found that, at present, local governments know little about the framework. Many however would be happy to cooperate in the types of partnership the framework envisages in order to improve service delivery.

Hyogo also calls for the promotion of, *"Community participation in disaster risk reduction through the adoption of specific policies, the promotion of networking, the strategic management of volunteer resources, the attribution of roles and responsibilities, and the delegation and provision of the necessary authority and resources."*

The readiness of local government to act, given the information and resources, as illustrated by the responses in Nairobi, shows that informed action at the local level is possible. Local initiatives to reduce vulnerability and increase community participation may be facilitated by training, capacity building and resource transfers. These kinds of efforts may require outside support and can be sustained through a network of organisations engaged in economic, social, political and scientific action and inter-organisational learning. Here is where international action of the type suggested in the Kyoto protocol is appropriate. The specific suggestion is that a "share of the proceeds" for the Clean Development Mechanism (CDM) (an arrangement under the Kyoto Protocol allowing industrialised countries with a greenhouse gas reduction commitment (so-called Annex 1 countries) to invest in emission reducing projects in developing countries as an alternative to what is generally considered more costly emission reductions in their own countries) shall be used to assist particularly vulnerable developing countries in meeting the costs of adaptation to the adverse effects of climate change. Some of that adaptation would be to assist the urban poor in flood prone areas. Already the international community has acknowledged the problems of low-lying areas in coastal cities, such as Accra and Lagos. However, flooding affects parts of nearly all urban areas, usually the parts where the poor live.

Other international decisions that have the potential for action and partnerships to alleviate the effects of climate change on urban flooding of poor communities are:

- The decision of the seventh meeting of the Climate Change Convention in Marrakech, 2001, to expand the scope of activities eligible for funding, including in the areas of adaptation and capacity building. The decision established: **1)** a Special Climate Change Fund; and **2)** a Least Developed Countries Fund that supports a special work programme to assist LDCs. The focus is initially on assisting LDCs to develop their National Adaptation Plans of Action.
- Support by the Global Environment Facility (GEF) for adaptation to climate change in developing countries through a three stage approach: **1)** support studies and planning; **2)** detailed planning and capacity building; and **3)** actual adaptations.

However, there are serious limits as to what international actions regarding adaptation can achieve. Such actions need to be developed in ways that support the adaptive capacity and resilience of vulnerable communities. Helping communities and local organisations to carry out the flood mitigation tasks that they can do themselves would integrate disaster management into the human development and slum upgrading process more fully. There is a clear challenge to international organisations to get their assistance operating effectively at the appropriate level. Such responsibilities extend to all major international donors, both governmental and non-governmental.

Responsibilities of donors

For the individual vulnerable slum dweller, flooding is a part of life. It is not something apart from health, apart from shelter or apart from education or work. Indeed, flooding affects their health, damages their home and belongings and temporarily prevents access to education or work. If flooding is so much part of the individual's life, then it, and similar disasters, ought to be part of any project aimed at assisting that individual. Thus, climate change, as one of the drivers of increased

flooding, deserves a place in all project planning designed to assist urban slum dwellers in Africa.

This plea for more holistic thinking in aid programmes must not fall on deaf ears. Flooding is linked to four of the Millennium Development Goal targets, as follows:

■ **Target 8: halt and begin to reverse the incidence of malaria and other diseases.**

Urban flooding carries water-borne diseases. Pools left by retreating flood waters can house disease vectors. Floods can spread E coli and other pathogens.

■ **Target 9: integrate the principles of sustainable development into country policies and programmes: reverse loss of environment resources.** Urban floods lead to water quality deterioration damaging aquatic ecosystems and fisheries.

■ **Target 10: reduce by half the proportion of people without access to safe drinking water and without sanitation.** Urban flooding affects shallow groundwater and surface water supplies and can carry human and animal wastes, spreading contamination and disease.

■ **Target 11: achieve significant improvement in the lives of at least 100 million slum dwellers.**

Urban flooding is an element of stress for urban slum dwellers. It can destroy homes and impoverish livelihoods, yet many slum dwellers have no option other than to build their shelters in hazardous sites.

Conclusion



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Climate change is aggravating the problems caused by the urban flooding that is regularly faced by poor people in African towns and cities. Poor people need urgent help to increase their ability to avoid these problems. They need help at the local community level to improve their options for emergency action and evacuation. They need help at the municipal level to improve drainage, regulate developments upstream and elsewhere that increase flooding in their communities, and give them greater security of tenure so that they can invest in making their homes more flood resistant. They need help at the national level, particularly to ensure that their needs are included in national disaster reduction plans and that these and other impacts of climate change are included in poverty reduction strategies. They also need international help to see that funding for adaptation to climate change is directed towards their problems. If Africa generally is a victim of climate change, it is the poorest of her people who will continue to bear the brunt of it unless swift action is taken.

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ActionAid International is registered as a foundation in Haaglanden, the Netherlands, under file number 27264198.