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# **Problem of land use and water supply in urban area: the case of the city of Touba, Senegal**

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## **Abstract**

This study focuses on the relation between land use and water supply. It results from direct observations coupled by semi-structured interviews with local actors. In urban areas of Senegal, water is drawn from two sources, from the drinking water network and from traditional wells. Our study focuses on the city of Touba, a city which is singled out by its recent character (new city) and by her religious inclination (religious city). The natural conditions are unfavorable: low rainfall, depth of the groundwater with wells brought up rates in salt and fluorine. Two types of land use have been identified in the city: a traditional occupation and modern occupation. They have real consequences on water supply. A city of 700000 inhabitants, Touba hosts two millions pilgrims every year. Water quality and the quantity have always been the main problem for the people and pilgrims. The first consequence of water lack is unhealthy. Water-borne diseases caused by pathogen agents appear in this city so endemic.

## **Keywords**

lack, pathogens, quality, water borne disease, water supply, well

## **INTRODUCTION**

The galloping demography of black Africa countries and the exponential urbanization of some cities of the continent so disparaged just after independence (1960) that it does not seem to be ready to stop. At the beginning of the 3<sup>rd</sup> millennium, a new urban mapping is taking shape: we talk about urban revolution. Next to the ancient city, some new cities came into existence, the same case with Touba Senegal, very recent city. The cities of second generation contribute certainly to ease congestion in capitals and to readjust the urban mapping. But like the old cities the new cities also have certain problems such as poor planning systems, anarchic land use, deficient water supply, no sewerage systems etc.

This essay is about the relationship between the systems of drinking water and land ownership in urban areas. This is not an exhaustive essay because it needs more research for the problems to be identified and because of the time constraints it is difficult to do the thorough analysis. The study carries reconciliation, generally speaking, on the concept of sustainable development between fast economic growth and the environment. But in this particular context, we are talking about the relationship between population growth in Africa and its environment. Indeed, in countries with low economic development, demographic weight drastic affect on the environment.

This study in the first part describes the city of Touba, what makes its prominent, is the way the space is occupied and used. Touba the religious city suffers from the problem of limited water supply. Touba is a holy city, but because of contaminated water it seems literally “mucked up”.

This study will try to cover this subject in the second part, and finally, the last part will focus on inherent health problems associated with the water in Touba.

## **MATERIEL AND METHODS**

This work examines the relations between land usage and water supply in urban areas. It results from direct observations coupled by semi-structured interviews with local authorities, people and doctors. We visited some drillings, health centres and interviews some families. Basically our methodology can be broken down into three steps:

### **Documentary research:**

It allowed the collection of secondary data and guided us to visit the chosen places and interview the most likely affected families.

### **Semi-structured interviews**

Our study is based on a qualitative approach purpose of which is get from the locals first hand information. Thus we discovered that it is in the relations of one-to-one debate that the locals devote themselves more and we benefited from their personal experience.

### **Observation**

Our presence in the field has enabled us to witness what the locals face to get basic supply of water. Easy access to water is not an easy mean in Touba. The locals travel about 20 miles to get access to drinking water which might not be clean water.

Keep in mine that this study was made easier by the various people whom we met during our field visit and was able to provide us with accurate information we need for this research. We like to take this opportunity to thanks them for all their support and wish them all the best.

## **TOUBA: BETWEEN TRADITION AND MODERNITY**

Located around 200 km east of Dakar, Touba is a Muslim holy city of the mourid brotherhood. The city of Touba was founded in 1887 by Sheikh Ahmadou Bamba. In just few years of urbanization, Touba has become the second biggest city in Senegal after the capital Dakar. With an area of over 20,000 hectares, its urbanization was mainly facilitated by a paternalistic land system, based on donation or a free attribution of plots, but also marked by speculation. The development of the city is link to the great pilgrimage which celebrates every year the departure into exile of the founder of the mourid brotherhood, Sheikh Ahmadou Bamba. This pilgrimage called “magal” means, celebration in Wolof. The intersection between the town and the village makes Touba in between tradition and modernity. So that is one foot in the city, an other one out. This gives to the city a mixed configuration.

