



Helping African cities prepare for climate change



According to United Nations figures, 40% of Africa's one billion people currently live in urban areas; 60% of this group live in slums without adequate water supply and sanitation. Urbanization in Africa is occurring at such a rapid pace that planning for services lags far behind. As a result, African cities are densely populated and plagued by high rates of poverty, weak infrastructure, and poor access to clean water and sanitation services. The effects of climate change will compound these challenges.

By the numbers

23.1 percent of Ghana's population lived in urban areas in 1960¹

43.8 percent lived in urban areas in 2000¹

45.4 percent of Ghana's urban population lived in slums in 2005²

Sources:

1. Statistical Agency of Ghana, Population Division (2008)
2. UN Department of Economic and Social Affairs

For these reasons, it is particularly important to manage water resources carefully, including stakeholders and using scientific information to support decisions. The task is complicated when urban and rural uses of water — for industry, agriculture, and households — are competing for the resources within the same basin. It is then crucial to take a holistic, basin-wide approach to meet the future needs of both cities and their rural neighbours.

URAdapt, a research project led by the International Water Management Institute (IWMI), is addressing this challenge, which is typical of urban centres in sub-Saharan Africa. The project focuses on Accra (Ghana) and Addis Ababa (Ethiopia). By generating new knowledge on the wider implications of urban water use and helping stakeholders from both urban and rural areas better understand how climate change will affect these issues, URAdapt aims to inform the strategic agenda for adaptation to climate change in Ghana and Ethiopia.

Local assembly representatives **Raymond Armah** and **Victoria Kudiwu** touring areas of Gbegbeyesi, on the outskirts of Accra, that have flooded even before the rainy season is truly under way.

Photo: IDRC / Joan Baxter

Using modelling to inform future plans

Computer modelling is a major component of the URAdapt project. Results of downscaling of global climate models are used as input to hydrological and water balance models to understand better the implications of different water management strategies of Addis and Accra in the long term. A vulnerability assessment framework has also been developed to identify areas that are most vulnerable when it comes to water supply, sanitation, and flooding. This framework is being applied in both cities; community participation in the research will shed light on how vulnerable communities build and sustain their resilience, and which public interventions are needed to support them.

In both study areas, modelling results are still preliminary. In Ethiopia, downscaling carried out using the RegCM3 climate model so far suggests a small increase in annual precipitation from 2030 to 2080. Though it appears there will be slightly more total annual rainfall, the distribution will change, with less rain likely in the minor rainy season from April to June, and an increase in rainfall during the major rainy season from July to September. While these results are initial, the scenarios allow researchers to pursue two paths of inquiry: to investigate how to adjust the design of urban infrastructure, and to study changes in hydrology and find out how they translate in terms of urban floods. Meanwhile, it is clear that for Addis, where water is sourced from dams fed by small upstream sub-catchments of the Greater and Little Akaki rivers, available volumes are small. In this context, research is continuing to explore water conservation measures at the city level that could counterbalance the potential impacts of rural development on these sources.

In Ghana, the downscaling research originally focused on Accra and the Densu Basin, but was widened to include the Volta Basin, which supplies part of Accra's water. Some communities within the city are chronically flood-prone, and residents report more frequent and intense flooding. The flooding has many underlying causes, including variable



According to Mary Quaye, who has lived on the outskirts of Accra her entire life, flooding in the community is a recent phenomenon.
Photo: IDRC / Joan Baxter

and sometimes torrential rainfall, land use patterns, and lack of infrastructure to handle storm water. Initial analysis projects an overall decrease in annual rainfall. In some cases, the occurrences of severe to extremely dry years had more than doubled. In this context, hydrological modelling was conducted to assess the impact of climate change and of water demand and allocation scenarios on water availability in the Densu Basin — the more sensitive of the two main basins supplying Accra. An initial assessment of the Densu Basin indicated a 20% to 40% chance of water scarcity. In comparison, Volta Basin surface water resources had a vulnerability index of only 3.5%. Such information, which has been lacking until now, will be very useful for planning decisions.

An assessment of the Densu Basin, near Accra, suggests a 20% to 40% chance of water scarcity.

In both cities, once climate change and hydrological modelling are completed, an urban impact simulation model (VENSIM) will be used to query the likely impacts of a range of demographic and water demand scenarios. This model will provide decision-makers at the local, basin, and national level with a much clearer picture of how various adaptation

strategies might protect both urban and rural populations. Once findings are consolidated within an integrated framework, the team will pursue targeted engagement to provide strategic policy recommendations.

