

Counting rooftops: Innovative remote-sensing techniques chart poverty in Angola April 2013

http://www.idrc.ca/EN/Programs/Agriculture_and_the_Environment/Climate_Change_and_Water/Pages/ArticleDetails.aspx?PublicationID=1144

Home > IDRC > Programs > Agriculture and Environment > Climate Change and Water > Articles

Climate Change and Water



Luanda rooftops

CLIMATE CHANGE AND WATER INSIGHTS

IDRC Communications

A longstanding IDRC grantee combines satellite observations with old-fashioned grassroots data gathering to measure the impact of Angola's rapidly growing slums on the environment.

Since 2002, when decades of civil conflict ended, Angola has struggled to rebuild. Its planners are hampered, however, by a shortage of reliable data about their own country's population and environment. During the long conflict, Angola's cities mushroomed when the rural economy collapsed and many parts of the countryside became unsafe. An influx of poor people settled in the urban districts they could afford — that is, in slums that are vulnerable to flooding or erosion, and that lack basic services and economic opportunities.

Poverty, in other words, has a spatial aspect and a circular effect. The poor are likely to settle in environmentally sensitive areas where their presence is likely to exacerbate environmental damage, thus aggravating their poverty.

If Angolan policymakers were to take effective measures to tackle urban destitution and environmental degradation, they needed a clear picture of the geographic distribution of slum dwellers and of their social and environmental circumstances.

Development Workshop Angola

An ambitious IDRC-funded research project, aimed primarily at documenting the environmental impact of encroaching slums, has been painting this picture. The study was conducted from 2009 to 2011 by Development Workshop Angola (DW Angola), a non-governmental organization (NGO) based in Luanda.

DW Angola is the oldest NGO in the country. Since 1981 it has worked closely with government and with local community groups to provide basic services to Angola's impoverished and war-ravaged people. IDRC has supported seven major initiatives the organization has conducted. DW Angola was co-founded and is directed by architect and urban planner Allan Cain, a Canadian who has lived in Angola almost 40 years (and who is Canada's honorary consul there). Cain has been made an officer of the Order of Canada in recognition of his humanitarian work.

New and old survey methods

The study employed geographic information systems (GIS) technologies, or what might be called the merging of cartography and statistics (incidentally, Canada's Central Mortgage and Housing Corporation has worked with DW Angola to train Angolans in GIS capabilities). DW Angola applied the classic "inverse problem" approach that is familiar to remote sensing, namely, obtaining a reasonable estimate of the variable that interests you by counting a related variable that is easier to measure. In this case, the researchers estimated population distribution in part by counting rooftops.

The survey examined three dissimilar but representative municipalities: the mega-city and national capital, Luanda; a second-tier provincial capital, Huambo; and the third-tier town of Cachiungo. Technicians inspected high-resolution satellite images of these cities and, using a system of digital markers, mapped every rooftop. In Luanda alone over 900,000 buildings were electronically tagged. Since the data from the eye-in-the-sky is one-dimensional, however, the researchers also employed a team of on-the-ground local informants to supply additional details.

By way of observations, interviews, focus groups, and household surveys, these informants described the buildings and neighbourhoods in terms of such factors as their environmental vulnerabilities, socio-economic conditions, housing quality, and access to services. DW Angola's innovative blending of GIS technologies with participatory diagnostic methods is believed to be unique to this project. The detailed data were geo-referenced — pinpointed on the earth's surface — by various means. For example, Global Positioning System (GPS) instruments in mobile telephones allowed the informants to record the geographic coordinates of any place where an observation was made or an interview carried out.

Planning precision

After statistical massaging, this storehouse of information yielded the desired aggregates about environmental risks, land tenure, access to water services, and other urban conditions. Among these results were basic demographic models of the three cities, including reasonable estimates of their populations. A surprising discovery is that Luanda's population and growth rate appear to be much higher than had been believed — in fact, it is among the five or six largest African cities.

Another key outcome has been the delineation of homogenous districts, that is, areas that exhibit similar socio-economic conditions. The project's Luanda map, for instance, presents "old urban centre," "new suburbs," "bairro," "social housing zones," and so forth. Conventional political or administrative boundaries inevitably embrace a mix of social characteristics, but this new demarcation framework helps urban planners act with greater local precision.

Demand from government and activists

This data is in great demand by Angolan planners. DW Angola has used its new surveying tools to produce profiles of several other municipalities for use as planning baselines. For example, the Huambo administration asked DW Angola's GIS team to help construct Angola's first post-war municipal cadastre, a survey that will help secure land tenure for poor citizens living in that city's informal settlements. Furthermore, DW Angola has made all results, data, and the monitoring system available to local community associations so that they can better track the environmental improvement and poverty reduction programs promised by the government.

For more information: [Development Works Angola website](#)