

Climate variability and accessibility to water : factors of water security in informal settlements in Ouagadougou (Burkina Faso)

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Introduction

Better access to water is as much a factor conducive to development as its result. In many ways, water scarcity is the first component of the food security (FAO 2008). Furthermore, improved water access has many effects on human health and well-being. This effect is mediated by both the quality and the quantity of water available in a household. Greater quantities of water and a reduction in the risk of water contamination are two principal means of preventing the diseases transmitted through the faecal-oral route, such as diarrhea, which are a leading cause of death among children in sub-Saharan Africa (Dos Santos et al. 2015). Nevertheless, in terms of water access, sub-Saharan African cities are some of the worst off in the world, with 20 % of their populations supplied by an unimproved water source (WHO/UNICEF 2014). Urban growth of African cities is leading to the development of informal settlements that do not have access to basic services, including access to water (UN-Habitat 2014). Changes in both water supply (because of climatic variability) and demand (because of the increase of urban populations and economic growth) have caused many African urban dwellers to experience difficulties in meeting daily water needs. In light of climate change and the continued growth of urban population, there is concern that the gap between the supply and demand for clean water will widen.

In this communication, we want to document the difficulties, the diversity and the variability of access to water depending on the variability of the climate (across seasons) in an African capital-city characterized by both population and spatial expansions, Ouagadougou, the capital-city of Burkina Faso. We specifically want to analyze factors that can affect the water scarcity in households living in informal settlements.

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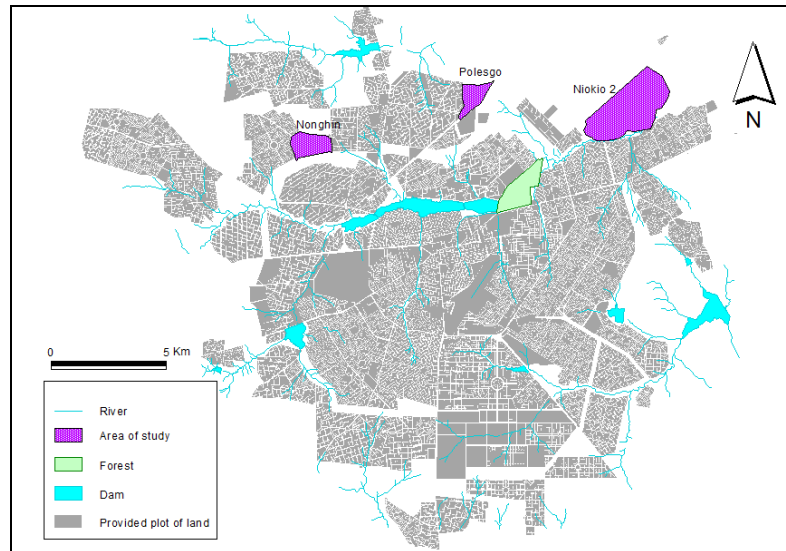
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Methods

The study was conducted in the Ouagadougou – Health and Demographic Surveillance System (Ouaga-HDSS) (Rossier et al., 2012) field site in 2012 and 2013.

Figure 1: Location of study sites, Ouagadougou Health and Demographic Surveillance System, 2011



It was a multidisciplinary project, for which one of the aim was to monitor the diversity and the variability of access and use of water in households, across seasons in the three informal neighborhoods followed by the Ouaga-HDSS (Soura, Dos Santos & Ouédraogo 2015). Four times per year, a questionnaire was administrated to the same representative sample of households (n=1496). It was composed by seven modules addressing issues as varied as the types of water supply, the conditions of collection and storage of water, the cost of water, the various domestic water uses as well as events of water scarcity in the households. In addition, a health module was administered on water related diseases occurring in the last 2 weeks preceding the survey for each child aged under ten years living in the household. To complete the dataset, water samplings was analyzed to test the microbiological quality of the water consumed by these households.

We first made some descriptive analysis on different modalities of water access, depending on the climate variability. We then estimated multivariate logit models to assess the effect of different factors of access to water and household related factors on the probability that a household had reported a water shortage (or scarcity) in the two weeks preceding the survey,

after controlling for demographic and socioeconomic variables. Self-reported water shortage was used as an outcome measure in this study.

Key independent factors were the main source of drinking water, the time needed to collect water outside the house, the practice of storing water and the use (or not) of an alternative source of water. In addition, socioeconomic variables of the household and neighborhood of residence were introduced in order to assess the effect of water factors all things being equal. Presumably, adding to the equation these controlling variables also proxies the effects of some omitted variables, allowing for a more precise assessment of the effects of water factors. All data were analyzed using STATA v.11 statistical software.

Preliminary results

Results show that population's adaptation to seasonal variability is high in terms of diversity and changes in the choice of water sources. This choice implies variability in the distance and in the price paid for water. To a certain extent, in some period of the year, people have not the possibility to choose between different sources: the scarcity lead to pay a high price and/or to travel long distances to a water fountain and, to limit the quantity for each domestic use or to alter the quality of water used. Results also highlight that a number of factors related to the accessibility to water are associated with water scarcity. More precisely, the principal type of access to water, the use of an alternative source of water, the storage of water and the duration at the water point are linked to events of scarcity of water in household. In addition, and as expected, the index of poverty and the number of members in the household are also associated with water scarcity.

Concluding remarks

Expected changes to the global environment have led to a burgeoning literature on climate change vulnerability and adaptation. A part of this literature focuses on developing higher-resolution climate models to better characterize uncertainty in the regional climate projections offered to decision-makers – the “top-down” methods. Another part of the literature addresses past and present climate variability and aims to reduce vulnerability, in a “bottom-up” approach. As social scientists, we want to contribute to this second part of the literature, as we agree with the geographer Richard Washington and his colleagues (Washington et al. 2006) that coping with present climate variability is in itself enough of a challenge.

As the issue of global water scarcity, combined with rapid urbanization, worsens in coming years, accurate water data at the household level will be increasingly necessary to support effective policymaking efforts.

From the results of this study, we have a broad picture and we can make first hypothesis on the future adaptation to consequences on climate changes in those informal parts of the city, and more generally in African irregular settlements. In particular, appropriate intervention programs targeting availability of piped water should be designed. There is also an urgent need for in-depth research on how the poorer households could face water scarcity in a cost-effective way without compromising their health.

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