Located in the Senegalese peanut basin, Touba is facing a growing desertification hence the drop in profitability of agricultural activities. Rainfall is increasingly weak; it varies between 300 and 600 mm of rain per year. Due to its geographical location, the city of Touba has Sudano-sahelian climate hot and dry. In the dry season, it is subject to the influence of hot and drying harmattan in the daytime and cool at night. Temperatures range between 27 and 46 °C. The soil type is Dior, very sandy therefore very often degraded and washed. Its water retention capacity is very low. The depth of the water table is 25 m.

In 2007, according to official estimates, Touba has about 700,000 people. The religious inclination of this city makes the population can increase up to 2 millions people during the “magal” annual religious appointment due to pilgrim from around Senegal. Touba record the

strongest population growth of settlements of Senegal, more than 10%. According to an unofficial source, this growth would increase by 19% in 2020. This growth is owed to the influx by the migration of villagers and even some city dwellers to the city of Touba. Most of the villages around the city are almost empty due to this migration.

Two types of land use have been identified in the mourid city. The first said traditional rhythm with the patterns of life of the occupiers. The voluntary migration of rural people toward Touba driven to an anarchic occupation of the area. According to our interlocutor, the country population which migrate to Touba has tendency once installed in the city, to rebuild their own environments and to extend the same socioeconomic practices. This is due to socioeconomic reasons.

Indeed, the new urbanites justify their arrival in town by the difficult living conditions for their place of origin. They come in effect from villages hit by an impairment climate, with a weak rainfall and combined with the drying of wells. But these people are in danger by living in the outskirts of Touba. Because they are not too keen of hygiene while the quality of water which they use doubtful. These add to the low endowment in health infrastructures. These rural newly installed in urban areas, are not used to visiting the hospital quickly in the event of occurrence of the first symptom of disease. As long as they are not seriously ill, they won't see a doctor. They are therefore at the mercy of water-borne diseases because, in the lack of treatment started quickly, cholera for example can create a quick and strict desiccate.

The second type of occupation says modern is a form of contemporary occupation. Residents are building modern houses. It is urban dweller's fact in retirement or immigrants who are in developing countries. This rush toward Touba of dwellers from other cities is due to religious factor, the majority of people who migrate to Touba consider their trip as an impetus to the rapprochement of the great holy city. In the individual and collective representation of these people, this rapprochement is a religious accomplishment. Unlike the old rural, they are more attentive to the basics of hygiene. They tend to bleach for example watershed water before consuming it. In addition, in case of demonstrations symptoms of diseases they rushed to hospital. Anyway, this migration has real consequences on the health plan. Often located in the urban fringe, these newcomers do not have easy access to the drinking fountains and they have no tap at home. While living in an urban environment they travel thousands of meters to obtain water. Because in the city of Touba, networks drinking water do not cover the whole urban area, the paradox is that the infrastructure of drinking water and as well as sanitation systems do not evolve at the same pace as the city. The offer is becoming increasingly lower than demand. This is the paradox of Touba.

### **WATER FROM TOUBA: AWARE OF DANGER**

Can the rural water supply provide for the urban environment? That is unfortunately the peculiarity of this city. Despite its rapid urbanization and its high population growth false, water supply is always provided through the drillings and wells. Touba is synonymous with lack of water; and also rhymes with waterborne epidemics. Since, 20 years this "City of God" suffers from the lack of water. If it is not the lacking of the quantity so, the quality will be problematic; however water of Touba has always had a bitter taste. Indeed, the city is still confronted with a problem of salinity. Most capture groundwater wells with high levels of salt and fluorine. Generally higher than those recommended by the WHO (World Health Organization): 1.5 g / l for salt and 0.5 to 1.5 m / l for fluoride.