Engaging stakeholders in science-based dialogue

Because of the range of sectors and stakeholders involved in the use and management of water resources, the team has formed a research-to-strategic-action platform (Re-SAP) in each city. Each Re-SAP brings together representatives of key water users, including utilities, community development associations, municipal agencies, and national ministries with mandates relevant to food and agriculture, disaster preparedness, and public health. These platforms provide input on the needs and interests of various stakeholder groups; at the same time, participants are being informed by the multidisciplinary research that the team and partners have undertaken. This research captures climate change and hydrological modelling, along with socio-economic change and vulnerability. In Accra, a smaller consultative group emerged from the Re-SAP to help provide strategic direction for



Poor drainage and sanitation in this canal increase the risk of flooding and threaten community health. Photo: IDRC / Joan Baxter

the project. Participants are offering valuable input on the structure and decision-making processes around water resource management and service delivery in Ghana. Engagement with the Re-SAP and the consultative group has allowed the research team to identify key “policy communities” in Ghana so that research findings can be strategically targeted to meet the needs of city, regional, and national authorities.

Faces behind the research



Liqa Raschid-Sally, Senior researcher, International Water Management Institute

As an environmental engineer with over 25 years of experience in urban planning and water and sanitation issues, Liqa Raschid-Sally knows well the intricate ties and tensions between urban and rural areas.

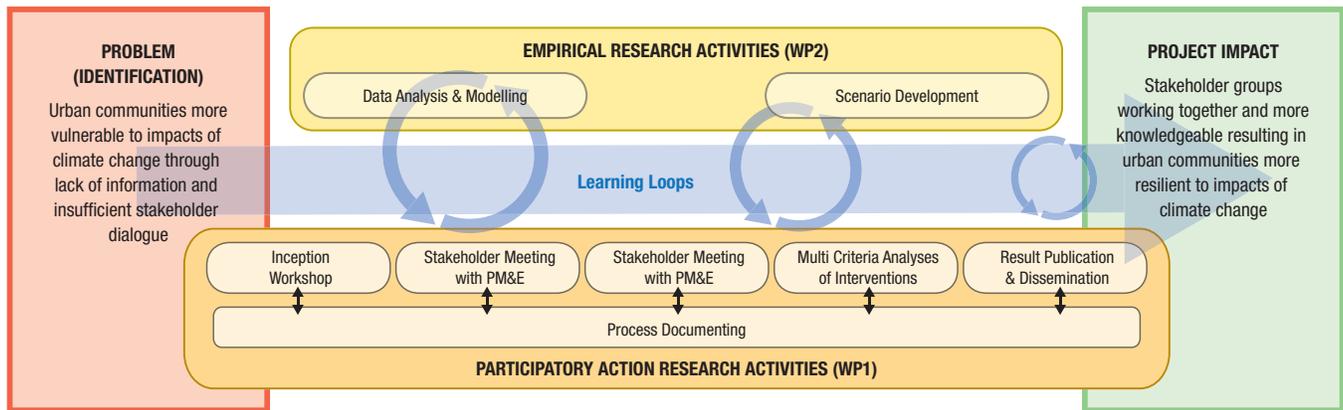
“You need to look at a city’s water situation in the context of the rural basin around it,” she says. “Hydrology is all in relation to a water basin. You can’t think of a city in isolation.”

As project leader, one of her chief aims is to help decision-makers in Accra and Addis Ababa better understand this interdependence between city and country dwellers, especially in light of their shared vulnerability to climate change. The key to reaching those who influence policies, according to Raschid-Sally, is to actively engage them.

“Externally driven research doesn’t always work. It makes a real difference having the prospective users of research involved. Being part of the process convinces you better than if information is brought to you and you are told, ‘This is the problem.’ By being part of the process — and I think this is human nature — you take on the responsibility.”

Photo: IDRC / Joan Baxter

Figure 1. URAdapt interactions between research and stakeholder engagement



The strategic action platform includes representatives of agencies and services from four national ministries, three departments of Accra’s Metropolitan Assembly (AMA), as well as research centres and development organizations looking at social vulnerability and inclusion. Ghana’s Environmental Protection Agency, which is spearheading the national adaptation strategy for climate change adaptation, has recognized the contribution that URAdapt can make and has given its commitment to the platform. The National Committee for Climate Change has likewise committed to take part in project activities. Meetings so far have revealed that other Re-SAP members have equally immediate and practical interests in applying the knowledge gained. The Ministry of Food and Agriculture, for example, is looking for knowledge that will help build the climate resilience of farming communities. Ghana’s Irrigation Development Authority looks to sensitize and educate farmers on more efficient water use and hopes the platform will help them to design more efficient irrigation systems.

Through dialogue, informed by science, the project is helping these stakeholders explore strategies for addressing climate change and urban growth to protect the vulnerable in both urban and rural settings.



Lydia Sackey, Director of Budgets at the Accra Metropolitan Assembly, is a member of the URAdapt Research to Strategic Action Platform.
Photo: IDRC / Joan Baxter

*The project Managing Water at the Urban-Rural Interface in Ghana and Ethiopia: The Key to Climate Change Resilient Cities illustrates progress toward CCA outcome area 4: **Policy processes are informed by good quality science-based work on vulnerability and adaptation and by the experiences of the rural and urban poor.***