

The search for water in urban Sahelian area
Analysis of original transitions: access and loss of running water in Ouagadougou

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Water is life. In many respects, the access to drinking water of good quality and adequate quantity can be regarded as a basic social service which everyone has a right. However, in Ouagadougou, 80 % of the households still spent hours in the daily search of drinking water.

The best way to have low cost and easily accessible water remains the access to water piped in dwelling. But, we show that this situation is still the prerogative of a small group of privileged people. And the most surprising, is that this access is far from being a definite asset. If 66 % have had at least once access to water piped in dwelling during their life, 64 % of them have lost it.

Based on a national survey gathered information of 2839 life histories in Ouagadougou, the analysis is carried out using longitudinal methods and proportional hazards models especially.

The availability of water is both a development factor and its result.

First, from an economic point of view, all industries need water to function, and running water to be more effective. From a micro-economic point of view, and concerning the household in particular, the availability of running water, because it avoids the hours spent in the daily search of water, enables to save time which can be possibly invested in income generating activities or in children's education. Moreover, the cost of one liter of water can be ten times lower for a household having a running water tap at home compared to a household deprived of this commodity and calling upon a water retailer. Such is particularly the case in Ouagadougou, the capital of Burkina Faso, where only 23 % of the households have a running water tap. Moreover, since water needs cannot be reduced below a certain threshold, a given minimal and daily water quantity per person is obligatory. And it is proven that the poorer the households are, the more the share of water in the expenditure is significant, especially to the detriment of other expenditure such as health and food (Adrianza and Graham, 1974).

Now, from a social point of view, the profit in life quality generated by a more quantitatively significant and easier accessibility is undeniable. Regarding public health, if studies are contradictory on the beneficial effect of an improvement of water supply on health (Shuval et al, 1981; Walsh and Warren, 1979; Prost, 1996), however, the risk related to some sensitive pathologies to individual hygiene practices (water-washed diseases " according to White's terminology (White *et al.*, 1972)) is reduced, even null when water becomes available in unlimited quantity (Prost and Négrel, 1989). And the best way to have low cost and easily accessible water remains the access to a private or semi-private running water tap.

Thus, in many respects, the access to running water can be regarded as a basic social service and everyone has the right to it. In this regards, its difficult access shows the existence of iniquity and a barrier to development.

This communication aims at a better knowledge of the access to this basic service which is running water in the capital city of Burkina Faso. By running water, we mean the connection of a housing or yard to the water distribution network of the Office National de l'Eau et de l'Assainissement (ONEA), the national office of water and cleansing. This connection can be a private one, i.e. at least a tap located inside the housing of the household, or a semi-private tap, placed in the yard and shared by the various households in the yard. This denomination therefore excludes the supply at public taps, though they are supplied by the drinking water from ONEA.

In West Africa, private or semi-private running water is still the prerogative of a small group of privileged people. Because urbanization is often fast and poorly controlled, conflicts between the population and the environment are exacerbated. Thus, the lack of hydraulic and health related equipment and their deficiency are a characteristic environmental problem of major African cities and megalopolis, and more generally in developing countries. The demographic pressure, induced by rural migration in particular, coupled with the generalization of the individual house, have contributed to the high development of urban space. Under such conditions, supplying all the urban territory with running water requires setting up a proportionally wider, and therefore very expensive network. While the resources of the authorities are weak, running water supply is quickly exceeded. But as usual, the poorest populations suffer from this dysfunction.

This communication consists of four parts. First, we will examine the modes of water supply in the Burkinabe capital compared to other cities of the sub-region in order to illustrate the diversity of the situations regarding this data. Then, we will follow the populations in their search for running water through their residential move, by the method of the multiple decrement life tables. Finally, we will highlight the factors that can accelerate or slow down, on the one hand, the first access to running water and, on the other hand, the loss of this access to running water. Indeed, we will see that this access is far from being a definite asset.

The data used come from the national survey "*Dynamique migratoire, insertion urbaine et environnement au Burkina Faso*" (EMUIB) jointly carried out in 2000 by UERD, CERPOD and the Department of Demography of the University of Montreal. We have more than 9000 life histories on Burkina on the whole including 2839 in Ouagadougou (Poirier *et al.* , 2001). Of all the investigations based on the life history methods carried out for ten years on migration and urbanization in West Africa, EMUIB is one of the rare to have a complete event history component on individuals' domestic environment. The history survey is made up of five components, among which the last four are retrospective questionnaires, each corresponding to an aspect of an individual's life: family origins and childhood, the residential mobility including the characteristics of all the residences, economic activity, matrimonial history and reproductive history and children's development only administered to women. Thus, the data of EMUIB in particular allow, at every point in time, to know the characteristics of individuals' housing from their 6th anniversary up to the survey date. For instance, and for each new residence, we have the type of water supply at the beginning of residence, the one at the end of residence and, if necessary, the year of change of the type of supply in the course of residence.