Despite the existence of 17 drillings in the city and over 150 linear kilometres for the supply, the water supply is worst during “magal”, because during “magal” the city dropped abruptly to 60000 cubic metres of water daily to 600000 cubic meter because people have switched from 700 000 to 2 000 000 people. During this period, water is placed under surveillance in the city because whenever there is water shortage, the local population and the pilgrims use the pools open and wells. In Touba during watershed people use the wells or the basins, a kind of tank to cope with water shortages. For the magal administrative and religious authorities ensure lot of water. In case of disruption of supply, they are trucks away from supplying the city during this period to prevent the population and pilgrims to consume water from the basins. During a visit to a house on the outskirts of Touba we asked the mother “*how long this water remained in the basin?*” She answers, “*Since 9 days.*” “*Are you going to drink this water whenever there is water shortage?*” She answers again, “*Yes we are going to drink it. It is used whenever there is water lack. You know Touba is a dry zone, we run out of water very often is why we are taking our precautions.*”

Epicentre of cholera Touba is also the breeding ground for water-borne diseases. According to the point of view of doctors, the water problem is the hub of the spread of cholera vibrio in Touba. All patients hospitalized with cholera in the department of infectious diseases have been to Touba during the magal. This revelation is from the head doctor of Infectious Diseases of Dakar. Each year, more than 50 cases of cholera were hospitalized at the department of infectious diseases. *When an individual does not have access to drinking water, he drinks anything. And all cases received the services of Infectious Diseases have in common the fact that they consumed water from wells, the water that comes from the watershed, a kind of open wells. But, warns the head of Infectious Diseases, 'until there managed the water issue in Touba and the problem of septic tanks every year, we may have to cope with outbreaks of cholera '.*

In water diseases, as soon as there gathering of people and there is no access to drinking water, there is a risk of cholera. The problem of cholera is not a medical problem, but a problem of quality of life. It is a health problem; the environment is an issue of environmental sanitation, access to clean water, live in conditions that have latrines, and so on. And for the prevention of this disease, there must be drinking water available to the people, sensitise them to respect the basic rules of hygiene such as washing hands before touching food. Touba is also an unhealthy city. There is acute a real problem of waste management. Indeed, the city has neither adequate sewerage system even less of an efficient service for the collection and disposal of garbage. This is reflected by a proliferation of wild depots near homes and the disposal of domestic sewage on the public highway. The city is characterized also by the absence of a network of storm water and sewage. The sewerage system missing and cesspits built mostly in the streets without adherence to standards sealing and sizing, expose people to a serious health and environmental problems. In terms of aesthetics, the city presents a face not at all bright with runoff water valves along the narrow streets. These waters loaded mostly viruses and bacteria seep into groundwater causing his infection. According to a hydraulic officer of the city, except one drilling on 17, all others have revealed the existence of pathogens so, each drilling need a kit for detecting microbes to better secure but before that he adds, people should make effort have to bleach water from drilling before use. According to a study, from 2005, 3.8% of households emptied the contents of their septic tanks in the courtyard of their homes, 9.5% in the street, 2.4% were not emptying.

### **CONCLUSIONS:**

The urbanization of African cities across all exceeded their willingness and openness. But this urban dynamic is only demographic. Precisely, it is the population growth that has changed the face of Touba. To better enjoy the city, African countries must control their population because an uncontrolled population will lead to uncontrolled urbanization therefore doomed to failure. Controlled urbanization means to supply the area with good quality and sufficient water. It is also provided the adequate sanitation facilities.

In essence, the problem of water is still the first and main problem for cities dwellers. In Touba, as in most of Senegalese urban areas, the water problem is seen as the main factor of vulnerability to multiple repercussions. The first problem of this water lack is notorious unhealthy found especially in urban areas. This unhealthy also has a profound effect on people's health. So there should be a better balance between land use and water supply. In Touba, water is a risk, a real risk. Worse water from the city of Touba is a danger, a danger that has claimed many victims. Because the networks of safe drinking water may not cover the whole urban area and there is also the quality of water infected largely due to the absence of inadequate sewerage. Yet in this city, water can become a resource if local authorities and government take necessary measures. Who said water is priceless?

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