The event history analysis enable us to go beyond the classical transversal analysis of water supply and to consider the various states crossed by an individual. From the residential route, we will try to understand the articulation of the access to running water in the various stages of an individual's life, professional life, family life and migratory move in particular, in order to better understand the conditions under which the first access to running water and the loss of this access occur.

First, the descriptive analysis of the two phenomena considered will be based on the functions and parameters of the survival curves. For instance, the function of survival in the state of having no running water regarding the study of the first access to running water and the duration in the state of having running water as regards the study of the first loss of running water.

Secondly, we use the Cox's proportional hazards models to study the process of accessing and losing running water (Allison, 1984; Courceau and Lelièvre, 1989). This model can be considered as a regression where temporal dimension would have been introduced: the regression is then made on the characteristics of an individual, not acquired at the end of his life, but on those acquired each year of his existence until the moment of the survey (Antoine and Piché, 1998). Thus, independent varying covariates can be introduced into the model of regression. The interpretation will take into account the change of the

individual's state during the period and therefore a variable risk in time according to given states that follow one another. The two dependent variables that one seeks to explain will be the instantaneous probability of shifting from the state of having no running water to that of having for the first time access to running water and, the reverse, i.e. the instantaneous probability shift from the state of having access to running water to that of having for the first time no water running. Let us recall that there are two ways to carry out these two transitions: an individual can have or lose access to running water by change of residence or by a modification carried out in the course of residence.

The migratory process was especially chosen for the development of the two models. We initially distinguished the natives from the non-natives of Ouagadougou. To be native is to be born in Ouagadougou or to have arrived in Ouagadougou before 6 years old. To be a non-native is to be born out of Ouagadougou and to have arrived in Ouagadougou after 6 years old. The migratory status as defined thus seems fundamental in several studies carried out in particular in Dakar and Bamako (Antoine et Al, 1995; Ouédraogo and Piché, 1995). Individuals born in the capital would be better established in their city compared to the migrants, because they have a broader family network which facilitates their insertion in the various spheres of urban life. On the other hand, the individuals born outside the capital would have a less broad network of reception and mutual assistance. However, in African cities, residential strategies are mainly developed on the basis of family network (Locoh, 1988; Osmont, 1987). One could thus assume that access to a housing with running water came from the same processes and that this access would be faster and more significant if one were a native.

Independently of the birthplace, we have considered the migratory move of the individuals, and in particular if they had left at least once the capital to return there later on, by making the difference between individuals who returned to the village from the individuals who came back from abroad, especially from Ivory Coast.

On top of the life cycle variables (Rossi, 1955; Bonvalet, 1994), we took into account the status of occupation in the housing. This variable seems particularly significant in the context of West Africa. Indeed, by leaving the rental market or lodged status to own their house, it came out that some households will totally accept to reduce the quality and comfort of their habitat and less access to basic urban services and infrastructures (Marcoux et al, 1995). In Bamako for instance, some households leave the rental market to acquire a plot with no access to water nor electricity in the suburbs at a price almost equal to their annual rent in the central districts of the city, in order to have more space as it seems (Yattara, 1987). In the same way, still in Bamako, there is a relation between a high percentage of occupying owners and less equipped residences (Morin and Gingras, 1995; Morin *et al.* , 1996). Moreover, the improvement of the conditions of habitat would take different forms depending on the occupation status and would go through the residential mobility for lodged persons and tenants and by the modifications of the housing for the owners (Van Westen, 1987; Van Lindert and Van Westen, 1991).

Results indicate that the migratory course is a particularly discriminating variable but not necessarily in the way one would expect it. Indeed, residences with access to running water are reserved to two types of very different group of people. On the one hand, a minority of the population, downtown residents, owner of their housing in which these households are definitively settled. Or they are provisional residences, often for renting, for households in wait for their own property in the non developed parts of the city, and not having basic urban services like running water. These households in rent carry out an activity in the formal sector, which enables them to pay their rent fees each month.

But since these residences are especially provisional ones, non-natives of the city get access to them most quickly, especially those who went away and came back more than once between Ouagadougou

and the outside city. However, migrants move out of this type of housings as fast as they had access to them, the duration of stay being shorter for non-natives compared to natives.

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